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A STUDY ON JOB SATISFACTION:-THE CASE OF BIOMEDICAL ENGINEERS ATADDIS ABABA PUBLIC HEALTH FACILITIES

BY

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LIST OF ACRONYMS

FMOH Federal Ministry of Health

AACAHB Addis Ababa City Administration Health Bureau

EPHIE Ethiopian Public Health Institute

PFSA Pharmaceuticals Fund Supply Agency

HTM Health Care Technology Management

EFMHACA Ethiopian Food, Medicine and Health Care Administration and Control Authority

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ABSTRACT

The purpose of this study is to determine the level of employee job satisfaction at Addis Ababa public health facilities and find out possible aspect of improvements. Data for this study were collected from biomedical engineers at Addis Ababa public health facilities. Data collection method was made through questionnaires for staffs and interviewees for directorates and case team leaders. The sample consists of 133 biomedical engineers at Addis Ababa public health facilities. The data collected from the questionnaire were analyzed in statistical tools such as frequency and percentage. The study is more of a qualitative research and descriptive analysis has been performed to determine employee job satisfaction. The findings of the study showed that most of employees were dissatisfied with wages paid for the work they do and having incentive wage schemes for their best performances. The findings also showed that most employees of each health facility has low job security and not paid any risk allowances so that they feel as they are non valued. As illustrated from the findings senior management of the health facility does not encourage creativity, innovation, and continuous improvements of quality services done. Not only in working conditions but also most of employees were dissatisfied on the present working environment at their respective health facilities. The results of this study confirmed that the employees were found to be most satisfied with relationships with co-workers but most of employees were dissatisfied for medical equipment workshop and its maintenance toolkits as well as on faire distribution of work assignments. The major suggestion forwarded from the results of study I recommended that the organization has to achieve biomedical engineers' job satisfaction by giving service training on medical equipment, HTM training, working on present working conditions and environment, letting them preparing technical specifications for all new medical equipment before procuring, and making them participating actively in logistic process of any medical equipment while importing to their respective health facilities.

***Keywords**: working conditions, biomedical engineering, working environment, job satisfactions, and medical equipment workshop.*

CHAPTER ONE

INTRODUCTION

This chapter addressed the introductory part of the research. It basically includes background of the study, role of biomedical engineers, statement of the problem, research questions, and research objectives, significance of the study, scope of the study, limitations of the study, and organizations of the study and definition of basic terms.

1.1 Background of the study

Job satisfaction has been defined as the favorable or unfavorable subjective feeling with which employees assess their work (Newsroom JW, Davis K.10th ed. and McGraw-Hill 1997). As employees are the back bone of any organization, without employees any type of work can't be done. Therefore employee's satisfaction is very important. The effectiveness and success of an organization relays on the people who perform and work with the organization. Employees in an organization to be able to perform their duties to change environment and to give meaningful contribution to the success of the organization goal. They need to acquire the relevant skills, working condition, reasonable reward, job securities, work status, appropriate company policy and administration, good interpersonal relation among the employees, and all things that employees can motivate and satisfy need to a take into account. This study will explore the factors affecting job satisfactions of biomedical engineers in Addis Ababa public health facilities. Having this information in mind, healthcare technology personnel play an extremely important role in everyday clinical and public health work. If they are properly handled, they can contribute a lot to increase greater efficiency for diagnosis and therapeutic technologies as well as to reduce the time needed for investigations, treatment, and rehabilitation. For these reasons, it is important to take great care for biomedical engineering employees' job satisfaction. Job satisfaction has been widely studied in many fields, including health care services.

Health sector is labor intensive where quality of patient care services are directly related to worker's satisfaction with their job, motivation and their readiness to apply resources to the task at work place (http://dx.doi.org/10.1186/1478-4491-1-9([PMC free article)(PubMed).

Job satisfaction presents a set of factors that causes a feeling of satisfaction (Aziri 2011). Job satisfaction represents a combination of positive or negative feelings that workers have towards their work. Job satisfaction represents the extent to which expectations are and

match the real awards. Job satisfaction is closely linked to that individual's behavior in the work place (Davis and Nestrom, 1985).

Satisfied employees tend to be more productive and committed to their jobs (Alhussami, 2008).

Employee Job satisfaction is the rate of enjoyment people receive from their work. This research evaluates employee job satisfaction of biomedical engineers at Addis Ababa public health facilities. It focuses on the importance of employee job satisfaction factors and their impacts on the overall job satisfaction of employee.

Biomedical engineers combine engineering principles with medical (the branch of science concerned with the study of the diagnosis, treatment, and prevention of disease) and biological sciences(studies life and living organisms, including their physical structure, chemical processes, molecular interactions, physiological mechanisms, development and evolution) to design and create equipment, devices, computer systems, and software used in healthcare.

A biomedical engineer is someone who analyzes and designs solutions to problems in biology and medicine, with the goal of improving the quality and effectiveness of patient care. They work in manufacturing, universities, hospitals, research facilities of companies and educational and medical institutions, teaching, and government regulatory agencies.

Biomedical engineers develop materials, processes, and devices that help prevent or treat disease or rehabilitate patients. The areas of specialization for biomedical engineers include biomaterials; bioinstrumentation; biomechanics; medical imaging; rehabilitation; and cellular, tissue, and genetic engineering (https://www.teachengineering. org/content/wpi_/activities/wpi_broken_bones/introduction.pdf) Biomedical engineers who specialize in biomaterials develop materials that can be safely implanted in the body. Engineers who work in biomechanics apply principles from physics to biological systems. They develop artificial organs, such as the artificial heart. Engineers who focus on bioinstrumentation use computers or other electronic devices to diagnose or treat disease. A rehabilitation engineer helps improve the quality of life for people with disabilities. Tissue and cellular engineers grow cells outside of the body to be implanted in the body and serve some function. Genetic engineering is a related discipline in which an organism’s DNA is altered so that different proteins will be produced. Genetic engineering has many applications in drug production.

Job satisfaction happens when employee feel fulfilled by their job and it allows them to have a sense of achievement. When this does not happen, job dissatisfaction may result (Bloisi, 2007). Job dissatisfaction matters to organizations, to managers, to customers and perhaps most of all to employees. Job dissatisfaction by definition is unpleasant, and most individuals are conditioned, probably even conditions by searching for mechanisms to reduce the dissatisfaction (Rosse and Satury, 2004). Thus, dissatisfaction of all employees with their jobs/works is very dangerous, because job dissatisfaction is a part of life dissatisfaction. It is the unfavorableness or unpleasant within which employees view their work. It expresses the amount of disagreement between one's expectation of the job and the reward and work conditions that the job provides. So, this study identifies the root causes and factors contributing to employee job satisfaction, for which being a main factor for high level of employee productivity, loyalty and reducing the effects of turnover. Biomedical engineers/technicians as it is known are the backbone of any public health facilities. They are the most valuable and important asset among all other assets of any public hospitals and health facilities.

1.1.1 The role of the biomedical engineering services in healthcare facilities

The role of biomedical engineering is to meet challenges by providing safe and effective management of technology used for patient diagnosis, therapy and monitoring within healthcare institutions (Bronzino, 1992). This implies involvement in all phases of the biomedical equipment lifecycle including equipment selection, acceptance testing, training in safe and effective use, equipment safety, maintenance and final disposal or replacement. Biomedical engineers are responsible for explaining new technologies and their impact on operating costs, as well as for translating technological ideas, problems and concepts into a non-technical language so that a wide range of people (i.e., outside the biomedical field) can understand those concepts with ease. Moreover, biomedical engineers are uniquely qualified to understand the many detail of medical devices and the various levels of equipment alarm operations related to clinical parameters. Engineers tend to have a very good understanding of the inner workings of medical devices, and are good at picking out situations where clinical staff may run into difficulties when using a certain type of device or feature (Keller, 2006). Trip and Drea (2002) suggested that if clinicians are satisfied with the quality of service provided by the biomedical engineering department and have a good working

relationship with members of the biomedical team; this will increase the biomedical engineering department's profile within the hospital. It is essential that service providers (biomedical engineering departments in Addis Ababa public hospitals) are aware of their internal customers' (clinical staff) perceptions of the services provided, as those perceptions are linked to achieving customer satisfaction. It is important to understand how medical technology is currently managed in Addis Ababa public hospitals to maintain quality and customer satisfaction. This phenomenon encouraged the current study of job satisfaction of biomedical engineers in Addis Ababa public hospitals.

1.2 Statement of the Problem

Biomedical engineers as it is known are the backbone of any public health facilities. They are the most valuable and important asset among all other assets of any public hospitals and health facilities. Employee Job satisfaction is one of the most important determinants that influence employees' behavior and work outcomes. If employees are not satisfied, it is important to identify the factors for dissatisfaction and solving these factors which let the employees dissatisfied. The senior management of the public health organizations did not work on biomedical engineers' job satisfaction to achieve the desired objectives respective to medical equipment management of the organization. The nature of biomedical engineering work engages semi skilled and skilled workforces or employees and is executed by the support of maintenance toolkits/equipment and calibrators. The description of this research problem understands the factors contributing and outcomes of biomedical engineers' job satisfaction, and its proper handling or managing in the public health facilities. Generally the absence of conducive physical working environment, medical equipment management systems/rules, medical equipment workshop structure, maintenance toolkits and medical equipment calibrators, training availability and benefits are the factors of job satisfaction for biomedical engineers.

The research problem stated that biomedical engineers from Addis Ababa public health facilities moved to private companies and other similar organizations. Due to this fact this most public health facilities are failed to attract and retain highly qualified biomedical engineers.

1.3 Research questions

1. What is the practice of managing working conditions of biomedical engineers at Addis Ababa public health facilities?
2. How is the biomedical workshop in the health facilities established to satisfy the biomedical engineers' safety need?
3. Does the lack of well equipped maintenance toolkits and medical equipment calibrators affect the job satisfaction of biomedical engineers?
4. Does the lack of trainings affect the job satisfaction of biomedical engineers?
5. Does the physical work environment affect job satisfaction of biomedical engineers?

1.4 Objective of the study

1.4.1 General objective of the study

The general objective of this research is to study Job Satisfactions of biomedical engineers at Addis Ababa Public Health Facilities.

1.4.2 Specific objectives of the study

The specific objectives of this study are listed below:

1. To investigate the practice of managing working conditions of biomedical engineers at Addis Ababa public health facilities.
2. To identify how biomedical workshop in the health facilities is established to satisfy the biomedical engineers' safety need.
3. To determine the lack of well equipped maintenance toolkits and medical equipment calibrators affect the job satisfaction of biomedical engineers.
4. To assess the lack of trainings affect the job satisfaction of biomedical engineers.
5. To investigate the physical work environment affects job satisfaction of biomedical engineers.

1.5 Significance of the study

The significance of this study is to understand the job satisfaction of an employee and what factor influence job satisfaction:-the case of biomedical engineers at Addis Ababa public health facilities. The study also facilitates further studies by other researchers who have an interest in understanding of job satisfactions:-the case of biomedical engineers at Addis Ababa public health facilities.

1.6 Scope of the Study

This study is limited to employee job satisfaction for biomedical engineers. The scope of this study is restricted to biomedical engineers at Addis Ababa public health facilities. The study covers only employees in Addis Ababa public health facilities due to cost and time constraints and most of Addis Ababa public health facility employees are based in Addis Ababa.

1.7 Limitations of the study

The researcher faced some challenges while doing this study. Some of the respondents' working conditions created some negligence in filling the questionnaire. Some respondents not gave values to the questionnaire and some others not returned it totally. Moreover, because of most respondents have been in a tight working condition, some of them were not as such willing to fill the questionnaire. In addition to this, absence of related documents in the study area, financial problem, and shortage of time were the constraints of the study.

1.8 Area of the study

The study conducted at Addis Ababa public health facilities namely; Black Lion hospital, St Paul hospital, St peter hospital, Alert hospital, Amanuel hospital, Yekatit 12 hospital, Minillik II hospital, Ras desta damtew memorial hospital, Tirunesh Beijing hospital, Zewditu Memorial hospital, Ghandi Memorial hospital, Addis Ababa health bureau, Addis Ababa's sub city health bureaus, and including: Federal ministry of health (FMOH), Ethiopian pharmaceutical Fund and supply agency (PFSA), Ethiopian Public Health institute (EPHI) and Ethiopian Food, Medicine and Health Care Administration and Control Authority (EFMHACA).

1.9 Organization of the Research Report

This research study has five chapters. Accordingly, the first chapter presents the introductory part of the paper which comprises the background of the study, statement of the problem, research questions, and objectives of the study, significance of the study, scope of the study, limitation and area of the study. In the second chapter related literatures review reviewed. The third chapter presents the research methodology used to carry out the research activities. It comprises the research design, research approach, data sources and data collection tools used, the study population, sample size sampling technic of the study, data collection procedures, the data collection procedures and methods of data analysis. The

fourth chapter consists of data analysis, interpretation and discussion of the research findings. Finally, the fifth chapter presents the summary of the finding, conclusion and recommendation of the study report.

CHAPTER TWO

LITERATURE REVIEW

This chapter revised the related literatures written in the areas of job satisfactions; workers' role in job satisfaction, need for employee satisfaction, biomedical engineering; biomedical engineers; biomedical engineers' training and qualification; duties of biomedical engineers, the role of biomedical engineering departments and factors affecting job satisfactions.

2.1 An overview of job satisfactions

According to Vroom (1964) Job satisfaction is an orientation of emotions that employees possess towards role they are performing at the work place. Job Satisfaction is the essential component for employee motivation and encouragement towards better performance .Many people has defined job satisfaction over the years. Hoppok & Spielgler (1938) defines job satisfaction as the integrated set of psychological, physiological and environmental conditions that encourage employees to admit that they are satisfied or happy with their jobs .Further, the role of employees at workplace is emphasized as there is an influence of various elements on an employee within the organization. Clark (1997) argue that if employees are not satisfied with the task assigned to them, they are not certain about factors such as their rights, working conditions are unsafe, co-workers are not cooperative, supervisor is not giving them respect and they are not considered in the decision making process; resulting them to feel separate from the organization. Furthermore, he highlighted that in current times, firms cannot afford dissatisfied employees as they will not perform up to the standards or the expectations of their supervisor, they will be fired, resulting firms to bear additional costs for recruiting new staff. So, it is beneficial for firms to provide flexible working environment to employees where they feel their opinions are valued and they are a part of the organization. Employee morale should be high as it will be reflected in their performance because with low morale, they will make lesser efforts to improve

Job satisfaction refers to a person's feeling of satisfaction on the job, which acts as a motivation to work. It is not the self-satisfaction, happiness or self- contentment but the Satisfaction on the job. The term refers to the total relationship between an individual and the employer for which he is paid. Satisfaction does mean the simple feeling –state accompanying the attainment of any goal, the end-state accompanying the attainment by an impulse of its objectives. Job satisfaction does mean absence of motivation at work.

Resource workers differently described the factors contributing to job satisfaction and job dissatisfaction. Hop pock described job satisfaction as, any combination that cause and person truthfully to say I am satisfied with my job.

Job satisfaction is defined as: "The pleasurable emotional state resulting from the appraisal of one's jobs as achieving or facilities the achievement of one's job values". In contrast job dissatisfaction is defined as "the un pleasurable emotional state resulting from the appraisal of one's job as frustrating or blocking the attainment of one's job values or as entailing disvalues". However both satisfaction and dissatisfaction were seen as, "a function of the perceived relationship between what on perceives it as offering or entailing." Job satisfaction is denied as the, pleasurable emotional state resulting from the appraisal of one's job as achieving simple feeling – state accompanying the attainment of any goal, the end-state accompanying the attainment by an impulse of it one's job values or as entailing disvalues". However, both satisfactions were seen as, "a function of the perceived relation between what on perceives it as offering or entailing.

