

## Selected Misurata Hospitals' Level of Preparedness on Possible Cases of Ebola Virus Disease: Implications to National Health Planning in Libya

Amelita Tarrayo Entica<sup>1</sup>, Fatima Mohammed Awaz<sup>2</sup>, Salem Saleh Elwahaishi<sup>2</sup>  
(College of Nursing, Misurata University, Misurata City Libya)

---

**Abstract:** The main objective of the study was to assess the selected private and public hospitals' level of preparedness on possible cases of Ebola virus disease in Libya and to find out any significant difference between these private and public hospitals' level of preparedness. Employing a quantitative-descriptive research design, the study utilized a questionnaire formulated with two sections: the first section focused on the respondents' relevant profile and the second section, which utilized a four-point scale, focused on the selected hospitals' level of preparedness in terms of guidelines and standard operating procedures, resources and facilities, and manpower. The findings revealed that private hospitals were generally rated as fully prepared in terms of guidelines and standard operating procedures (mean=3.28), resources and facilities (mean=3.26), and manpower (mean=3.05) while public hospitals were consistently rated as not fully prepared in these three categories (mean=2.48; mean=2.28; and mean=2.22, respectively). The findings also revealed that private hospitals are significantly more prepared than public hospitals for possible cases of EVD in terms of guidelines and standard operating procedures ( $p < .001$ ), resources and facilities ( $p < .001$ ), and manpower ( $p < .01$ ). It was concluded that private hospitals are fully prepared for possible Ebola cases but not the public hospitals. It was recommended that the findings be considered in national health planning to improve the disease management system of both the private and public hospitals of the country.

**Keywords:** hospital preparedness, infection control, contagious disease, resources, standard procedure

---

### I. Introduction

The spread of any kind of disease among human beings is no doubt a serious matter. As a matter of fact, in August of 2007, the World Health Organization (WHO) delivered a report warning that infectious diseases are spreading faster than ever before. Scientists are discovering new diseases at an average rate of one each year. Such rate is much faster than any other recorded rate at any other time in history.

In a recent report, health experts and medical authorities have sadly expressed the inevitable spread of several highly contagious diseases that are even difficult or next to impossible to stop. Apparently, this fast spread of contagious diseases can be related to the legitimate observation that there are many different ways diseases spread. Diseases can pass from person to person, from animal to person, and from mother to unborn child. Some diseases can pass through the air from one person to another while some others pass through body fluids or through the slightest contact that is made with any contaminated object or clothes.

More recently, WHO has alarmingly expressed that the Ebola virus disease (EVD) outbreak in affected countries in West Africa is unprecedented in scale and geographical reach and that this disease is capable of spreading to African countries and beyond [1].

In view of this, WHO developed a checklist with eleven key components which can serve as a guide to evaluate hospital's preparedness for the emergence of possible EVD cases and recommended EVD affected countries and all the countries within the continent of Africa to review their readiness in order to facilitate more effective implementation of preparedness actions [2].

Considering the above reality, researchers do believe that understanding how people react to diseases is important. They believe that certain types of human behavior, as manifestations of profound understanding of the disease or lack of it, can bring about unintentional effect on the spread of disease. The first line of defense against any form of disease is full awareness of its existence, its potentially alarming effects on man's health, and the various ways by which it can be controlled. In this light, the researchers realized the need to assess the level of preparedness of selected Misurata hospitals' on possible cases of EVD which currently poses a universal threat to mankind. The very purpose of the study is to determine the private and public hospitals' level of preparedness to estimate the points of improvement and determine the focus of skill enhancement, and preclusion measures. Moreover, the study also tried to find out if there is any significant difference between the private and public hospitals' level of preparedness.

## **1.1 Related Literature**

The Ebola virus is a deadly disease which may be transmitted by animals or humans. The Ebola virus disease (EVD), named after the Ebola River that flows in Congo, was discovered by scientists in 1976 in Sudan and the Democratic Republic of Congo. Although the Ebola virus outbreak that began in West Africa only occurred in March 2014, it has proven to be more deadly, more severe, and more catastrophic than any other previous outbreak [3].