There are excess of definitions of job satisfaction, some of which are contradictory in nature. Spector (1997) refers to job satisfaction in terms of how people feel about their jobs and different aspects of their jobs. Ellickson and Logsdon (2002) support this view by defining job satisfaction as the extent to which employees like their work. Schermerhorn (1993) defines job satisfaction as an affective or emotional response towards various aspects of an employee's work. The author emphasizes that likely causes of job satisfaction include status, supervision, co-worker relationships, job content, remuneration and extrinsic rewards, promotion and physical conditions of the work environment, as well as organizational structure.

Similarly, Mc Namara (n.d.) points out that job satisfaction refers to an individual's feeling or state of mind giving heed to the nature of the individual's work. The author further explains that job satisfaction can be influenced by a diversity of job dimensions, inter alia, the quality of the employee's relationship with their supervisor, the status of the physical environment in which the individual works, degree of fulfillment in work.

In direct contrast, Rue and Byars (1992) refer to job satisfaction as an individual's mental state about the job. Robbins et al. (2003) add that an individual with high job satisfaction will display a positive attitude towards their job, and the individual who is dissatisfied will

have a negative attitude about the job. This definition is expanded by Greenberg and Baron (1995) who define job satisfaction as an individual's cognitive, affective and evaluative reactions toward their jobs. According to Coster (1992 cited in Sempane, Rieger & Roodt, 2002), the work itself could have an effect on the total quality of life of the employee. Schneider and Snyder (1975 cited in Sempane et al., 2002) conclude job satisfaction is an individual's personal assessment of conditions prevalent in the job, thus evaluation occurs on the basis of factors, which they regard as important to them. According to Cherrington (1994), research on job satisfaction has identified two aspects to understanding the concept of job satisfaction, namely, the facet satisfaction and overall satisfaction. These two concepts are explained as follows:

2.1.1 Facet Satisfaction

Facet satisfaction refers to the tendency for an employee to be more or less satisfied with various facets or aspects of the job (Johns, 1988). Cherrington (1994) refers to the various aspects or facets of the job as the individual's attitude about their pay, the work itself - whether it is challenging, stimulating and attractive, and the supervisors - whether they possess the softer managerial skills as well as being competent in their jobs.

2.1.2 Overall Satisfaction

Overall satisfaction focuses on the general internal state of satisfaction or dissatisfaction within the individual. Positive experiences in terms of friendly colleagues, good remuneration, compassionate supervisors and attractive jobs create a positive internal state. Negative experiences emanating from low pay, less than stimulating jobs and criticism create a negative internal state. Therefore, the feeling of overall satisfaction or dissatisfaction is a holistic feeling that is dependent on the intensity and frequency of positive and negative experiences (Cherrington, 1994).

In Ethiopia, lack of proper management of medical equipment has limited the capacity of health institutions to deliver adequate health care. It is estimated that only 72% of medical equipment found in Addis Ababa public hospitals functional and in some hospital in the region functional equipment are near to 50%.

The rising number of these non-functional equipment are due to Poor equipment handling and utilization, frequent power surges, the age of the equipment, lack of operator training, lack of preventive maintenance, lack of spare parts, lack of maintenance capacity, and

minimal knowledge regarding sophisticated equipment are factors that contribute to equipment breakdowns.

As healthcare delivery continues to expand and improve in Ethiopia, and an increasing number of sophisticated medical equipment is introduced, a system capable of supporting and managing these medical technology must be in place. It is very crucial to implement Medical Equipment Management in the hospitals to manage and coordinate the medical equipment management cycle which includes planning and assessment of needs, procurement, training, operation, maintenance, decommissioning and disposal. Activities that ensure the successful management of resources and patient related risk in a healthcare facility.

To realize this medical Equipment management in all public hospitals FMOH introduce the previous Medical Equipment Management Guideline and have tried to implement in some hospitals. Due to different reason the implementation was not as it was expected. However the introduction of that guideline creates hospital managers and professionals to have a good understanding of Medical Equipment management importance. To enhance the implementation of the Medical Equipment management chapter and to include the components of HSTP agendas the revision of the previous document is become important.

This chapter outlines procedures that hospitals should undertake to appropriately manage their medical equipment, allowing for the extension of services while ensuring the safety of its patients.

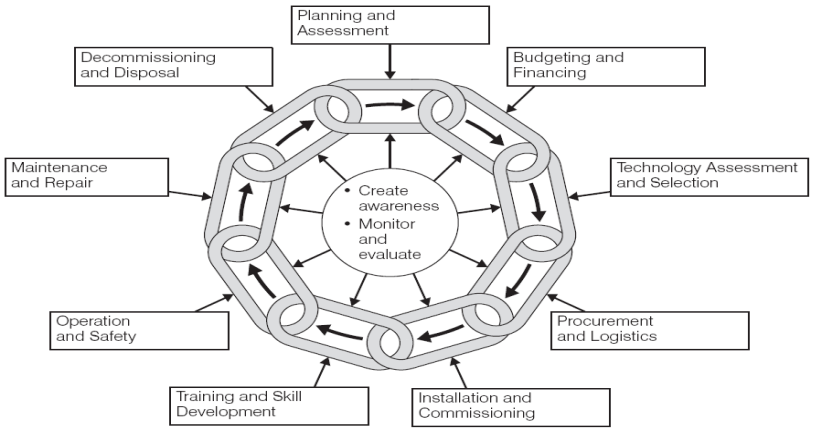

Figure 2.1 Medical Equipment Management Cycle

2.2 Workers' roles in job satisfaction

If job satisfaction is a worker benefit, surely the worker must be able to contribute to his or her own satisfaction and well-being on the job. The following suggestions can help a worker find personal job satisfaction.

Seek opportunities to demonstrate skills and talents. This often leads to more challenging work and greater responsibilities, with attendant increases in pay and other recognition.

Develop excellent communication skills. Employee's value and reward excellent reading, listening, writing, and speaking skills know more. Acquire new job-related knowledge that helps you to perform tasks more efficiently and effectively. This will relieve boredom and often gets on enticed. Demonstrate creativity and initiative. Qualities like these are valued by most organizations and often result in recognition as well as in increased responsibilities and rewards. Develop teamwork and people skills. A large part of job success is the ability to work well with others to get the job done. Accept the diversity in people. Accept people with their differences and their imperfections and learn how to give and receive criticism constructively.

See the value in your work. Appreciating the significance of what one does can lead to satisfaction with the work itself. This helps to give meaning to one's existence, thus playing a vital role in job satisfaction.

Learn to de-stress. Plan to avoid burnout by developing healthy stress-management techniques.

2.3 Assuring job satisfaction

Assuring job satisfaction, over the long-term, requires careful planning and effort both by management and by workers. Managers are encouraged to consider such theories as Herzberg's (1957) and Maslow's (1943) Creating a good blend of factors that contribute to a stimulating, challenging, supportive, and rewarding work environment is vital. Because of the relative prominence of pay in the reward system, it is very important that salaries be tied to job responsibilities and that pay increases be tied to performance rather than seniority. So, in essence, job satisfaction is a product of the events and conditions that people experience on their jobs. Brief (1998) wrote: "If a person's work is interesting, her pay is fair, her promotional opportunities are good, her supervisor is supportive, and her co-workers are friendly, then a situational approach leads one to predict she is satisfied with her job" . Very

simply put, if the pleasures associated with one's job outweigh the pains, there is some level of job satisfaction.

2.4 Need for employee satisfaction

Everyone from managers, retention agents to HR need to get a handle on employee loyalty and satisfaction – how committed is the workforce to the organization and if workers are really contented with the way of things for gauging their likelihood to stay with the company. One of the main aspects of Human Resource Management is the measurement of employee satisfaction. Companies have to make sure that employee satisfaction is high among the workers, which is a precondition for increasing productivity, responsiveness, and quality and customer service. The litmus test is to study turnover and average length of service. If turnover is on the rise, loyalty levels are low and vice versa. Comparing them to industry averages gives good idea of attrition probabilities. Staff attendance, compliance with policies and confidence in leadership are other indirect indicators of allegiance while excessive theft and sabotage spell obvious lack of commitment.

According to Heskett et al (1994), more satisfied employees, stimulate a chain of positive actions which end in an improved company Identification of Variables Affecting Employee Satisfaction and Their Impact on the Organization performance. In another research it is said that employee satisfaction influenced employee productivity, absenteeism and retention, Derek R. Allen & Merris Wilburn, (2002). The success of any company is directly link to the satisfaction of the employees who embody that company, that retaining talented people is critical to the success of any organization, Freeman, (2005) .Studies shows that businesses that excel in employee satisfaction issues reduce turnover by 50% from the norms, increase customer satisfaction to an average of 95 % & lower labor cost by 12%., Carpitella, (2003). The more satisfied an employee is, the less turnover and absenteeism occurs, Maloney, & McFillen, (1986). Judge, et. al, (1993), on the other hand, mentions that employee satisfaction is positively correlated with motivation, job involvement, organizational citizenship behaviour, organizational commitment, life satisfaction, mental health, and job performance, and negatively related to absenteeism, turnover, and perceived stress and identify it as the degree to which a person feels satisfied by his/her job. In contrast, Rousseau (1978) identified three components of employee satisfaction: they are characteristics of the organization, job task factors, and personal characteristics.

In the construction industry, where the quality of products is dependent on the skill of laborers and onsite supervisors, employees play a significant role in the success and outcome of the product and the company.

U.S. Bureau of Labor Statistics, 2004 Profit and growth are stimulated directly (and primarily) by customer loyalty. Customer loyalty is adirect consequence of customer satisfaction. Customer satisfaction is heavily influenced by customer perceptions of the value of services they receive. Value is created by satisfied, loyal and productive employees. Employees who feel a sense of teamwork and common purpose, a strong commitment to communication, and managerial empowerment are most able, and willing, to deliver the results that customers expect (Employee Satisfaction", 2005) Human Relations perspective posits that satisfied workers are productive workers (e.g., Likert, 1961; McGregor, 1960). Thus, organizational productivity and efficiency is achieved through employee satisfaction and attention to employees‟ physical as well as socio emotional needs. Human relations researchers further argue that employee satisfaction sentiments are best achieved through maintaining a positive social organizational environment, such as by providing autonomy, participation, and mutual trust (Likert, 1961). Employees‟ job satisfaction sentiments are important because they can determine collaborative effort. Consistent with this reasoning, Likert (1961) has argued that collaborative effort directed towards the organization's goals is necessary for achievement of organizational objectives, with unhappy employees failing to participate (effectively) in such efforts.

In a unique study conducted by Harter et al. (2002), based on 7,939 business units in 36 organizations, the researchers found positive and substantive correlations between employee satisfaction-engagement and the business unit outcomes of productivity, profit, employee turnover, employee accidents, and customer satisfaction.

The predominant view has focused on the situational context (e.g., supervisory support) as a cause of satisfaction and has argued that high-performance work practices and thus a positive working climate foster employee satisfaction (see, e.g., Bowen, & Ostroff, 2004; Wright, Dunford, & Snell, 2001; Wright, Gardner, Moynihan, & Allen, 2005).

Keen observation of employee reactions and conduct is by far the most obvious and easiest technique. Casually walk around the office, watching employees working, interacting with each other and talk to them informally. Are they smiling, energized, cooperative and alert or

listless, inactive and unhelpful? You can even employee a professional consultant as an objective third-party to assess the work atmosphere and compare with other companies.

Taking simple observation to the next level by asking employees outright in attitude surveys, focus groups and exit interviews and analyzing the results to determine staff attitude, opinions and motivation. While satisfied employees are not necessarily loyal or loyal ones always satisfied, it cannot be denied that job satisfaction fuels loyalty. After all its been rightly said that, the more satisfied an employee is regarding his or her working conditions, the more likely is he or she to develop a psychological attachment or commitment to the organization. According to Mark graham Brown, (2006), there is a strong link between employee satisfaction and customer satisfaction and between customer satisfaction and future revenue.

Companies should try their best to evaluate why employees leave or what kindles their dissatisfaction. Examine the root causes – where does the problem lie? Is it earnings or benefits? Does it have something to do with job quality or workplace support? Or is lack of appreciation or growth to blame. The onus is on the management to keep employees engaged and happy, so as to persuade them to stay. In fact, this is critical to organizational success.

Biomedical engineering is the application of the principles and problem-solving techniques of engineering to biology and medicine. This is evident throughout healthcare, from diagnosis and analysis to treatment and recovery, and has entered the public conscience though the proliferation of implantable medical devices, such as pacemakers and artificial hips, to more futuristic technologies such as stem cell engineering and the 3-D printing of biological organs.

Engineering itself is an innovative field, the origin of ideas leading to everything from automobiles to aerospace, skyscrapers to sonar. Biomedical engineering focuses on the advances that improve human health and health care at all levels.

Biomedical engineers differ from other engineering disciplines that have an influence on human health in that biomedical engineers use and apply an intimate knowledge of modern biological principles in their engineering design process. Aspects of mechanical engineering, electrical engineering, chemical engineering, materials science, chemistry, mathematics, and computer science and engineering are all integrated with human biology in biomedical

engineering to improve human health, whether it be an advanced prosthetic limb or a breakthrough in identifying proteins within cells.

There are many sub disciplines within biomedical engineering, including the design and development of active and passive medical devices, orthopedic implants, medical imaging, biomedical signal processing, tissue and stem cell engineering, and clinical engineering, just to name a few.

Biomedical engineers work in a wide variety of settings and disciplines. There are opportunities in industry for innovating, designing, and developing new technologies; in academia furthering research and pushing the frontiers of what is medically possible as well as testing, implementing, and developing new diagnostic tools and medical equipment; and in government for establishing safety standards for medical devices. Many biomedical engineers find employment in cutting-edge start-up companies or as entrepreneurs themselves.

Tissue and stem cell engineers are working towards artificial recreation of human organs, aiding in transplants and helping millions around the world live better lives. Experts in medical devices develop new implantable and external devices such as pacemakers, coronary stents, orthopedic implants, prosthetics, dental products, and ambulatory devices. Clinical engineers work to ensure that medical equipment is safe and reliable for use in clinical settings. Biomedical engineering is an extremely broad field with many opportunities for specialization.

2.5 What is biomedical engineering?

Many of the problems confronting health professionals today are of extreme importance to the engineer because they involve the fundamental aspects of device and systems analysis, design, and practical application all of which lie at the heart of processes that are fundamental to engineering practice. These medically relevant design problems can range from very complex large-scale constructs, such as hospital information systems, to the creation of relatively small and “simple” devices, such as recording electrodes and transducers used to monitor the activity of specific physiological processes. The American health care system, therefore, encompasses many problems that represent challenges to certain members of the engineering profession, called biomedical engineers. Since biomedical engineering involves applying the concepts, knowledge, and approaches of

virtually all engineering disciplines (e.g., electrical, mechanical, and chemical engineering) to solve specific health care–related problems, the opportunities for interaction between engineers and health care professionals are many and varied. Although what is included in the field of biomedical engineering is considered by many to be quite clear, many conflicting opinions concerning the field can be traced to disagreements about its definition. For example, consider the terms biomedical engineering, bioengineering, biological engineering, and clinical (or medical) engineer, which are defined in the Bioengineering Education Directory. While Pacela defined bioengineering as the broad umbrella term used to describe this entire field, bioengineering is usually defined as a basic-research oriented activity closely related to biotechnology and genetic engineering that is, the modification of animal or plant cells or parts of cells to improve plants or animals or to develop new microorganisms for beneficial ends. In the food industry, for example, this has meant the improvement of strains of yeast for fermentation. In agriculture, bioengineers may be concerned with the improvement of crop yields by treatment plants with organisms to reduce frost damage. It is clear that bioengineers for the future will have tremendous impact on the quality of human life. The term biomedical engineering appears to have the most comprehensive meaning. Biomedical engineers apply electrical, chemical, optical, mechanical, and other engineering principles to understand, modify, or control biological (i.e., human and animal) systems. When a biomedical engineer works within a hospital or clinic, he or she is more properly called a clinical engineer. However, this theoretical distinction is not always observed in practice, since many professionals working within U.S. hospitals today continue to be called biomedical engineers. The breadth of activity of biomedical engineers is significant. The field has moved significantly from being concerned primarily with the development of medical devices in the 1950s and 1960s to include a more wide-ranging set of activities. The field of biomedical engineering now includes many new career areas: Application of engineering system analysis (physiologic modeling, simulation, and control to biological problems),Detection, measurement, and monitoring of physiologic signals (i.e., biosensors and biomedical instrumentation) , Diagnostic interpretation via signal-processing techniques of bioelectric data, Therapeutic and rehabilitation procedures and devices (rehabilitation engineering), Devices for replacement or augmentation of bodily functions (artificial organs), Computer analysis of patient-related data and clinical decision

making (i.e., medical informatics and artificial intelligence), Medical imaging that is, the graphical display of anatomic detail or physiologic function, The creation of new biologic products (i.e., biotechnology and tissue engineering) Typical pursuits of biomedical engineers include the following: Research in new materials for implanted artificial organs, Development of new diagnostic instruments for blood analysis, Writing software for analysis of medical research data, Analysis of medical device hazards for safety and efficacy, Development of new diagnostic imaging systems, Design of telemetry systems for patient monitoring, Design of biomedical sensors, Development of expert systems for diagnosis and treatment of diseases, Design of closed-loop control systems for drug administration , Modeling of the physiologic systems of the human body, Design of instrumentation for sports medicine, Development of new dental materials, Design of communication aids for individuals with disabilities, Study of pulmonary fluid dynamics, Study of biomechanics of the human body, Development of material to be used as replacement for human skin The preceding list is not intended to be all-inclusive. Many other applications use the talents and skills of the biomedical engineer. In fact, the list of activities of biomedical engineers depends on the medical environment in which they work. This is especially true for the clinical engineers biomedical engineers employed in hospitals or clinical settings. Clinical engineers are essentially responsible for all the high-technology instruments and systems used in hospitals today, the training of medical personnel in equipment safety, and the design, selection, and use of technology to deliver safe and effective health care.

2.5.1 The role of biomedical engineering departments

Biomedical engineering involves meeting technology management challenges that can be broadly defined as providing a safe and effective management of technology used for patient diagnosis, therapy and monitoring within healthcare institutions (Bronzino, 1992; Keller, 2006). This implies involvement in all phases of the equipment lifecycle including selection, acceptance testing, training in safe and effective use, equipment safety, maintenance and final disposal or 71 replacements (Bronzino, 1992). Biomedical engineers are responsible for explaining new technologies and their impact on operating costs, and are also responsible for translating technological ideas, problems and concepts into a language that

nontechnical people can readily understand. Bronzino (1992) suggested that biomedical engineering departments usually perform the following tasks:

(i) corrective maintenance and calibration of medical equipment;

(ii) inspections (acceptance testing) for new equipment acquisitions and for equipment returned after an outside repair is performed, before the equipment is designated for patient use (Grigg & Walls, 2007;

(iii) preventive maintenance and periodic inspections of equipment as per medical equipment management standard;

(iv) equipment safety checks such as screening hazard notices, performing equipment and electrical safety checks and generally contributing to a safer environment;

(v) training users on the safe, effective use of technologies and prevention of equipment misuse or abuse and accidents related to the use of equipment;

(vi) pre-purchase consultation, especially where the clinical engineering department is expected to repair the equipment after expiry of the warranty, and sometimes even during the warranty period;

(vii) physiological measurements requiring personnel with a technical background, such as the catheterization procedure and cardiac investigation studies;

(viii) clinical research and development, including equipment modification and design (this activity contributes important skills to medical researchers and brings the clinical engineer in closer contact with direct patient care, and it provides a multidisciplinary approach to problem solving and to the quality of patient care); and

(ix) Administrative duties relating to the department's budgets, staffing, planning, training and development.

This role description seems to have acquired general acceptance in many parts of the world, including the United States (Betts, 1987; Bronzino, 1985), Canada (Frize, 1988), Japan (Kanai, 1986), and the United Kingdom (Dey & Hariharan, 2006; Keller, 2006; Whelpton, 1988). Furthermore, clinical engineers are uniquely qualified to understand the many details of medical devices and their alarm functions, such as high blood pressure alarm and low patient temperature alarm. They tend to have a very good understanding of the inner

workings of the devices and are good at identifying situations where clinical staff may run into trouble when using a certain type of device or feature (Keller, 2006). Kortum (2010) suggests that the modern era has seen the application of biomedical engineering in almost every branch of medicine, so much so that the practice of medicine is now completely dependent on the work and support of biomedical engineers. The introduction of electronic patient records, complex and extremely powerful electro-medical equipment and devices, and minimally invasive technologies is just the beginning. The future holds new possibilities of providing telemedicine and e-health services, new ways of home self-care and sophisticated medical equipment. Therefore, biomedical engineers are required to continuously up-skill to understand and apply technological advances in electronics and mechanical engineering, computer science and ICT. The blending of all these fields requires biomedical engineers to seek solutions to problems related to clinical equipment. As a consequence, a biomedical engineer is positioned to work at the intersection of engineering, mathematics, physics, biology and medicine to solve equipment-related problems (Kortum, 2010). Therefore, maintenance of medical equipment has become more important than ever before. It is necessary to study the setup of the department and function of the biomedical engineer in any medical equipment maintenance system. Zasimova and Shishkin (2013) reported that when it comes to medical equipment maintenance, hospitals' biomedical engineers should play the role of gatekeeper to monitor equipment movements to and from the hospital. They should also be responsible for managing the entire life cycle of all clinical equipment in the hospital.

Hospitals have been allocating a significant portion of their resources to procuring and managing capital assets. In addition, they are continually faced with demands for new medical equipment and are also asked to manage existing inventory. From the literature, it can be concluded that although medical technology has changed over the years, and that biomedical engineers are now dealing with more complex technology, their actual role and responsibilities within the hospital have remained the same. Thus, biomedical engineering is a necessary component of the healthcare system. This profession provides knowledge and leadership in maintaining, applying, acquiring, and managing safe and effective use of medical technology.

2.6Duties of biomedical engineers

Biomedical engineers typically do the following:

(i) Design biomedical equipment and devices, such as artificial internal organs, replacements for body parts, and machines for diagnosing medical problems

(i) Install, adjust, maintain, repair, or provide technical support for biomedical equipment

(ii) Evaluate the safety, efficiency, and effectiveness of biomedical equipment

(iii)Train clinicians and other personnel on the proper use of biomedical equipment

(iv)Research the engineering aspects of the biological systems of humans and animals with life scientists, chemists, and medical scientists

(v) Prepare procedures, write technical reports, publish research papers, and make recommendations based on their research findings

(vi)Present research findings to scientists, nonscientist executives, clinicians, hospital management, engineers, other colleagues, and the public

(vii) Design systems and products, such as artificial organs, artificial devices that replace body parts, and machines for diagnosing medical problems

(viii) Install, adjust, maintain, repair, or provide technical support for biomedical equipment

(ix)Evaluate the safety, efficiency, and effectiveness of biomedical equipment

(x) Train clinicians and other personnel on the proper use of equipment

Biomedical engineers design instruments, devices, and software used in healthcare; develop new procedures using knowledge from many technical sources; or conduct research needed to solve clinical problems. They frequently work in research and development or quality assurance.

Biomedical engineers design electrical circuits, software to run medical equipment, or computer simulations to test new drug therapies. In addition, they design and build artificial body parts, such as hip and knee joints. In some cases, they develop the materials needed to make the replacement body parts. They also design rehabilitative exercise equipment.

The work of these engineers spans many professional fields. For example, although their expertise is based in engineering and biology, they often design computer software to run complicated instruments, such as three-dimensional x-ray machines. Alternatively, many of these engineers use their knowledge of chemistry and biology to develop new drug

therapies. Others draw heavily on math and statistics to build models to understand the signals transmitted by the brain or heart. Some may be involved in sales.

The following are examples of specialty areas within the field of biomedical engineering:

Bioinstrumentation uses electronics, computer science, and measurement principles to develop instruments used in the diagnosis and treatment of medical problems.

Biomaterials are the study of naturally occurring or laboratory-designed materials that are used in medical devices or as implantation materials.

Biomechanics involves the study of mechanics, such as thermodynamics, to solve biological or medical problems.

Clinical engineering applies medical technology to optimize healthcare delivery.

Rehabilitation engineering is the study of engineering and computer science to develop devices that assist individuals recovering from or adapting to physical and cognitive impairments.

A biomedical engineer may design instruments, devices, and software, bringing together knowledge from many technical sources to develop new procedures, or conducting research needed to solve clinical problems. They often serve a coordinating function, using their background in both engineering and medicine. In industry, they may create products where an in-depth understanding of living systems and technology is essential. They frequently work in research and development or in quality assurance.

Some biomedical engineers design electrical circuits, software to run medical equipment, or computer simulations to test new drug therapies. Some also design and build artificial body parts to replace injured limbs. In some cases, they develop the materials needed to make the replacement body parts. They also design rehabilitative exercise equipment.

Biomedical engineers work in teams with scientists, healthcare workers, or other engineers. Thus, where and how they work is often determined by others' specific needs. For example, a biomedical engineer who has developed a new device designed to help a person with a disability to walk again might have to spend hours in a hospital to determine whether the device works as planned. If the engineer finds a way to improve the device, the engineer might have to return to the manufacturer to help alter the manufacturing process to improve the design.

2.7 Work Environment

Biomedical engineers work in a variety of settings, depending on what they do. Some work in hospitals where therapy occurs and others work in laboratories doing research. Still others work in manufacturing settings where they design biomedical engineering products. In addition, some biomedical engineers also work in commercial offices where they make or support business decisions. The work of these engineers spans many professional fields. For example, although their expertise is based in engineering and biology, they often design computer software to run complicated instruments, such as three-dimensional x-ray machines. Biomedical engineers work with patients and in teams with other professionals. Thus, where and how they work is often determined by others' specific needs. For example, a biomedical engineer who has developed a new device designed to help a person with a disability to walk again might have to spend hours in a hospital to determine whether the device works as planned. If the engineer finds a way to improve the device, the engineer might have to then return to the manufacturer to help alter the manufacturing process to improve the design. A biomedical engineer can work in a variety of settings, depending on what they do. Some work in hospitals where therapy occurs, and others work in laboratories doing research. Still others work in manufacturing settings where they design biomedical engineering products.

2.8 Qualifications and training

Biomedical engineers typically need a bachelor's degree in biomedical engineering from an accredited program to enter the occupation. Alternatively, they can get a bachelor's degree in a different field of engineering and then either get a graduate degree in biomedical engineering or get on-the-job training in biomedical engineering. Prospective biomedical engineering students should take high school science courses, such as chemistry, physics, and biology. They should also take math courses, including calculus. Courses in drafting or mechanical drawing and computer programming are also useful. Bachelor's degree programs in biomedical engineering focus on engineering and biological sciences. Programs include laboratory-based courses in addition to classroom-based courses in subjects such as fluid and solid mechanics, computer programming, circuit design, and biomaterials. Other required courses may include biological sciences, such as physiology.

2.9 Conceptual framework

According to Vroom (1964) Job satisfaction is an orientation of emotions that employees possess towards role they are performing at the work place. Job Satisfaction is the essential component for employee motivation and encouragement towards better performance. Satisfied employees tend to be more productive and committed to their jobs (Alhussami, 2008). Employee Job satisfaction is the rate of enjoyment people receive from their work.

Health sector is labor intensive where quality of patient care services are directly related to worker's satisfaction with their job, motivation and their readiness to apply resources to the task at work place (http://dx.doi.org/10.1186/1478-4491-1-9([PMC free article)(PubMed).

Biomedical engineering, part of healthcare sector, involves meeting technology management challenges that can be broadly defined as providing a safe and effective management of technology used for patient diagnosis, therapy and monitoring within healthcare institutions (Bronzino, 1992; Keller, 2006).

Factors that affect job satisfactions of biomedical engineers-in case of Addis Ababa public health facilities include wages, security/safety, training, recognition, rewards, promotion, relationship with co-workers, working conditions, working environment, creativity and innovations, enough space for biomedical engineering unit office, enough space for medical equipment workshop,well equipped medical equipment workshop, fair workload, value and respect, maintenance toolkits, medical equipment calibrators, medical equipment management systems, and other benefits.

Nevertheless, the factors must be closely monitored to ensure that strict measures are taken within the best time to either take advantages of the opportunities or combat their threats. The relationship of independent and dependent variables can be expressed and shown in the figure below.

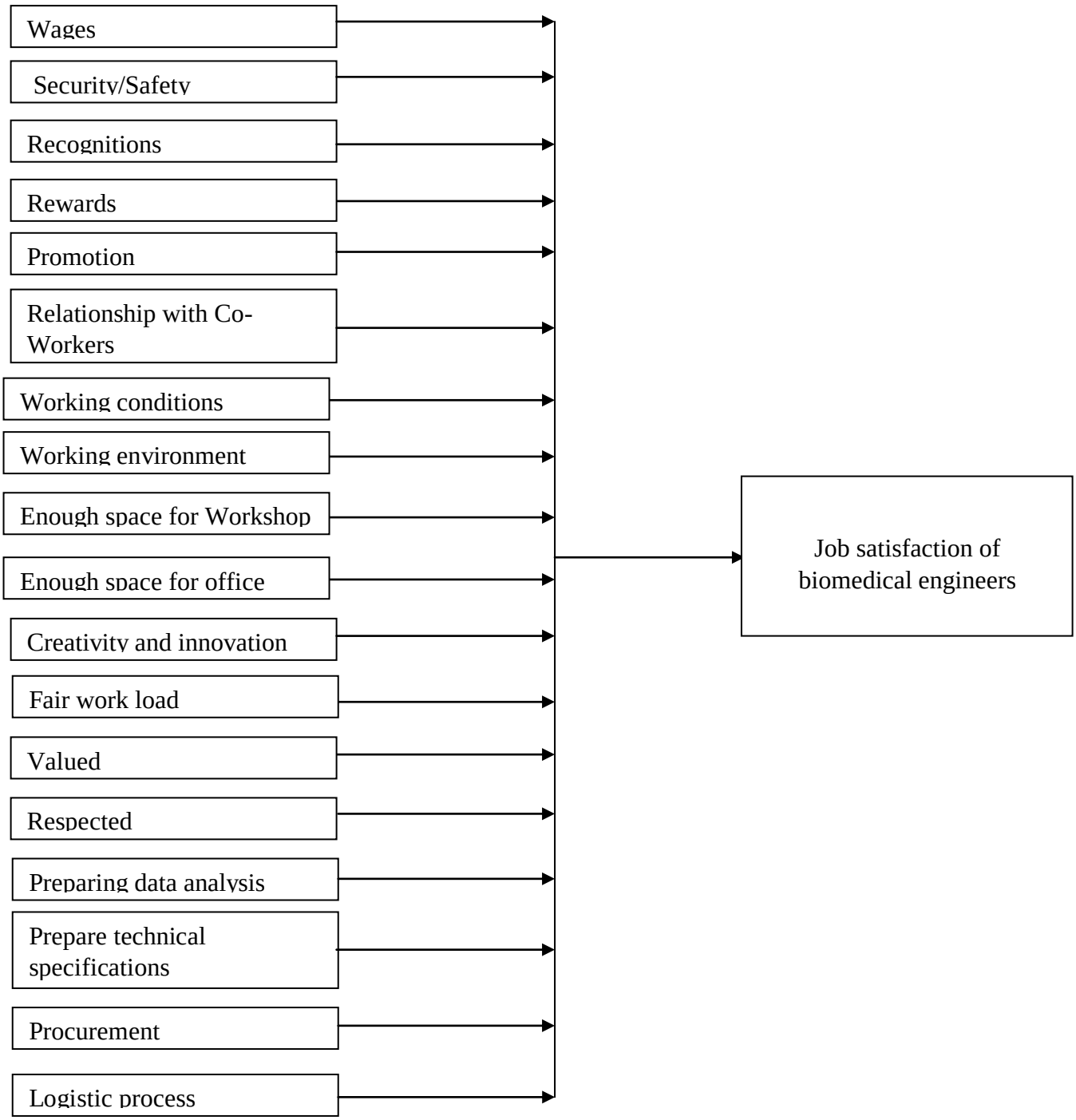

Figure2. 2 Conceptual frameworks (own model)

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter is concerned with the methodology used for the research in relation to the research design, research approach, source of data, data collection tools, total population, sample size and sampling techniques, procedures of data collection, methods of data analysis methods and ethical considerations conducted in the study of employee job satisfaction at Addis Ababa public health facilities.