### **1.1.2 EVD Transmission and Effects**

Belonging to the viral family Filoviridae, the Ebola virus causes hemorrhagic fever or profuse bleeding inside and outside the body accompanied by a very high fever [3]. Known to have originated from African fruit bats, the Ebola virus is identified as a “zoonotic” virus because of its natural mode of transmission from animals to humans [4]. Once become infected however, humans can also transfer the virus to each other.

The virus can be transmitted through the animal’s blood and body fluids. People who have come in contact with these animals become infected with Ebola, and they can transmit it to others through breast milk, feces, saliva, semen, sweat, urine, and vomit [5]. The Ebola virus can reside in these bodily fluids and people can get the virus when they come in contact with these fluids via the eyes, nose, mouth, or broken skin. This is why most healthcare workers are at high risk for acquiring Ebola because they often deal with different bodily fluids from patients infected with contagious diseases [6].

Ebola infected people may experience the following symptoms which can take as long as three weeks to appear [5]. Disease symptoms may include diarrhea, fever, headache, muscle pain, stomach pain, unexplained bleeding or bruising, and vomiting. Medical experts have pointed out that the early symptoms of Ebola can closely mimic other diseases like the flu, malaria and typhoid fever [1]. This is why people who have been infected with Ebola should be immediately quarantined to prevent further transmissions. Blood tests are performed to check for the presence of antibodies or the Ebola virus when people show the first symptoms of what could be Ebola. Blood tests may reveal information such as low white blood cell counts, low platelet counts, and high liver enzymes. People who have recovered from Ebola will develop certain antibodies to the disease in their blood which confirms that the disease was Ebola. In addition to blood tests, medical analysis includes the patients’ activities to find out whether they have come in contact with anyone who could have Ebola [7].

### **1.1.3 Hospital Preparedness and Control of Infection**

When outbreaks of infectious disease emerge, medical facilities are primarily the focal point of action [1]. In March 2014, thousands of news flooded the internet websites, social media, television, newspapers and other forms of communication regarding the outbreak of Ebola Virus Disease in Liberia, West Africa. Since then, most countries around the world screen people arriving in their ports and borders [7]. Passengers coming from EVD affected countries are assessed for presence of signs and symptoms consistent with EVD and are required to submit medical clearance from their country of origin.

While the whole world is preparing for preventive measures [8], Libya remains uncontaminated of EVD. However, considering the country’s being a part of North Africa and its proximity to EVD affected countries, it is deemed necessary to assess how prepared its hospitals are in managing possible EVD cases. It is a logical decision to take the necessary response to the international advice released by WHO [2] stating that all countries covering African continent must review their level of readiness and implement the minimum preparedness requirement in terms of managing possible EVD outbreak.

### **1.1.4 Compliance and Preparedness Actions**

Hospitals and medical institutions are established not only to provide the essential and immediate care to patients but also to deliver the needed services that are crucial to the successful control of the spread of diseases. In fact, hospital administrators all over the world are cognizant of the unconditional need to comply with the regulations and accreditation standards set for medical institutions. Apparently, it is through hospitals’ efforts to meet world-class standards that readiness and preparedness for possible emergence of outbreaks such as Ebola may actually be achieved [9].

At the heart of the general effort under which processes of standardization and enhancement of services mainly operate is the idea of compliance. Generally defined, compliance is the degree to which a person adheres to advice [10], and may also be defined as “the act of complying, yielding, or acting in accord” [11] and that compliance or obedience occurs when another person or group influences an individual [12]. Interesting developments in medical research, however, point to the idea that the concept of compliance must move from the individual constituent to the whole organization that is responsible for delivering required medical services. The fact that individual patients are expected to adhere to medical advice, medical institutions and hospitals are equally obliged to comply with standards set for delivering optimum services. At the institutional level,

compliance must be viewed as the term indicating that an organization operates in accordance to established laws, regulations, protocols, standards and specifications [13]. Several models have served as useful bases by which a significant level of compliance can be attained.