3.1 The Research design

Based on the purpose of the study, the main objective of this research is to identify and analyze employee job satisfaction to biomedical engineers at Addis Ababa public health facilities. The type of research employed under this study is descriptive research. This is because; the main purpose of descriptive research is to describe the state of relationships as it exists at present. Therefore, this study describes and critically assesses job satisfaction to biomedical engineers at Addis Ababa public health facilities.

3.2 Research approach

Depending on the philosophical stance, strategies of inquiry and specific methods, a research approach can be categorized as quantitative research approach, qualitative research approach and mixed research approach.

Quantitative research

In quantitative design, Mujis (2011) suggests the use of a survey to collect numerical data that can be systematically analyzed, generally with the use of statistics. The data to be collected for this study concerned models presented in the literature, such as job satisfaction surveys used by Abdulla , Djebarni and Mellahi (2011), Al -Rubaish et al. (2012), Clark and Oswald (1996), and Ellickson and Logsdon (2001) among many others. These Surveys are presented quantitatively, where data may be collected in numerical form through Likert scales or similar quantitative data gathering. Collection of data for descriptive statistics, according to Mujis (2011), concerns numbers and totals, and changes within numeric data.

Quantitative research is grounded in the post-positivism knowledge claim that primarily reflects the scientific method of the natural sciences. This paradigm adopts a deductive

approach to the research process. It is one in which the investigator primarily uses positivist claims for developing knowledge and its strategies of inquiries are associated with experimental and survey research methods. Creswell (2009) mentioned that experimental research seeks to determine if a specific treatment influence an outcome. This impact is assessed by providing a specific treatment to one group and withholding it from another and then determining how both groups scored on an outcome. Therefore, pure experiment enables the researcher to manipulate an independent variable in order to see the effect on the dependent variable with the random assignment of subjects to treatment conditions while quasi experiments uses non randomized designs and it is a single subjects design.

Qualitative approach

Qualitative data collection is superior at addressing complex situations with multiple variables, where interviewing, focus groups and ethnographic data collection enable in-depth analysis and understanding. The departure from positivism with its rigorous attention to reliability and validity led towards a qualitative research approach that attended to rigorous scholarship in its design and execution (Creswell 2003).Qualitative approach is centered on the interpretive social sciences paradigm.

Qualitative methodology of investigation tends to be based on recognition of the importance of the subjective, experimental 'life-world' of human beings (Blanchi and Durrhein, 1999). Shaw (2006) described that qualitative research seeks to come to terms with meaning rather than frequency because they discover or uncover issues in order to generate ideas and hypothesis. This paradigm therefore focuses on context and capture ways in which people interpret events, experiences and relationship.

Data collection methods for qualitative research include interviews, group discussions and focus groups, observation and reflective field notes, and secondary data sources such as documentation, and media reports (Creswell & Plano Clark 2007).

Creswell (2009) defined that mixed approach is one in which the researcher tends to base knowledge claims on pragmatic grounds (e.g., consequence-oriented, problem-centered, and pluralistic). It employs strategies of inquiry that involve collecting data either simultaneously or sequentially to best understand research problem. The data collection also involves gathering both numeric information (e.g., on instruments) as well as text information (e.g., on interviews) so that the final database represents both quantitative and

qualitative information. As a result, when methods are combined, the advantages of each methodology complement those of the other, making a stronger research design that will yield more valid and reliable findings. Indeed, the inadequacies of individual methods are reduced.

Phenomenological design is explained by Palmer , Larkin, de Visser and Fadden (2010) as an interpretive approach to qualitative research concerned with understanding people's experiences. Whilst data collection for interpretive phenomenological studies is usually based on one-on-one interviews, the researcher may advocate for focus groups to gather rich experiential data.

Therefore, the research approach of this study is quantitative approach as data collected in numerical form through Likert scales.

3.3 Sources of Data

Data for this study was collected from biomedical engineering case team leaders and staffs. The research study involves collecting and analysis of primary and secondary data. Both primary and secondary sources of data were used for this study.

3.3.1 Primary Data

Primary data was obtained directly by structured questionnaire comprised of statements which retrieving accurate data and describes employee job satisfaction to biomedical engineers at Addis Ababa public health facilities. In addition to structured questionnaire, biomedical engineering case team leaders of all health facilities were interviewed to understand on the current status of biomedical engineers' job satisfaction.

3.3.2 Secondary Data

Secondary sources of data were obtained from review of related literatures from published journals, books, internet and relevant documents related the studies were broadly reviewed as references.

3.4 Data Collection Tools

Structured questionnaires and interviews are the tools of gathering primary data. Instrument of data collection relatively depended on standard questionnaires prepared by the Society for human resource Management (SHRM) Survey Program (2007)which was prepared in the form of Likert five scales to measure Employee job satisfaction.

The questionnaire comprised of two sections: Section A, consists of 6 questions which is about demographics characteristics of employees. The characteristics includes: -Gender, Age, Educational level, Year of experience, Position in the health facility and salary of employees. Section B, consists of 43issuesof which determines employee job satisfaction. The questionnaire has requested biomedical engineering employees of Addis Ababa health facilities to indicate the extent of their satisfaction or dissatisfaction level using the five point Likert-type scales.

3.5 Study Population

The total population for this study was all biomedical engineers working at Addis Ababa public health facilities. In the study period, there are 200 permanent biomedical engineers located in Addis Ababa. Hence, the study population for this study is 200biomedical engineers.

3.6 Sample Size and Sampling Techniques

The population of the study includes the permanent biomedical engineering employees who are working at the Addis Ababa public health facilities; Black Lion hospital, St Paul hospital, St peter hospital, Alert hospital, Amanuel hospital, Yekatit 12 hospital, Minillik II hospital, Ras desta damtew memorial hospital, Tirunesh Beijing hospital, Zewditu Memorial hospital, Ghandi Memorial hospital, Addis Ababa regional health bureau, Addis Ababa's sub city health bureaus, and including: Federal ministry of health (FMOH), Ethiopian pharmaceutical Fund and supply agency (PFSA), Ethiopian Public Health institute (EPHI)and Ethiopian Food, Medicine and Health Care Administration and Control Authority (EFMHACA).

According to the data collected from each health facility's human resource office, the total numbers of employees working at Addis Ababa health public health facilities were 200. Out of these 103 employees were selected using proportionate stratified sampling technique and 20 biomedical engineering unit leaders and directorates taken to be part of the study.

Based on Yamine (1967:886) sample size determination formula, the study determined the sample size at 95% confidence level and 0.05 precision levels.

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

Where, n is number of respondents

N is total population

E sampling error/level of precision

Therefore, for total population N=200 and sampling error e=0.05sample size of respondents

$$n = \frac{200}{1 + 200(0.05 * 0.05)} = \frac{200}{1.5}$$ is 133.

Therefore, the total sample size of respondents based on the above sample size determination is 133. For selecting these samples of employees, proportionate stratified sampling used in which the 17 focused areas that biomedical engineers are engaging to take as strata so as to give equal chance to each of the sectors. Case team leaders and directorates of these institutions took an interview.

3.7 Data Collection Procedures

The data collection tools were developed based on the theoretical facts available in the literature to answer the basic research questions designed. The data for all the studies were collected from 13 Dec 2018 to 25 March 2019. The structured questionnaires on job satisfaction of biomedical engineers at Addis Ababa public health facilities were developed. The questionnaire developed was pilot tested involving twelve (12) employees to check its clarity and understandability. After, modifications were made before distributing it to gather the actual data required for the study, the final copy of questionnaire was duplicated and distributed to respondents by the researcher. The semi - structured interview questions were also developed based on the basic questions that the study intends to answer with all 24 biomedical engineering unit leaders were administered by the principal investigator and the responses were noted on the questionnaire.

3.8 Methods of data analysis

According to Welman & Kruger (2004) descriptive research can be either quantitative or qualitative. It involves collections of quantitative information that can be tabulated along a continuum in numerical form . Therefore, for this study, combinations of both qualitative and quantitative analyses were used. The quantitative data were collected by means of a questionnaire using closed questions and a Likert scale for the main questions. The qualitative analysis used to describe the existing scenarios regarding job

satisfaction of biomedical engineers at Addis Ababa public health facilities in comparison against the given literatures.

In addition, this study used descriptive statistics. Thus, tabulation, coding and categorization were employed to analyze the responses of the respondents on the variables that influence job satisfaction and to draw accurate conclusions about the participant's job satisfaction. Quantitative data analyze method was used to analysis the data obtained from the distributed questionnaires. Usually numbers and percentages were used to quantify the responses given in relation to the variables addressed. The data collected through interview were analyzed qualitatively.

In this study, the gathered data were entered in IBM Statistical Package for the Social Sciences (SPSS) version 20 for window so that frequency and descriptive statistics were used to analyze the data. This was carried out to ensure that the data from the respondents is accurate, reliable and consistent. The collected data were analyzed by means of descriptive statistics that included frequencies, and percentages were used to compare group differences in job satisfaction with respect to different factors.

Furthermore, to investigate job satisfaction Likert-type scale ranging from strongly disagree=1, disagree=2, neutral=3, agree=4 and strongly agree=5 were used.

3.8.1 Descriptive Analysis

The descriptive statistics analysis was conducted with tables, frequency distributions and percentages values to provide a summary picture of the data collected. At the beginning, the personal data character was analyzed.

Frequency distributions for all respondents on the five alternative choices provided in the questionnaires were counted and computed in the analysis of the data.

3.9 Ethical Considerations

In social research the ethical matters traditionally considered are informed consent and confidentiality (Mujis 2011). Informed consent occurs by informing the participant about the purpose of the research and its primary features. Confidentiality includes data that could identify the participant; names and private details were not recorded.

Before starting the actual data collection the purpose of the study, the right to participate and refuse was told to the study subjects. Verbal consent from the study subjects was obtained.

Confidentiality of the information was guaranteed by not writing a name or anything that enable to identify study participants. In addition to that a respondent answer kept in a confidential place.

The researcher acted responsibly according to ethical standards to ensure that the information gathered was not brought to disrepute. All respondents had a right to privacy, to safety, to know the true purpose of the research, to obtain research results and to abstain from answering questions (Aaker et al, 1995).

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATIONAND DISCUSSION

This chapter explains the collected data from the survey through the use of questionnaires. The responses of respondents have been analyzed and results have been presented in the form of tables and figures. The results are presented with two parts; the first part personal data of the respondents, while the second part presents data analysis and interpretation part of the paper.

Of the 133 distributed questionnaires, 129 were retuned (response rate 96%). of these, 2 were incompletely filled, and 127 completely filled questionnaires. But 4 can't be returned from respondents to the researcher. Thus, 127 questionnaires were used for analysis.

For data analysis purpose the IBM Statistical Package for the Social Sciences (SPSS) version 20 software was used to analyze the generated data.

4.1 Personal data of the Respondents

This section presents the personal data of respondents such as gender, age education level, year of experience, position in the health facility and salary.

4.1.1 Gender distribution of the respondents

Below is table 4.1shows the summary of the respondents' gender information.

Table4.1 distribution of respondent by gender

Gender	Frequency	Percent
Male	92	72.4
Female	35	27.6
Total	127	100.0

Source: own survey data, 2019

The sample consists of 127 biomedical engineers. Table 4-1 shows 92 employees were male, and they represented 72.4% of the total sample. The Rest 35 employees were female and they represented 27.6% of the total sample. As clearly indicated in the table 4-1, the sample was predominantly male (72.4%). This reflects the low participation rate for women in the workforce of biomedical engineering at Addis Ababa public health facilities.

4.1.2 Age distribution of the respondents

Below is a table 4-2 show the summary of the respondents' age information.

Table4.2distribution of respondent by gender

Age	Frequency	Percent
21-28 years	91	71.7
29-35 years	32	25.2
36-45 years	3	2.4
46-55 years	1	.8
Total	127	100.0

Source: own survey data, 2019

For easily understanding of respondents' age the researcher categorized in four age groups. First category was 21-28years age range. Out of the total respondents 91 of them were belonging to this category and that represents 71.65% of the respondents.

The second category was 29-35 years age range. Under this category there were 32 employees and they represented 25.2% of the total sample.

Third category was 36-45 years age range. In this category there were 3 respondents and represented 2.36% of the total sample.

Lastly the fourth category from 46-55 years age range there was only 1 respondent found and accounts for 0.79 % of the total sample. Based on the data on Table 4-2, the highest portion of the respondents grouped under the first age category (21-29 years). However the fourth category (46-55 years) was having the least number of respondents. Based on the age group data from table 4-2 the sample was predominantly aged between 21 and 28years (71.65%), with the highest number (91 respondents).

4.1.3 Education level distribution of the respondents

Table4.3distribution of respondent by education level

	Frequency	Percent
BSC degree	113	89.0
MSC	14	11.0
Total	127	100.0

Source: own survey data, 2019

Education level was categorized into four groups. But employees who have college diploma and PHD were not participated for this research. Employees who have BSC degree were 113 which represented 88.98% of the total sample. MSC holder of respondents was 14 of which represented 11.02% of the total sample. As showed on table 4-3 of the total respondents participated for this study 89% has BSC and 11% MSC holders. This indicates that most of biomedical engineers at Addis Ababa public health facilities were attended BSC degree.

4.1.4 Year of experience distribution of the respondents

Table4.4distribution of respondent by year of experience

	Frequency	Percent
less than 1 year	26	20.5
1-2 years	42	33.1
3-5 years	51	40.2
6-9 years	6	4.7
10 and above years	2	1.6
Total	127	100.0

Source: own survey data, 2019

This component represents the number of years of employee service within health facilities. Twenty six employees have worked less than three year and they represented 20.5% of the total sample. The employees, who are employing greater than three year and less than five years, were 51 of the total sample and represented 40.2% of the total sample. From the total respondents 42 employees, who worked for 1-2 years, were represented 33.1% of the sample.

Therefore, from the above table the work experience of the respondents shows that the majority of the participants had 3-5 years' work experience.

4.1.5 Position in the health facilities distribution of the respondents

Table 4.5distribution of respondent by Position in the health facilities

	Frequency	Percent
staff	91	71.7
unit coordinator	30	23.6
director	6	4.7
Total	127	100.0

Source: own survey data, 2019

As shown on table 4-5, from the collected data 91 employees which accounts 71.7% of the total sample belongs to staffs position. Under second category of position 30 employees are unit coordinators which represents23.6% of the total sample and 6 employees were under director position and they represented 4.7% of the total sample. As per table 4-5, in terms of positions in the health facilities, majority of biomedical engineers are staff at their health facilities.