Comprehensive models of compliance have influenced the way in which hospitals and medical institutions are managed [13]. Standard procedures and guidelines which are at the forefront of all hospital services allow for a systematic application of appropriate medical procedures. An effective compliance program upholds standards or benchmarks that demonstrate implementation and achievements. Eventually, a compliance program should become part of the fabric of routine hospital operations. Specifically, compliance programs guide a hospital's governing body Boards of Directors, Chief Executive Officer (CEO), managers, other employees and physicians and other health care professionals in the efficient management and operation of a hospital.

One model of compliance that lend itself for adoption is the GRC (Governance, Risk Management, and Compliance) model [13]. The model which presents five levels of hospital optimization has been particularly designed to assess and monitor governance, risk, and compliance in hospitals. In essence, the primary value of the model lies in the compact presentation and its practical approach which can guide hospitals to improve their GRC level.

The relevance of GRC in hospitals can be clearly illustrated by considering the high and straight level of anticipation people have when they walk to hospitals for their desired medical treatment. In reality, patients expect that they would be attended to by reliable specialists, would be placed in a hygienic environment and would be confident that their privacy is not at risk. It is for this kind of situation that the GRC model has been designed to explicitly focus on hospitals and has been built on dimensions and levels of development geared to hospitals' practice.

In order to develop a specific model for GRC in hospitals, a systematic design and scientific approach must be taken. They have offered four steps that must be followed which are all based on existing approaches on how to create such model. Firstly, the actual purpose of the model must be defined. Secondly, the target group must be identified. Thirdly, a comparison against existing related models must be conducted to find similarities and differences from which parts of these models can be retrieved for future use. Fourth and finally, a development strategy must be elaborated. On the whole, the end point of the GRC model through which a development strategy could be achieved is the optimization of hospital services [13].

Striving to protect the whole world against Ebola virus disease, WHO has offered a consolidated preparedness checklist containing eleven key components and preparation requirements that must be met by medical institutions all over the world [2]. Specifically, the consolidated preparedness checklist has been designed to guide existing hospitals and other medical institutions to meet the requirements and identified preparedness actions that will handle the highly invasive Ebola Virus disease which is now considered as a global threat to mankind.

To facilitate more effective implementation of preparedness actions, WHO has identified 4 groups of countries based on risk assessment. The risk assessment included factors such as proximity to highly-affected countries, transport and travel routes, and health systems development.

The activities contained in the revised risk assessment checklist are divided into two categories: Minimum Preparedness Requirements and Additional Preparedness Requirements. WHO highly recommends that all countries in African continent are encouraged to review their levels of readiness and, where needed, implement the Minimum Preparedness Requirements.

Following are the eleven key components proposed by WHO for assessing the preparedness of EVD affected countries and all other countries seemed threatened by the disease.

1. Coordination—designing coordination structures and response plans
2. Rapid Response Team (RRT)—forming a fully operational healthcare staff acting immediately once a suspected case is reported
3. Public Awareness and Community Engagement—establishing effective risk communication for possible outbreak management
4. Infection Prevention and Control—setting guidelines for minimizing the risk of transmission of EVD
5. Case Management - designating at least one fully operational ETC facility before a first case occurs
6. Epidemiological Surveillance – establishing a public health surveillance system to detect and report possible cases of EVD
7. Contact Tracing – identifying and following-up of persons who may have come into contact with an EVD infected person
8. Laboratory— performing immediate laboratory tests for suspected EVD cases

9. Capacities at Points of Entry – setting public health emergency plans and standard operational procedures at international airports, seaports and major land crossings
10. Budget - ensuring that sufficient funds are available and can be rapidly mobilized
11. Logistics - ensuring that the logistical capacities needed to implement the above listed functional areas are in place

In the present study, seven (coordination, rapid response team, infection prevention control, case management, laboratory, budget and logistics) out of these eleven components have been classified into three (3) aspects of preparation for EVD case management namely, guidelines and standard operating procedures, resources and facilities, and manpower. This classification served as the basis for the assessment process employed on the selected private and public hospitals included in this study.

#### **Guidelines and operating procedures**

- Coordination plans and structures for possible EVD case management are imposed.
- Infection prevention control procedures in different areas of the hospital are observed.
- Case management is observed by designating at least one fully operational Ebola Treatment Center (ETC) facility before a first case occurs.

#### **Resources and Facilities**

- Laboratories where testing for suspected EVD cases may be performed and highly contagious disease containment rooms are always available.
- Budget is always available to ensure that both preparedness and response activities are costed in a coordinated and planned manner and sufficient resources are identified to enable rapid implementation.
- Provision of facilities and services is appropriate and systematic to ensure that the logistical capacities needed to implement the functional areas are in place.

#### **Manpower**

- A fully operational rapid response team (or equivalent) that investigates and implements initial controls, including systematic contact tracing and initial stabilizing resource in the earliest phase of the outbreak is always available.

The other key components such as public awareness and community engagement, epidemiological surveillance, contact tracing, and capacities at points of entry have not been included for hospital preparedness assessment process since these key components primarily address preparation procedures at the national level. The concern of the present study is to assess the preparedness and readiness of selected hospitals in Misurata city for managing possible EVD cases. Hence, this is a hospital context level.

#### **1.1.5 Difference between Private and Public Hospital Services**

Where the quality of hospital service is discussed, there is no commoner idea than the impression that private hospitals offer more quality and more appropriate services than public hospitals do. Legitimately observed, people have a high and straight level of anticipation when they walk to hospitals for their desired medical treatment. These expectations of patients are usually considered in assessing the service quality of healthcare organization [14]-[15] and should be met by the quality of service delivered to patients in general [16]. Nevertheless, several expectations are not always met in all hospitals and in most cases, only private hospitals are generally considered as a better medical place where patients would be attended to by reliable specialists, would be placed in a hygienic environment, and would feel confident that their privacy is not at risk [17].

Several studies point to the idea that private hospitals do provide better services to patients than public hospitals.

A study which compared the quality of services provided by public and private hospitals in Bangladesh revealed that private hospitals play a meaningful role in Bangladesh and justify their existence, continuation and growth. The results also yielded that quality perceptions are driving many patients to private hospitals and that these private hospitals provide better services than public hospitals on responsiveness, community, discipline and medical procedures [17].

Another study conducted regarding the service quality between public and private hospitals in Turkey, found out that patients in private hospitals were more satisfied in terms of assurance dimension, including doctors, nurses and supportive services than their counterparts in the public hospital [18].

In a more recent study, which compared the quality of healthcare services delivered by the public and private hospitals to gain patient satisfaction in Pakistan indicated that private hospitals deliver better quality of services to their patients as compared to public hospitals [15].

This very concept on the difference between the quality of services delivered by private and public hospitals has also been considered in the present study which takes for its assumption that private hospitals are more prepared for possible EVD cases. Moreover, this study hypothesizes that there is a significant difference between private and public hospitals' level of preparedness for possible cases of EVD.

## **II. Materials and Method**

The study which was conducted in Libya included six hospitals covering 3 private and 3 public hospitals. The health care staffs of emergency department and out-patient department such as nurses and doctors were purposely selected as respondents of the study considering that they are the frontline forces providing immediate and other initial care necessary for any individual requiring medical treatment.

### **2.1 Instrument**

Hospital preparedness on managing possible EVD cases was evaluated using a set of criteria categorized into guidelines and standard operating procedures, resources and facilities, and manpower as the parameters of the key components proposed by WHO in the consolidated preparedness checklist recommended to all countries in the African continent [2].