4.1.6 Salary distribution of the respondents

Table 4.6 distribution of respondent by Salary

	Frequency	Percent
Birr 4,000-4,900	50	39.4
Birr 5,000-6,200	51	40.2
Birr 6,300-10,000	19	15.0
above birr 10,000	7	5.5
Total	127	100.0

Source: own survey data, 2019

This component showed the salary of employee within health facilities. Fifty (50) employees have been paid from birr 4,000-4,900and they represented 39.4% of the total sample. The employees, who have been paid from birr 5,000-6, 200, were represented 40.2% of the total sample and account for 51 in number. Employees, who have been paid from birr 6,300-10,000were 19 and were represented 15.0% of the total sample. Lastly, from the total

respondents 7 employees were paid above birr 10,000 and represented 5.5%of the total sample.

Therefore, from table 4-6salary of the respondents' shows that the majority of the participants have been paid from birr 5,000-6,200as clearly identified.

4.2 Data Analysis and Interpretation

The data analysis method used was descriptive statistics method using Statistical Packages for the Social Science/SPSS/ version 20 Software. The survey questionnaires were distributed to 133 sample respondents, and out of all only 129 respondents completed and returned, however two of them found incomplete and excluded from the analysis. Hence, the final data collected and analyzed were from 127 sample respondents.

This aspect was divided into seven topic areas: -wages and benefits, job security and sense of value, recognition/promotion and creativity, the work itself and work environment, relationship with co-workers and senior management, work assignment, workshop and training.

4.2.1 Wages and benefits

Table 4.7 wages and benefits

Statement of questionnaire	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total sample
I am satisfied with the wages paid to me for the work I do.	51	55	11	8	2	127
	40.2%	43.3%	8.7%	6.3%	1.6%	
I have incentive wage schemes for efficient work at this health facility.	75	46	3	2	1	127
	59.1%	36.2%	2.4%	1.6%	0.8%	
There is little chance for promotion on my job.	14	21	9	47	36	127
	11.0%	16.5%	7.1%	37.0%	28.3%	
This health facility provides other benefits for biomedical engineers.	34	59	9	23	2	127
	26.8%	46.5%	7.1%	18.1%	1.6%	

Source: own survey data, 2019

Wages Paid

From table 4-7it can be seen that 51respondents rated 40.2% of total sample were strongly disagreed with satisfaction of wages paid for the work they do. Similarly, 55respondents rated 43.3% of total sample were disagreed with satisfaction of wages paid for the work they do. About 8.7% or 11respondents of total sample were neutral with satisfaction of wages paid for the work they do.

Apart from this, there are 8numbers rated 6.3% of respondents of the total sample were agreed with satisfaction of wages paid for the work they do and 2 numbers rated 1.6% of respondents of the total sample were strongly agreed with satisfaction of wages paid for the work they do. Totally 10 numbers of (a total of 7.9%) respondents of total sample were agreed with satisfaction of wages paid for the work they do.

Therefore, more than three-quarters (a total of 83.5%) respondents of total sample were disagreed with satisfaction of wages paid for the work they do.

Incentive wage schemes

Secondly, 75 respondents rated 59.1%of total sample were strongly disagreed with having incentive wage schemes for efficient work. And 46 respondents rated 36.2% of total sample were disagreed with having incentive wage schemes for best performance. About 2.4% or 3respondents of total sample were neutral with having incentive wage schemes for best performance. But there were 2 respondents rated 1.6% of total sample agreed and only 1 respondent rated 0.8% of total sample strongly agreed with having incentive wage schemes for efficient work.

From this point of view, table 4-7 clearly showed that 121 (a total of 95.3%) respondents of total sample were disagreed with having incentive wage schemes for best performance.

Little chance for promotion

Thirdly, table 4-7showed that 14 respondents rated 11.0% of total sample were strongly disagreed and 21respondents rated 16.5%of total sample were disagreed with little chance for promotion on job. There were 9 respondents rated 7.1% of total sample neutral with little chance for promotion on job. But 47 respondents rated 37.0% of total sample were agreed and 36 respondents rated 28.3% of total sample were strongly agreed with little chance for promotion on job. The above analysis implies that more employees (total of 83 respondents)

were agreed and strongly agreed with little chance for promotion on job at the health facilities.

Other benefits

Lastly, there were 34 respondents (26.8%) of total sample were strongly disagreed on health facility provides other benefits for biomedical engineers. In addition 59respondents (46.5%) of total sample were disagreed on health facility provides other benefits for biomedical engineers. There were 9 respondents (7.1%) of total sample neutral on health facility provides other benefits for biomedical engineers. Finally 23respondents (18.1%) of total sample strongly agreed and 2 respondents (1.6%) of total sample agreed on health facility provide other benefits for biomedical engineers.

According to this analysis, a total of 93 respondents rated 73.2% of total sample were disagreed on health facility provide other benefits for biomedical engineers.

4.2.2 Job security and sense of value

Table 4.8job security and sense of value

Statement of questionnaire	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total sample
I feel a sense of secure in doing my job.	47	62	10	5	3	127
	37.0%	48.8%	7.9%	3.9%	2.4%	
I sometimes feel my job is meaningless.	10	16	20	52	29	127
	7.9%	12.6%	15.7%	40.9%	22.8%	
There is a clear system that this health facility pays risk allowance for biomedical engineers.	72	34	15	5	1	127
	56.7%	26.8%	11.8%	3.9%	0.8%	
I feel that I am a valued and respected employee for this health facility.	34	47	6	24	16	127
	26.8%	37.0%	4.7%	18.9%	12.6%	
I see myself remaining at this health facility for an extended period of time.	59	45	12	7	4	127
	46.5%	35.4%	9.4%	5.5%	3.1%	
I am satisfied with my job security at this health facility.	47	41	18	14	7	127
	37.0%	32.3%	14.2%	11.0%	5.5%	

Source: own survey data, 2019

Job Security

Table 4-8 describes that 47numbers of respondents of total sample rated37.0%were strongly disagreed with feeling sense of secure in doing job and 62numbers of respondents of total sample rated 48.8%were disagreed with feeling sense of secure in doing job. There were 10respondents (7.9%) of total sample neutral with feeling sense of secure in doing job.

In addition to this, 5numbers of respondents of total sample rated 3.9% were agreed and 3numbers of respondents of total sample rated 2.4%were strongly agreed with feeling sense of secure in doing job.

Therefore, total of 109 numbers of respondents (85.8%) of total sample were disagreed with feeling sense of secure in doing job. This indicates that each health facility has low job security for biomedical engineers.

Job meaninglessness

Table 4-8 also shows that the employees feeling about their job contributions to themselves and health facilities/society as a whole is meaningless. Having informed this,10 numbers of respondents of total sample rated 7.9%were strongly disagreed and 16respondents of total sample rated 12.6%weredisagreed with sometimes feeling the job is meaningless. On the other side, 20respondents of total sample rated 15.7%were neutral with sometimes feeling the job is meaningless.

But, 52numbers of respondents of total sample rated 40.9%were agreed and 29respondents of total sample rated22.8%werestrongly agreed with sometimes feeling the job is meaningless.

From this analysis, it is clear that a total of 81 respondents or about 64% of the total sample were agreed that they sometimes feel their job is meaningless.

Risk allowance

There were 72numbers of respondents of total sample rated 56.7%strongly disagreed and 34respondents of total sample rated26.8%disagreedfor there is a clear system that each health facility pays risk allowance for biomedical engineers. And 15respondents of total sample rated11.8% were neutral for there is a clear system that each health facility pays risk allowance for biomedical engineers. Table 4-8also shows that 5numbers respondents of total sample rated3.9% were agreed and 1 number of respondents of total sample rated 0.8% were

strongly agreed for there is a clear system that each health facility pays risk allowance for biomedical engineers.

This analysis can conclude that more than three-quarter (106 numbers of respondent rated about 83%) were disagreed for there is a clear system that each health facility pays risk allowance for biomedical engineers. As strengthened from interview, there is no a clear system of paying risk allowance and other benefits.

Valued and respected

From table 4-8there were 34numbers of respondents of total sample rated 26.8%were strongly disagreed and 47respondents rated 37.0%of total sample were disagreed with a feeling that a valued and respected employee for their respective health facility. In between 6respondents of total sample rated 4.7% were neutral with a feeling that a valued and respected employee for their respective health facility. Another 24 respondents rated 18.9%of total sample were agreed and 16 numbers of respondents rate of 12.6% of total sample were strongly agreed with a feeling that a valued and respected employee for their respective health facility.

According to this analysis, a total number of 81 respondents or about 64% of the total sample were disagreed that the respondents feel as they are a valued and respected employee for their respective health facility.

Remaining for an extended period of time

According to collected data 59 numbers of respondents (46.5%) of total sample were strongly disagreed and 45 respondents (35.4%) of total sample were disagreed that the employees themselves remaining at their respective health facility for an extended period of time. Under this statement 12 respondents of total sample rated9.4% were neutral in that the employees themselves remaining at their respective health facility for an extended period of time. And, there were 7respondents (5.5%) of the total sample agreed and 4respondents (3.1%) strongly agreed that the employees themselves remaining at their respective health facility for an extended period of time. The result shows that a total of 104 numbers of respondents (about 82%) were disagreed that the employees themselves remaining at their respective health facility for an extended period of time. As interview responses too, almost all biomedical engineers are not feeling remaining for an extended period of time at their facility.

Satisfied with job security

Table 4-8 lastly, indicates 47 numbers of respondents rated 37.0% of the total sample were strongly disagreed and 41 respondents (32.3%) of the total sample were disagreed by being satisfied with job security at health facilities in which they are employed in. And there were 18numbers of respondents rated 14.2% of the total sample who are neutral for being satisfied with job security at health facilities in which they are employed in.

In addition to this, table 4-8 shows that 14 numbers of respondents (11.0%) of the total sample were agreed and 7 respondents rated 5.5% of the total sample were strongly agreed for being satisfied with job security at health facilities in which they are employed in.

Therefore, the result tells that more than three-quarter (88 numbers of respondent or 69%) of the total sample were disagreed for being satisfied with job security at health facilities in which they are working in.

4.2.3 Recognition/promotion and creativity

Table 4.9 Recognition/promotion and creativity

Statement of questionnaire	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total sample
When I do a good job, I receive the recognition from my immediate director.	49	50	9	12	7	127
	38.6%	39.4%	7.1%	9.4%	5.5%	
Senior management team of the facility encourages to biomedical engineers for their best performance.	34	59	27	4	3	127
	26.8%	46.5%	21.3%	3.1%	2.4%	
Higher officials/managers reward to biomedical engineers for their best performance.	32	48	26	13	8	127
	25.2%	37.8%	20.5%	10.2%	6.3%	
Senior management of the health facility encourages creativity, innovation, and continuous improvement.	33	52	22	11	9	127
	26.0%	40.9%	17.3%	8.7%	7.1%	
I am satisfied with my health facility's senior management team's recognitions/rewards.	40	60	21	4	2	127
	31.5%	47.2%	16.5%	3.1%	1.6%	

Source: own survey data, 2019

Recognitions

As the above table illustrates, 38.6% (49 numbers) of the respondents were strongly disagreed and 39.4% (50 numbers) of the respondents were disagreed on employees receive the recognition from their immediate director when they do a good job. But, 9 respondents (7.1%) of the total sample were neutral for employees receive the recognition from their immediate director when they do a good job.

Furthermore, 12respondents (9.4%) of the total sample were agreed and 7number of respondents rated5.5%were strongly agreed for employees receive the recognition from their immediate director when they do a good job.

The study in this aspect point out that most of the employees has disagreed for receiving recognitions from their director when they do a good job.

Management team's encouragement

Table 4-9 indicates that 34 numbers of respondents (26.8%) of the total sample were strongly disagreed and 59 respondents rated (46.5%) of the total sample were disagreed on senior management team of the facility encourages to biomedical engineers for their best performance. The above table also shows that 27 number of respondents rated 21.3% of the total sample were neutral on senior management team of the facility encourages to biomedical engineers for their best performance.

On the other hand, among the respondents only 4(3.1%) of the total sample respondents were agreed and 3 respondents rated 2.4% were strongly agreed on senior management team of the facility encourages to biomedical engineers for their best performance.

This study indicated that most of the respondents were not agreed on senior management team of the facility encourages to biomedical engineers for their best performance. AS directorates and case team leaders strengthened from interview, senior management of the health facility does not encourage biomedical engineers for their best performance.

Rewards

More than three-quarter that is 32respondents (25.2%) of the total sample were strongly disagreed and48(37.8%) respondents disagreed with the statement of which higher officials/managers reward to biomedical engineers for their best performance.Other26 respondents rated20.5% of the total sample were neutral to the statement of which higher

officials/managers reward to biomedical engineers for their best performance. But, 13numbersof respondents 10.2% of the sample were agreed and 8(6.3%) respondents of the sample were strongly agreed for higher officials/managers reward to biomedical engineers for their best performance.

The finding of this study shows that most of the respondents a total number of 80(63%) were disagreed with the statement of which higher officials/managers reward to biomedical engineers for their best performance. AS interviewed directorates and case team leaders strengthened, senior management of the health facility does not give the recognitions or rewards.

Creativity and innovation

Table 4-9 indicates that there were 33 respondents rated 26.0%from the total sample strongly disagreed and 52(40.9%) number of respondents of the total sample were disagreed in which senior management of the health facility encourages creativity, innovation, and continuous improvement. Besides, only 22 rated 17.3% respondents were neutral to the statement of senior management of the health facility encourages creativity, innovation, and continuous improvement. On the other hand, 11 numbers of respondents rated 8.7% of the total sample were agreed and other 9 respondents 7.1% were strongly agreed to the statement of senior management of the health facility encourages creativity, innovation, and continuous improvement.

Therefore, this study found out that most of the respondents (total of 85 or about 70%) disagreed for the statement of senior management of the health facility encourages creativity, innovation, and continuous improvement.

Satisfaction with recognitions/rewards

Lastly, table 4-9 shows that there were 40 numbers of respondents rated 31.5%who are strongly disagreed and 60numbers of respondents rated 47.2% of the total sample were disagreed on satisfaction with their health facility's senior management team's recognitions/rewards. But, about21 numbers of respondents 16.5% of the total sample were neutral on satisfaction with their health facility's senior management team's recognitions/ rewards. Furthermore, 4 numbers of respondents of the total sample were agreed and 2 respondents rated 1.6%of the total sample were strongly agreed on satisfaction with their health facility's senior management team's recognitions/rewards.

From this study, it is clear that most of respondents about 78% from the total sample were disagreed on satisfaction with their health facility's senior management team's recognitions/rewards.

4.2.4The work itself and work environment

Table 4.10the work itself and work environment

Statement of questionnaire	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total sample
I am satisfied with my current biomedical engineering job at this health facility.	35	49	22	18	3	127
	27.6%	38.6%	17.3%	14.2%	2.4%	
I have been satisfied with too much maintenance/repairing work.	43	32	10	26	16	127
	33.9%	25.2%	7.9%	20.5%	12.6%	
My satisfaction determines my productivity and job performance at this health facility.	4	10	7	65	41	127
	3.1%	7.9%	5.5%	51.2%	32.3%	
I am satisfied with the present working conditions at this health facility.	47	46	14	16	4	127
	37.0%	36.2%	11.0%	12.6%	3.1%	
I am satisfied with the present working environment at this health facility.	51	43	20	7	6	127
	40.2%	33.9%	15.7%	5.5%	4.7%	
I am satisfied with the medical equipment management systems and service training provided by the health facility.	36	50	24	13	4	127
	28.3%	39.4%	18.9%	10.2%	3.1%	
I am satisfied with this health facility's medical equipment workshop and its maintenance toolkits.	51	51	16	7	2	127
	40.2%	40.2%	12.6%	5.5%	1.6%	
I would highly rank my overall job satisfaction at this health facility.	58	46	19	3	1	127
	45.7%	36.2%	15.0%	2.4%	.8%	
There are changes I feel it could be made to improve my job satisfaction.	34	38	27	18	10	
	26.8%	29.9%	21.3%	14.2%	7.9%	

Source: own survey data, 2019

Satisfaction with current job

As table 4-10 illustrates, large number of respondent that is 35 in numbers or 27.6% of the total sample were strongly disagreed and 49 number of respondents rated 38.6% of the total sample were disagreed on satisfaction with their current biomedical engineering job at each respective health facility. And other respondents 22 in numbers or rated 17.3% of the total sample were neutral on satisfaction with their current biomedical engineering job at each respective health facility. On the other hand, 18respondents or 14.2%of the total sample were agreed and 3 respondents rated 2.4% of the total sample were strongly agreed on satisfaction with their current biomedical engineering job at each respective health facility.

Generally, from the above illustration we can conclude that most of the respondents that are 84numbers (66%) from the total sample were disagreed on satisfaction with their current biomedical engineering job at each respective health facility.

Too much maintenance/ repairing work

Table 4-10 also illustrates that the majority 33.9% or 43 numbers of the respondents of the total sample were strongly disagreed and 32numbers of the respondents rated 25.2% of the total sample were disagreed for having been satisfied with too much maintenance/ repairing work. But, 10(7.9%) numbers respondents were neutral on the response of having been satisfied with too much maintenance/ repairing work. Furthermore, there were respondents 26 or 20.5% of the total sample agreed and 16 respondents rated12.6%were strongly agreed for having been satisfied with too much maintenance/ repairing work.

Therefore, this study concludes that more of the respondents (75 numbers of respondents) were disagreed for being satisfied with too much maintenance/ repairing work.

Satisfaction determines productivity and job performance

In table 4-10, 3.1% or 4 numbers of respondents of the total sample were strongly disagreed and 10 respondents rated 7.9% of the total sample were disagreed on the statement of employees' satisfaction determines their productivity and job performance at their health facility. In between, there were 5.5% of respondents or 7 in numbers of the total sample were neutral for the statement of employees' satisfaction determines their productivity and job performance at their health facility. But, the majority of respondents that is 65 numbers or 51.2% of the total sample were agreed and 41 numbers of respondents rated 32.3% of the

total sample were strongly agreed for the statement of employees' satisfaction determines their productivity and job performance at their health facility.

Thus, the result implies that more of the respondents a total number of 106 employee rated about 83.5% of the total sample were agreed for the statement of employees' satisfaction determines their productivity and job performance at their health facility.

Present working conditions

As per the data collected with regards to satisfaction of the present work conditions, only 47 numbers of respondents or 37.0% of the total sample were strongly disagreed and 46 number respondents or 36.2% of the total sample were disagreed with employees' satisfaction of the present working conditions at their health facilities. Other respondents, 14 in numbers or 11.0% of the total sample were neutral with employees' satisfaction of the present working conditions at their health facilities. But in other words, 16 numbers of respondents rated 12.6% of the total sample were agreed and 4numbers of respondents rated 3.1% of the total sample were strongly agreed on employees' satisfaction of the present working conditions at their health facilities. From this point of view, the study indicates that most of the respondents that are 93 numbers of respondents or about 73.2% of the total sample were disagreed on employees' satisfaction of the present working conditions at their health facilities. As strengthened from interview, the working conditions is not totally satisfying most of biomedical engineers at their respective health facility.

Present working environment

As table 4-10 illustrates, large number of respondents that are 51 in numbers or 40.2% of the total sample were strongly disagreed and 43 numbers of respondents or 33.9% of the total sample were disagreed on employees' satisfaction of the present working environment at their health facilities. But in between, there were 20 numbers of respondents or 15.7% of the total sample neutral on employees' satisfaction of the present working environment at their health facilities. Besides, there were 7 numbers of respondents or 5.5% of the total sample agreed and 6 respondents rated 4.7% of the total sample were strongly agreed on employees' satisfaction of the present working environment at their health facilities. Thus, from this study it is clear that a total of 94 respondents or about 74% of the total sample were disagreed on employees' satisfaction of the present working environment at their respective health facilities.

As strengthened from interview, the working environments is not totally satisfying most of biomedical engineers at their respective health facility.

Medical equipment management systems and service training

As table 4-10 illustrates, large number of respondents namely 36 in numbers or 28.3%of the total sample were strongly disagreed and 50 respondents or 39.4% of the total sample were disagreed were for the statement of employee's satisfaction with the medical equipment management systems and service training provided by the health facility. Additionally, 24 respondents or 18.9% of the total sample were remaining neutral with the statement of employee's satisfaction with the medical equipment management systems and service training provided by the health facility.

In addition, there were respondents counted 13 in number or 10.2% of the total sample agreed and 4 number of respondents rated 3.1%of the total sample were strongly agreed the statement of employee's satisfaction with the medical equipment management systems and service training provided by the health facility.

Therefore, from this result it can be concluded that large number of respondents a total of 86numbers or about 68% of the total sample were disagreed for the statement of employee's satisfaction with the medical equipment management systems and service training provided by the health facility.

Medical equipment workshop and its maintenance toolkits

From study 51 numbers of respondents rated 40.2% of the total sample were strongly disagreed and similarly 51number of respondents or 40.2%of the total sample were disagreed with satisfaction of health facility's medical equipment workshop and its maintenance toolkits. In between, there were 16 numbers of respondents or 12.6% of the total sample was neutral for the statement of satisfaction of health facility's medical equipment workshop and its maintenance toolkits. Beside this, 7 numbers of respondents or 5.5% of the total sample were agreed and 2 respondents rated1.6% were strongly agreed for statement of satisfaction of health facility's medical equipment workshop and its maintenance toolkits. Therefore, the finding of this research pointed out that there is more than three-quarter of the total sample were disagreed for the statement of satisfaction of health facility's medical equipment workshop and its maintenance toolkits. In addition to

this from interview, medical equipment shop is not well designed and equipped with maintenance toolkits and calibrators.

Rank of overall job satisfaction

Table 4-10 also shows that the majority of respondents that is 58 numbers or 45.7% of the total sample were strongly disagreed and 46 numbers of respondents rated 36.2% of the total sample were disagreed for the statement of employees highly rank their overall job satisfaction at their respective health facility. And 19 numbers of respondents rated15.0%of the total sample were neutral for the statement of employees highly rank their overall job satisfaction at their respective health facility. But, there were 3 respondents or 2.4%agreed and only 1 respondent rated .8%of the total sample were strongly agreed for the statements of employees highly rank their overall job satisfaction at their respective health facility.

This implies that, more than three-quarter of respondents or about 81% of employees were disagreed for the statements of employees highly rank their overall job satisfaction at their respective health facility.

Changes to improve job satisfaction

Lastly from table 4-10, there were respondents counted for 34 numbers or rated 26.8%of the total sample were strongly disagreed and 38 numbers of respondents or 29.9% of the total sample were disagreed on the statement that employees' feeling about changes that could be made to improve their job satisfaction.27 numbers of respondents or 21.3% of the total sample were neutral for the statement that employees' feeling about changes that could be made to improve their job satisfaction. Furthermore, 18 numbers of respondents or 14.2% of the total sample were agreed and 10 numbers of respondents or rated 7.9% of the total sample were strongly agreed for the statement that employees' feeling about changes that could be made to improve their job satisfaction.

Thus, this study concluded that more than half of respondents namely a total numbers of 72 or rated about 56%of the total sample were disagreed with the statement of employees' feeling about changes that could be made to improve their job satisfaction.

4.2.5 Relationship with co-workers and senior management

Table4.11relationship with co-workers and senior management

Statement of questionnaire	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total sample
I have a good relationship with m y co-workers.	2	5	8	52	60	127
	1.6%	3.9%	6.3%	40.9%	47.2%	
We biomedical engineers behave well with the senior management of the health facility.	12	17	18	34	46	127
	9.4%	13.4%	14.2%	26.8%	36.2%	
Senior management believes that biomedical engineers are the most important asset of this health facility.	48	51	17	7	4	127
	37.8%	40.2%	13.4%	5.5%	3.1%	

Source: own survey data, 2019

Relationship with co-workers

Employees' positive relationships with co-workers or managements of the health facility may the work more attractive and increase job satisfaction.

According to the survey 2 numbers of respondents or 1.6% of the total sample were strongly disagreed and 5 respondents rated 3.9% of the total sample were disagreed with having a good relationship with other co-workers. On the other hand, 8 numbers of respondents rated 6.3% of the total sample were remain neutral for the statement of having a good relationship with other co-workers. But, table 4-11 illustrates that a majority of respondents, 52 in number or 40.9% of the total sample were agreed and other 60 respondents rated47.2% of the total sample were strongly agreed that employees have a good relationship with other workers. As a result shown above concluded, most of respondents (88% of the total sample) have a good relationship with other workers.

As interview strengthened, almost all biomedical engineers had good relationships with their co-workers and senior management team members.

Behave well with senior management

As table 4-11 clearly shows, small amount of respondents that is 12 numbers or 9.4% of the total sample were strongly disagreed and 17 numbers of respondents rated 13.4% of the total sample were disagreed with biomedical engineers behave well with the senior management of the health facility. But, 18 numbers of respondents or 14.2% of the total sample were remaining neutral for the statement that biomedical engineers behave well with the senior management of the health facility. On the other hand, 34 respondents or 26.8% of the total sample were agreed and other 46 numbers of respondents rated 36.2% of the total sample were strongly agreed for the statement that biomedical engineers behave well with the senior management of the health facility.

This concludes that, more than half of the employees (63% of respondents)were agreed for the statement that biomedical engineers behave well with the senior management of the health facility.

Most important asset

The majority respondents 48 in numbers or 37.8% of the total sample were strongly disagreed and 51 numbers of respondent or 40.2%of the total sample were disagreed with the statement of Senior management believes that biomedical engineers are the most important asset of that particular health facility. In between, 17 respondents or 13.4% of the total sample were neutral for senior management believes' that biomedical engineers are the most important asset of that particular health facility. But, other respondents 7 in numbers or 5.5% of the total sample were agreed and 4 numbers of respondents or 3.1%of the total sample were strongly agreed for the statement of senior management believes' that biomedical engineers are the most important asset of that particular health facility.

From this point of view, the study concludes that most of respondents a total number of 99 or about 78% of the total sample were disagreed with senior management believes' that biomedical engineers are the most important asset of that particular health facility.

4.2.6 Work assignment

Table 4.12work assignment

Statement of questionnaire	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total sample
The workload I have at this health facility is distributed fairly.	30	44	18	26	9	127
	23.6%	34.6%	14.2%	20.5%	7.1%	
I have a clear job descriptions prepared by the organization that help in improving my performance.	36	36	16	24	15	127
	28.3%	28.3%	12.6%	18.9%	11.8%	
Work assignments provided by unit leader are fully explained.	12	25	20	47	23	127
	9.4%	19.7%	15.7%	37.0%	18.1%	
Work assignments provided by medical director/directorate /CEO are fully explained.	26	49	25	18	9	127
	20.5%	38.6%	19.7%	14.2%	7.1%	
Biomedical engineering department is ordered by Medical directors/directorates/CEO to prepare data analysis for all needy medical equipments before procuring.	48	54	16	6	3	127
	37.8%	42.5%	12.6%	4.7%	2.4%	
Biomedical engineering department solely prepare technical specifications for all medical equipments before procuring new medical equipment.	38	46	9	20	14	127
	29.9%	36.2%	7.1%	15.7%	11.0%	
Biomedical engineering department actively participate in a planned and strategically lead procurement of medical equipment for this health facility.	47	46	18	10	6	127
	37.0%	36.2%	14.2%	7.9%	4.7%	
Biomedical engineering department actively participate during logistic process of medical equipment for this health facility.	49	45	18	10	5	127
	38.6%	35.4%	14.2%	7.9%	3.9%	

Source: own survey data, 2019

The Workload

According to the collected data 30 numbers of respondents or 23.6% of the total sample were strongly disagreed and 44 respondents rated 34.6% of the total sample were disagreed with the workload that employees have at their respective health facility is distributed fairly. Others 18 numbers of respondents or14.2% of the total sample were remaining neutral for the statements of the workload that employees have at their respective health facility is distributed fairly.

But, there were respondents 26 in number or 20.5% of the total samples were agreed and 9respondents or 7.1%of the total sample were strongly agreed for the workload that employees have at their respective health facility is distributed fairly.

Therefore, from table 4-13 more than half of the total samples (58% of employees) were disagreed for the statement that the workload employees have at their respective health facility is distributed fairly.

Clear job descriptions

Table 4-12also describes that 36 numbers of respondents or28.3% of the total sample were strongly disagreed and similarly 36 numbers of respondents or28.3% of the total sample were disagreed on having a clear job descriptions prepared by the health facility that help in improving their performance. And 16respondents rated 12.6% of the total sample were neutral for response of having a clear job descriptions prepared by the health facility that help in improving their performance. But,24 numbers of respondents or18.9%of the total sample were agreed and 15 respondents rated 11.8% of the total sample were strongly agreed for response of having a clear job descriptions prepared by the health facility that help in improving their performance.

This study indicates that more than half of employees disagreed for response of having a clear job descriptions prepared by the health facility that help in improving their performance.

Work assignments by unit leader

When asked about the Work assignments provided by unit leader,12respondents or 9.4% of the total sample were strongly disagreed and other 25 numbers of respondents or 19.7% of the total sample were disagreed for the statement of Work assignments provided by unit leader are fully explained. But, 20 numbers of respondents or 15.7% of the total sample

were remaining neutral for the statement of Work assignments provided by unit leader are fully explained. Other respondents that is 47 in numbers rated 37.0% of the total sample were agreed and 23 numbers of respondents or 18.1% of the total sample were strongly agreed for the statement of Work assignments provided by unit leader are fully explained.

As this result illustrates, majority of respondents (55% of employees) were agreed for the statement of Work assignments provided by unit leader are fully explained.

Work assignments by medical director/ directorate /CEO

As table 4-12 illustrates, a large numbers of respondents that is 26 in numbers or 20.5% of the total sample were strongly disagreed and 49 numbers of respondents or 38.6%of the total sample were disagreed for the statements of work assignments provided by medical director/ directorate /CEO are fully explained. Other respondents,25 in numbers or 19.7%of the total sample were remaining neutral for the statements of work assignments provided by medical director/ directorate /CEO are fully explained. In addition, there were18 numbers of respondents rated 14.2%of the total sample were agreed and other 9 numbers of respondents or 7.1% were strongly agreed for the statements of work assignments provided by medical director/ directorate /CEO are fully explained.

From this study, we can understood that more than half of the total sample (75 numbers of respondents or 59% of the total sample) were disagreed for the statements of work assignments provided by medical director/ directorate /CEO are fully explained.

Order by Medical directors/directorates/CEO

As the above table illustrate, 48 numbers of respondents or 37.8% of the total sample had replied as they are strongly disagreed and 54respondents or rated 42.5% of the total sample had replied as they are disagreed that biomedical engineering department is ordered by Medical directors/directorates/CEO to prepare data analysis for all needy medical equipments before procuring. But, in-between there were respondents 16 in numbers or 12.6% who are remaining neutral for the statement of biomedical engineering department is ordered by Medical directors/directorates/CEO to prepare data analysis for all needy medical equipments before procuring. And, 6 numbers of respondents or 4.7%of the total sample were agreed and other 3 numbers of respondents or 2.4% of the total sample were strongly agreed that biomedical engineering department is ordered by Medical

directors/directorates/CEO to prepare data analysis for all needy medical equipments before procuring.

Thus, the above table concluded that most of respondents a total of 102 numbers or more than 80% of the total sample were disagreed for the statement of biomedical engineering department are ordered by Medical directors/directorates/CEO to prepare data analysis for all needy medical equipments before procuring.

Technical specifications for all medical equipments

According to the collected data, a large numbers of respondents 38 in numbers or 29.9% of the total sample were strongly disagreed and 46 numbers of respondents or rated 36.2% of the total sample were disagreed that biomedical engineering department solely prepares technical specifications for all medical equipments before procuring new medical equipment. Others 9numbers of respondents or 7.1%of the total sample were remaining neutral for the statement of biomedical engineering department solely prepares technical specifications for all medical equipments before procuring new medical equipment. In addition, 20numbers of respondents or 15.7% of the total sample were agreed and 14respondents or 11.0% of the total sample were strongly agreed on biomedical engineering department solely prepares technical specifications for all medical equipments before procuring new medical equipment.

Therefore, the result showed that more than half of the respondents that 84 numbers or 66% of the total sample were disagreed with the statement of biomedical engineering department solely prepare technical specifications for all medical equipments before procuring new medical equipment.

Planning and lead procurement of medical equipment

As indicated in the above table 4-12, 47 numbers of respondents or37.0% of the total sample replied that they were strongly disagreed and 46 numbers of respondents or 36.2%of the total sample replied that they were disagreed in a biomedical engineering department actively participates in a planned and strategically lead procurement of medical equipment for the health facility. On the other hand, there were respondents 18 numbers or 14.2% of the total sample who are remaining neutral in a biomedical engineering department actively participates in a planned and strategically lead procurement of medical equipment for the health facility. But, 10 numbers of respondents rated 7.9% of the total sample were agreed

and only 6 numbers of respondents or 4.7% from the total sample were strongly agreed for the statement of a biomedical engineering department actively participates in a planned and strategically lead procurement of medical equipment for the health facility.

As a result, there were more respondents a total of 93 numbers or 73% of the total sample disagreed for the statement of a biomedical engineering department actively participates in a planned and strategically lead procurement of medical equipment for the health facility.

the interviewers had replied on the final interviewee question, as biomedical engineering case team of the health facility is not actively involving in preparing technical specifications and procurement of new medical equipments. This is because; there are legal declarations for procurements of new medical equipments were procured by PFSA for Ethiopian public health facilities.

Logistic process of medical equipments

Lastly table 4-12, illustrates that 49 numbers of respondents or 38.6% from the total sample were strongly disagreed and 45 respondents rated 35.4% of the total sample were disagreed with the statement of biomedical engineering department actively participate during logistic process of medical equipment for the health facility. And 18 numbers of respondents or 14.2% of the total sample were remaining neutral for the statement of biomedical engineering department actively participates during logistic process of medical equipment for the health facility. But, other respondents 10 in numbers or7.9% of the total sample were agreed and only 5 numbers of respondents rated3.9% from the total sample were strongly agreed for the statement of biomedical engineering department actively participates during logistic process of medical equipment for the health facility.

Therefore, table 4-12 concluded that majority of respondents that is a total of 94 in numbers or about 74% from the total sample were disagreed on the statement of biomedical engineering department actively participates during logistic process of medical equipment for the health facility. That means they were not participated during logistic process of any medical equipment providing to their respective health facility.

4.2.7 Workshop and Training

Table 4.13workshop and training

Statement of questionnaire	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total sample
This health facility provides a wide enough space for biomedical engineering unit office.	44	54	16	11	2	127
	34.6%	42.5%	12.6%	8.7%	1.6%	
This health facility's biomedical engineering unit office is well structured and equipped.	43	54	16	9	5	127
	33.9%	42.5%	12.6%	7.1%	3.9%	
This health facility's medical equipment workshop is well structured interms of design.	62	42	12	7	4	127
	48.8%	33.1%	9.4%	5.5%	3.1%	
This health facility's medical equipment workshop is well structured interms of electric power availability.	14	24	14	47	28	127
	11.0%	18.9%	11.0%	37.0%	22.0%	
This health facility's medical equipment workshop is well structured interms of water availability.	33	37	17	25	15	127
	26.0%	29.1%	13.4%	19.7%	11.8%	
This health facility's medical equipment workshop is well equipped interms of medical equipment calibrators availability.	63	38	10	10	6	127
	49.6%	29.9%	7.9%	7.9%	4.7%	
This health facility provides service training for biomedical engineers regarding medical equipment maintenance/ repairing.	41	44	19	15	8	127
	32.3%	34.6%	15.0%	11.8%	6.3%	
This health facility provides health care technology management/on medical equipment management policy/training for biomedical engineers.	32	53	8	19	15	127
	25.2%	41.7%	6.3%	15.0%	11.8%	

Source: own survey data, 2019

Space for biomedical engineering unit office

As table 4-13 illustrates, a large number of respondents 44 in numbers or 34.6% of the total sample were strongly disagreed and other 54 numbers respondents or rated 42.5% from the total sample were disagreed their this health facility providing a wide enough space for

biomedical engineering unit office. As remaining neutral, there were respondents16in numbers or 12.6% of the total sample on the statement of the health facility providing a wide enough space for biomedical engineering unit office. But, 11 numbers of respondents or 8.7% from the total sample agreed and only 2 numbers of respondents or 1.6% of the total sample were strongly agreed for the statement of the health facility providing a wide enough space for biomedical engineering unit office.

Thais indicates that more than three-quarter of employees were disagreed on the health facility providing a wide enough space for biomedical engineering unit office.

Office structure and equipment

As above table indicates, most of respondents 43 in numbers or 33.9% of the total sample were strongly disagreed and 54 numbers of respondents rated 42.5%from the total sample were disagreed for the statement of the health facility's biomedical engineering unit office is well structured and equipped. But, 16 numbers of respondents or 12.6% from the total sample were remaining neutral with employees health facility's biomedical engineering unit office is well structured and equipped.

Beside this, there were 9 numbers of respondents or 7.1%of the total samples were agreed and other 5 numbers of respondents or 3.9% from the total samples were strongly agreed with employees health facility's biomedical engineering unit office is well structured and equipped.

From this point of view, most of respondents a total of 97 numbers or about 76% from the total samples were disagreed in health facility's biomedical engineering unit offices are well structured and equipped.

That means most health facilities' biomedical engineering unit offices are not well structured and equipped with furniture and maintenance equipments.

Medical equipment workshop design

From table 4-13, 48.8% of employees or 62 numbers of respondents were strongly disagreed and 33.1% of employees or 42 numbers of respondents were disagreed on the health facility's medical equipment workshop is well structured interms of design. For this statement, there were respondents counted 12 or 9.4% of the total sample remaining neutral for the health facility's medical equipment workshop is well structured interms of design. And other employees 7 in numbers or 5.5% of the total sample were agreed and only 4

respondents that are3.1% of the total sample were strongly agreed for the health facility's medical equipment workshop is well structured interms of design.

Therefore, from this study it can be concluded that more than three-quarter of employees that is a total of 82% from the total sample were disagreed for the health facility's medical equipment workshop is well structured interms of design. From this conclusion, we understood that the health facility's medical equipment workshop is not well structured interms of design.

Workshop's Electric power availability

As table 4-13 illustrates, 14 numbers of respondents or 11.0% of employees were strongly disagreed and 24numbers of respondents or 18.9% of employees were disagreed with health facility's medical equipment workshop is well structured interms of electric power availability. But, 14 numbers of respondents or 11.0% of employees from the total sample were remaining neutral with health facility's medical equipment workshop is well structured interms of electric power availability. According to the survey, 47 numbers of respondents or 37.0%of employees from the total sample were agreed and others 28 respondents or 22.0% of employees of the total sample were strongly agreed with health facility's medical equipment workshop is well structured interms of electric power availability.

Thus, from the study more than half of respondents that is 75 in numbers or 59% of employees from the total sample were agreed that health facility's medical equipment workshop is well structured interms of electric power availability.

Workshop's Water availability

According to the survey, employees of 26.0%or33 numbers of respondents from the total sample were strongly disagreed and 37 respondents or 29.1% of employees were disagreed with the health facility's medical equipment workshop is well structured interms of water availability. And 17 numbers of respondents or 13.4% of employees from the total sample were remaining as neutral for the statement of the health facility's medical equipment workshop is well structured interms of water availability. But, 25 numbers of respondents or 19.7% of employees from the total sample were agreed and the other respondents 15 in numbers or11.8% of employees from the total samples were strongly agreed for the statement of the health facility's medical equipment workshop is well structured interms of water availability.

Therefore, from this point of view more than half of the employees of 55% or 70 numbers of respondents were disagreed with the health facility's medical equipment workshop is well structured interms of water availability. From this result, we understood that most health facility's medical equipment workshop is not well structured interms of water availability.

Workshop's calibrators availability

According to the collected data summarized in table 4-13 shows 49.6% of employees that are63 numbers of respondents of the total sample were strongly disagreed and 38 respondents or 29.9% of employees from the total sample were disagreed for the health facility's medical equipment workshop is well equipped interms of medical equipment calibrators availability. But, others respondents 10 in numbers or 7.9% of employees were remaining neutral for the health facility's medical equipment workshop is well equipped interms of medical equipment calibrators availability. Table 4-13 also shows that there were employees of 7.9% or 10 numbers of respondents of the total sample were agreed and only 6 numbers of respondents or 4.7% of employees from the total sample were strongly agreed for the health facility's medical equipment workshop is well equipped interms of medical equipment calibrators availability.

Thus, the result of the survey concluded that more than three-quarter of employees a total of 101 numbers of respondents that is about 79% of employees from the total sample were disagreed that the health facility's medical equipment workshop is well equipped interms of medical equipment calibrators availability.

Service training for biomedical engineers

Table 4-13 indicates that 41 numbers of respondents or 32.3% of employees from the total sample were strongly disagreed and 44 respondents which are 34.6% of employees from the total sample were disagreed for the statement of the health facility provides service training for biomedical engineers regarding medical equipment maintenance/ repairing. And 19 numbers of respondents or 15.0% of employees from the total sample were neutral for statement of the health facility provides service training for biomedical engineers regarding medical equipment maintenance/ repairing. Others employees 15in numbers or 11.8% of respondents from the total sample were agreed and only 8 numbers of respondents or 6.3% of employees from the total sample were strongly agreed for statement of the health facility

provides service training for biomedical engineers regarding medical equipment maintenance/ repairing.

Therefore, from table 4-13 the result showed that more than half of employees a total numbers of 85 respondents or about 70% of employees from the total sample were disagreed for statement of the health facility provide service training for biomedical engineers regarding medical equipment maintenance/ repairing. That means most biomedical engineers disagreed in that most facility did not provide them service training regarding medical equipment maintenance/ repairing.

Health care technology management training

As lastly table 4-13 illustrates, 32 numbers of respondents or about 25.2% of employees from the total sample were strongly disagreed and 53 numbers of employees rated 41.7% of employees from the total sample were disagreed in that the health facility provides health care technology management/on medical equipment management policy/training for biomedical engineers. Other 8 numbers of respondents or 6.3% of employees from the total sample were remaining neutral for the statement of the health facility provides health care technology management/on medical equipment management policy/training for biomedical engineers. In addition to these, other 19 numbers of employees or 15.0% of employees from the total sample were agreed and only 15 numbers of respondents or 11.8%of employees from the total sample were strongly agreed for the statement of the health facility provides health care technology management/on medical equipment management policy/training for biomedical engineers.

From this result, we understood that a total of 85 numbers of employees or about 70% of the total sample were disagreed with each health facility provides health care technology management/on medical equipment management policy/training for biomedical engineers.

That means most biomedical engineers were not provided health care technology management/on medical equipment management policy/training at their respective health facilities.

Additionally from interviews, health care technology management (HTM) and service training are not provided by their health facility.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The chapter is divided into three sections to present the information derived from this study. The first section is summary of the findings. The second section presents conclusions for real practices based on those findings and the relevant literatures. The third and final section presents recommendations from the researcher.

5.1 SUMMARY OF THE FINDINGS

In this study, it was designed to study job satisfaction: the case of biomedical engineers at Addis Ababa public health facilities. A sample of 133biomedical engineers was taken for the study. In the process of answering the basic questions, a questionnaire that include demographic profiles, wages and benefits, job security and sense of value, recognition/promotion and creativity, the work itself and work environment, relationship with co-workers and senior management, work assignment, workshop and training was designed in a closed ended and likert scales. Moreover, structured interviews were held with biomedical engineering case team leaders, and directorates. After the data has been collected, descriptive analysis was done based on the seven levels of topic areas as their chronological order. Based on the survey data collected, analysis has been made and the summary of the major findings of the study were summarized as follows:-

- A large numbers of employees a total of 71.7% were staffs following with unit coordinator accounted for 23.6% of total employees.
- The final demographic variable, salary, of most of employees within health facilities a total percent of 40.2% was from birr 5000-6200 and next salary range from birr 4000-4900 accounted for 39.4% of employees from the total sample.
- The results related to the wages and benefits satisfaction showed that more than three-quarters (a total of 83.5%) of employees were dissatisfied with wages paid for the work they do. Moreover, most of employees that are a total of 95.3% were dissatisfied with having incentive wage schemes for best performance. This is because they feel that they should be having incentives for their efficient work. In addition to this, a large numbers of employees (73.2%) were not satisfied on other benefits provided by health facility. And the analysis implies that about 65% employees were dissatisfied with chances for

promotion on their job at the health facilities. This is because they feel that they should be promoted for their job during their stay at their respective health facility.

- The study indicated that most of respondents (85.8% of employees) were dissatisfied with the sense of feeling secure in doing job. This indicates that each health facility has low job security for biomedical engineers in which they are employed. As a result more than three-quarter (69% respondents) of employees were dissatisfied with job security at health facilities in which they are working in.
- The finding shows that majority of the employees or about 64% of the total samples were agreed that they sometimes feel their job is meaningless. Accordingly, they feel as they are not valued and respected employees for their respective health facility. This indicates that most employees were not satisfied by their work and they feel as they are non valued or meaningless for their respective health facility.
- According to majority of the respondents, more than three-quarter (about 83% of employees) were not satisfied for having a clear system that each health facilities pays risk allowance for biomedical engineers. In other words, most of employees were dissatisfied with health facilities because of not paying any risk allowance. And because of this reason, most of employees that are about 82% of the total sample were dissatisfied for remaining at their respective health facility for an extended period of time. This implies that most of employees had no any interest for remaining at their health facility for an extended period of time; rather they want to leave to private importer companies or other related organizations.
- With respect to recognitions/promotions and creativity, the study in this aspect point out that 78% of employees were not satisfied for receiving recognitions from their director when they do a good job. In other words, more than three-quarter of the employees were dissatisfied because of not receiving any recognitions from their directors when they do a good job. This study also indicated that most of the employees were dissatisfied on senior management team of the facility encourages biomedical engineers for their best performance. In other words, senior management team of the facility did not encourage biomedical engineers for their best performances.
- It is also revealed that a total of 63% of the employees were dissatisfied with higher officials/managers reward them for their best performance. In other words, more than

half of biomedical engineers had no given any rewards from higher officials/managers for their best performance. Not only this but also, the study found out that most of the respondents (about 70% of employees) dissatisfied for senior management of the health facility encourages creativity, innovation, and continuous improvement. As interviewees also strengthened, senior management of the health facility does not encourage creativity, innovation, and continuous improvements of quality services done by biomedical engineers. That is why most of employees about 78% of the total sample were dissatisfied for their health facility's senior management team's recognitions/rewards. Meaning that, almost all of employees were not satisfied with the recognitions or rewards given by their health facility's senior management team.

- The results in relation to the work itself and work environment concluded that more than half of respondents that are 66% of employees from the total sample were dissatisfied on satisfaction of their current biomedical engineering job at each respective health facilities. This implies that most of the employees were not satisfied with their current biomedical engineering job at each respective health facilities. In addition, this study also showed that more half of the respondents (60% of employees) were dissatisfied with too much maintenance/repairing work. Which implied that, most of employees were not satisfied with much of repairing/maintenance works; rather they expected and wanted to do other medical equipment management works.
- As per the analysis of the respondents' response most of employees (about 83.5% of the total sample) replied as they were agreed on job satisfaction determines their productivity and job performance at their health facility. That means, more than three-quarter of employees believed that job satisfaction determines their productivity and job performance at their health facilities. On the other hand, this study also indicated that most of the respondents that are 73.2% of employees from the total sample were not satisfied with the present working conditions at their health facilities. In other words,the responses illustrated that about three-quarter of the employees were dissatisfied with the present working conditions in which they were working in. Not only in working conditions but also 74% of employees of the total sample were dissatisfied on the present working environment at their respective health facilities.

- The analysis also showed that more than half of employees or 68% respondents of the total sample were dissatisfied with medical equipment management systems and service training provided by the health facility. That is, more than half of employees were not satisfied with medical equipment management systems and service training provided. According to the finding, the study pointed out more than three-quarter of the total samples was dissatisfied for health facility's medical equipment workshop and its maintenance toolkits.
- As strengthened from interviewees, most of employees were not satisfied with medical equipment workshop and its maintenance toolkits having at each health facilities.
- Other employees, more than three-quarter or about 81% of employees were not satisfied for highly ranking their overall job satisfaction at their respective health facility. In other words, most of employees were not highly rank their overall job satisfaction at their respective health facility. This study also indicated that more than half of respondents (56% of employees) of the total sample were dissatisfied with feeling of changes that could be made to improve their job satisfaction. This implies that more than half of employees believed that there were no changes that could be made to improve their job satisfaction.
- The results in relation to relationship with co-workers and senior management showed that most of respondents (88% of employees) of the total sample have a good relationship with other workers. This indicates that more than three-quarters of employees have a good relationships with their co-workers and other workers. According to the analysis, more than half of the employees (63% of respondents) were agreed that biomedical engineers behave well with the senior management of the health facility. This indicates that more than half of total employees were behaved well with senior management team of the health facility. From this study, the analysis pointed out that most of employees a total of 78% of the total sample were dissatisfied with senior management's believe that biomedical engineers are the most important asset of that particular health facility. That means, the analysis showed that more than three-quarter of employees were not satisfied because of senior management of that particular health facility did not believe that biomedical engineers are the most important asset; rather it considered them as non essential and influential employees.

- The results related to the work assignment indicated that 58% of employees were dissatisfied with faire distribution of the workload employees have at their respective health facility. That means, more than half of employees were not satisfied with the workload because it is not fairly distributed for employees at their respective health facility. This study also indicated that about 56% of employees were dissatisfied for response of having a clear job descriptions prepared by the health facility that helps improving their performance. In other words, more than half of the employees had no a clear prepared job descriptions at their health facilities. Besides this, 55% of employees were agreed for work assignments provided by unit leader are fully explained. This implies that, more than half of employees were satisfied with all work assignments provided by unit leaders are fully explained.
- It is also revealed that 59% of the employees were dissatisfied for work assignments provided by medical director/directorate/CEO are fully explained. That means, because of not fully explained more than half of employees were not satisfied with work assignments provided by medical director/directorate/CEO of the health facilities. Moreover, more than three-quarter (80%) of the employees were also dissatisfied on biomedical engineering department is ordered by Medical directors/directorates/CEO to prepare data analysis for all needy medical equipments before procuring. As strengthened with interviewees, biomedical engineering department is not ordered by Medical directors/directorates/CEO to prepare data analysis for all needy medical equipments before procuring.
- According to the collected data a large numbers of respondents, about 66% of employees of the total sample were dissatisfied with biomedical engineering department solely prepare technical specifications for all new medical equipments before procuring. In other words, more than half of the employees were not satisfied because of not preparing technical specifications for all new medical equipments before procuring for their health facilities. In addition to this, about 73% of employees of the total sample were dissatisfied on biomedical engineering department is actively participated in a planned and strategically lead procurement of medical equipment for the health facility. The interviewees emphasized this is because of most of the health facility's biomedical engineering department is not actively participated in a planned and strategically lead

procurement of medical equipments because of legal declarations. Moreover about three-quarter of employees (74%) from the total sample were dissatisfied on biomedical engineering department actively participates during logistic process of medical equipment for the health facility. This indicates that they were not participated during logistic process of any medical equipment providing to their respective health facility.

- With regard to the workshop and training information it is found that 77% of the employees were dissatisfied on the provided space of biomedical engineering unit office. This implies that more than three-quarter of employees were not satisfied with the health facilities because of not providing a wide enough space for biomedical engineering unit office. Similarly, most health facilities' biomedical engineering unit offices were not well structured and equipped with furniture and maintenance equipments.
- In addition to this, a total of 82% of employees from the total sample were dissatisfied on health facility's medical equipment workshop's structure interms of design. In other words, most employees were not satisfied in that the health facility's medical equipment workshop's structures interms of design. Interms of power availability, more than half of respondents (59% of employees) from the total sample were satisfied that health facility's medical equipment workshop is well structured interms of electric power availability. But, Interms of water availability, more than half of the employees (55% of respondents) were dissatisfied with the health facility's medical equipment workshop structures interms of water availability. From this result, we understood that most health facility's medical equipment workshop was not well structured interms of water availability. The result of the survey data also indicated that more than three-quarter of respondents or 79% of employees from the total sample were dissatisfied on the health facility's medical equipment workshop is well equipped interms of medical equipment calibrators availability. That means, most of employees were not satisfied because of most medical equipment workshops are not well equipped with medical equipment calibrators.
- It is also revealed that about 70% of employees from the total sample were dissatisfied on health facilities provide service training for biomedical engineers regarding medical equipment maintenance/repairing. In other words, most biomedical engineers were not satisfied because of most health facilities did not provide them service training regarding

medical equipment maintenance/repairing. The results of analysis also indicate that majority of the respondents (70% of employees) were not satisfied with each health facility's health care technology management/on medical equipment management policy/training for biomedical engineers. That means most biomedical engineers were not provided health care technology management/on medical equipment management policy/training at their respective health facilities.

- As strengthened with interviewees, almost all of health facilities did not provide either service or HTM training for their biomedical engineers.

5.2 CONCLUSIONS

Based on the summary of the finding, the conclusions are as follows:-

- The outcome of this thesis is the finding of biomedical engineers at Addis Ababa public health facility are satisfied with their employment that relate to wages and benefits, job security and sense of value, recognition/promotion and creativity, the work itself and work environment, relationship with co-workers and senior management, work assignment, workshop and training led to a reasonable amount of job satisfaction at each health facilities.
- The result of the finding showed that biomedical engineers at Addis Ababa public health facility were least satisfied with wages paid and incentive wage schemes for best performance, other benefits and job promotions.
- Biomedical engineers of Addis Ababa public health facilities were also dissatisfied with job security, workshops availability, maintenance toolkits availability, office spaces, working conditions, working environment and medical equipments management systems
- As the major negative dissatisfies, each health facility did not provide service and health care technology management (HTM) training to biomedical engineers.
- The majority of employees were satisfied with work assignments provided by unit leaders are fully explained and relationships with other workers.
- Most of employees were believed that job satisfaction determines their productivity and job performance at their health facility.

- A large numbers of employees had good relationships with their co-workers and other workers. In addition to this biomedical engineers behaved well with the senior management of the health facility.
- Interms of power availability, more than half of employees were satisfied with their health facilities medical equipment workshop's electric power availability.
- Most of employees from the total sample were not satisfied with medical equipment management systems and service training provided.
- This is because senior management of the health facilities was not creating a work environment that encourages creativity, innovation, continuous improvement.
- Most importantly, the management was not letting biomedical engineers to prepare technical specifications for all medical equipments, and involving actively in procurement of new medical equipments and logistic process of any medical equipments those are imported to their health facility.

5.3 RECOMMENDATIONS

Based on the findings and conclusions of the study, the researcher forwards the following recommendations to senior managements of Addis Ababa public health facilities to enhance its biomedical engineers satisfaction.

- Senior management of Addis Ababa public health facilities need to focus on providing wage paid and other inceptive benefits programs and reimbursement for the employee. To achieve this reviewing practice of other similar abroad organizations and include paid training programs and reimbursement in the health facilities policy.
- Senior management needs focus more on job security and risk allowance for biomedical engineers. This can be achieved by providing personal protective equipments and paying appropriate risk allowance payments.
- The management of Ababa public health facilities also need to work on recognitions or rewards for best performer and promotion and creativity to improve best practices and innovations done by biomedical engineers. This can be done by preparing a program for recognitions or rewards for best practice as well as encouraging creativity within the organization.

- Another thing that senior management should focus is,on working present working conditions and environment. This is done by making all working conditions and environment suitable for work and fulfilling all working materials needed.
- The management needs to provide service and THM training for biomedical engineers. This can be achieved by giving training to Ababa public health facilities' biomedical engineers from different training centers.
- Senior management of Addis Ababa public health facilities need to focus on especially preparing technical specifications for all new medical equipments before procuring. This can be done by officially ordering from directors or CEO to do responsibly.
- Finally the management needs work on logistic process of any medical equipment while importing to their respective health facilities. This can be achieved by formulating a rule which incorporates biomedical engineers during logistic process of any medical equipment.

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APPENDICES

Appendix A: Survey Questionnaire

St. Mary's University

MBA General Program

Survey Questionnaire for biomedical engineers at Addis Ababa public health facility

Dear respondents,

My name is Ermiyas Haymanot. I am a post graduate student at St. Mary's University and I am conducting a final research entitled "A study on Job Satisfactions-The case of Biomedical Engineers at Addis Ababa Public Health Facilities". This questionnaire is designed to collect primary data, for the purpose of purely academicals, and hence will result in no negative consequences on your present job and health facility.

Your honest and genuine answers are important and provide valuable input to achieve the objectives of this research. Therefore, I kindly ask you to fill out this questionnaire with honestly and genuinely. While you are providing this data your confidentiality will be protected and your responses will be secured.

I would like to thank you for your time and co-operation.

Sincerely yours,
Ermiyas Haymanot

Section: A Personal data

1) Gender: ☐ male ☐ female
2) Age : ☐ 21-28 years ☐ 29-35 years ☐ 36-45 years ☐ 46-55 years
3) Education level: College diploma ☐ BSC degree ☐ MSC ☐ PHD ☐
4) Year of experience :less than 1 year ☐ 1-2 years ☐
   3-5 years ☐ 6-9 years ☐ 10 and above years ☐
5) Position in the health facility: staff ☐ unit coordinator ☐ Director ☐
   Others specify_____

6) Your salary: Birr 4,000-4,900 ☐ Birr 5,000-6,200 ☐ Birr 6,300-10,000 ☐ above Birr 10,000 ☐

Section B: Statements of survey

This instruction of the statement is about job Satisfaction and determinants of job satisfaction related to biomedical engineers. Give your own opinion and feeling about each provided statement. Please put a cross mark (X) for each question in the given space to reflect your own opinions based on the following five-point level in terms of your own agreement and disagreement to the statement.

No.	Please put a cross mark (X) for each question to reflect your own opinions to the given space.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I am satisfied with the wages paid to me for the work I do.					
2.	I have incentive wage schemes for best performance at this health facility.					
3.	I feel a sense of secure in doing my job.					
4.	When I do a good job, I receive the recognition from my immediate director.					
5.	My satisfaction determines my productivity and job performance at this health facility.					
6.	There is little chance for promotion on my job.					
7.	I sometimes feel my job is meaningless.					
8.	I have a good relationship with m y co-workers.					
9.	I have been satisfied with too much maintenance/repairing work.					
10.	I am satisfied with my current biomedical engineering job at this health facility.					

11.	I am satisfied with the present working conditions at this health facility.					
12.	I am satisfied with the present working environment at this health facility.					
13.	We biomedical engineers behave well with the senior management of the health facility.					
14.	Senior management believes that biomedical engineers are the most important asset of this health facility.					
15.	Senior management team of the facility encourages to biomedical engineers for their best performance.					
16.	Higher officials/managers reward to biomedical engineers for their best performance.					
17.	Senior management of the health facility encourages creativity, innovation, and continuous improvement.					
18.	This health facility provides a wide enough space for biomedical engineering unit office.					
19.	This health facility's biomedical engineering unit office is well structured and equipped.					
20.	This health facility's medical equipment workshop is well structured interms of design.					
21.	This health facility's medical equipment workshop is well structured interms of electric power availability.					
22.	This health facility's medical equipment workshop is well structured interms of water availability.					
23.	This health facility's medical equipment workshop is well equipped interms of medical equipment calibrators availability.					
24.	This health facility provides service training for biomedical engineers regarding medical equipment maintenance/ repairing.					

25.	This health facility provides health care technology management/on medical equipment management policy/training for biomedical engineers.					
26.	There is a clear system that this health facility pays risk allowance for biomedical engineers.					
27.	This health facility provides other benefits for biomedical engineers.					
28.	The workload I have at this health facility is distributed fairly.					
29.	I have a clear job descriptions prepared by the organization that help in improving my performance.					
30.	Work assignments provided by unit leader are fully explained.					
31.	Work assignments provided by medical director/directorate /CEO are fully explained.					
32.	I feel that I am a valued and respected employee for this health facility.					
33.	I see myself remaining at this health facility for an extended period of time.					
34.	I am satisfied with my job security at this health facility.					
35.	I am satisfied with my health facility's senior management team's recognitions/rewards.					
36.	I am satisfied with the medical equipment management systems and service training provided by the health facility.					
37.	I am satisfied with this health facility's medical equipment workshop and its maintenance toolkits.					
38.	I would highly rank my overall job satisfaction at this health facility.					
39.	There are changes I feel it could be made to improve my job satisfaction.					
40.	Biomedical engineering department is ordered by medical directors/directorates/CEO to prepare data analysis for all needy medical equipments before procuring.					

41.	Biomedical engineering department solely prepare technical specifications for all medical equipments before procuring new medical equipment.					
42.	Biomedical engineering department actively participate in a planned and strategically lead procurement of medical equipment for this health facility.					
43.	Biomedical engineering department actively participate during logistic process of medical equipment for this health facility.					

Please submit your completed survey. Thank you once again for your response.

Appendix B: Interviewee questions for directors and case team leaders

Q.1 Does senior management of the health facility gives the recognitions/rewards or encourages biomedical engineers for their best performance? And is there a clear system of paying risk allowance and other benefits for biomedical engineers?

Q.2 is working condition and environment really satisfying all biomedical engineers at this health facility? Is medical equipment workshop well designed and equipped?

Q.3 Do biomedical engineers have a clear job descriptions prepared by the organization? And is this health facility provides service and HTM training for all biomedical engineers regarding medical equipment?

Q.4 is biomedical engineering case team of the health facility actively involves in preparing technical specifications and procurement of new medical equipments? Is it responsibly participating in logistic process of medical equipments imported to the health facility?

DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Professor Belete Mebratu. All sources of material used for the thesis have been properly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institutions for the purpose of earning any degree.

Ermiyas Haymanot Abate

_____ _____

Signature

St Mary's University, Addis Ababa **May, 2019**

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Professor Belete Mebratu

_____ _____

Signature

St Mary's University, Addis Ababa **May, 2019**