The survey questionnaire consisted of two (2) sections. The first section of the questionnaire focused on the profile of the respondents which includes educational attainment, length of teaching experience and number of trainings and seminars attended related to infection control. The second section of the questionnaire presents the list of criteria under the categories presented above and has been designed using a four-point scale to measure the level of hospitals' preparedness. The questionnaires were prepared in English and were explained in Arabic language during the administration of the said survey questionnaire.

### **2.2 Data Collection**

The purpose, importance, and research procedures were presented to the concerned authorities. Upon approval, the researcher selected the possible sample population guided by the criteria of gathering data. The researcher explained to the respondents the possible benefits and aims of the said study. The desired data were personally gathered by the researchers through the administration of questionnaires to the nurses and doctors in selected hospitals from March 2015 to April 2015. During the administration of the questionnaire, a follow up unstructured interview was conducted with the respondents to validate the accuracy of the results and address some relevant questions.

### **2.3 Limitations**

The present study whose primary objective is to assess the level of preparedness of selected private and public hospitals in Misurata City adapted only 7 out of 11 key components presented in the checklist offered by WHO (2015) as a guide in determining the preparedness of health care institutions for EVD case management both in EVD affected countries and other countries within African continent. Four key components namely, public awareness and community engagement, epidemiological surveillance, contact tracing, and capacities of point of entry were not included in the study since these components are more of national health ministry concerns and beyond the level of hospital preparedness context. To address the problem of time constraints in data gathering, the researcher decided to control the respondents' tendency to give long or indirect responses by limiting the number of questions for every category that would address each of the research questions.

### **2.4 Data Analysis**

The data were recorded and subjected to appropriate statistical analysis procedures. Frequency and percentage distribution was used to analyze the gathered responses from section number 1 of the questionnaire dealing with the private and public hospital staffs' profile. The weighted means which were obtained from section number 2 of the questionnaire were also computed in order to analyze and generalize the results in determining the private and public hospitals' level of preparedness in terms of managing possible cases of EVD. Finally, T-test of statistical significance was employed to determine if there is a significant difference between private and public hospitals' level of preparedness for possible EVD cases.

## **III. Results and Discussions**

### **3.1 Results on the Respondents' Profile**

The first research problem which is also the focus of the first part of the questionnaire addresses the profile of the selected respondents of the survey questionnaire. The respondents' profile included their educational attainment, length of work experience, and number of seminars and trainings attended. All these professional qualifications of the respondents were assessed and analyzed using the frequency and percentage distribution.

**Table 1. Educational Attainment of the Respondents**

Educational Attainment	Private Hospitals		Public Hospitals	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Six (6) Month Nursing Course	0	0%	4	20%
Higher Institute Graduate	0	0%	1	5%
College Degree	14	70%	14	70%
Post Graduate (Master's/Doctorate)	6	30%	1	5%
Total	20	100%	20	100%

Table 1 clearly shows that although a considerable percentage (30%) of private hospital staffs have obtained a postgraduate degree, majority of the respondents from both the private (70%) and public hospitals (70%) have obtained a college degree which indicates that both of these categories of hospitals are generally served by qualified healthcare staffs. It is to be noted here, however, that a certain percentage (20%) of the public hospital staffs have just finished a six-month nursing course and one respondent (5%) is just a higher institute graduate indicating that some healthcare workers in the selected public hospitals have not attained the standard educational qualification that is the college level of education. No respondent from the private hospitals is a six-month nursing course or higher institute graduate. This finding is therefore suggestive of the fact that private hospital staffs are more educationally qualified for their work.

**Table 2. Respondents' Length of Working Experience as Hospital Staff**

Length of Working Experience as Hospital Staff	Private Hospitals		Public Hospitals	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
< 1 year – 3 years	2	10 %	8	40%
< 4 years – 6 years	14	70 %	10	50%
< 7 years – 10 years	2	10 %	0	0
10 years and above	2	10 %	2	10%
Total	20	100%	20	100%

Regarding the respondents' length of working experience, the study also found out that majority of the respondents from both private (70%) and public (50%) hospitals have 4 to 6 years working experience which is indicative of the fact that the healthcare staffs from these two categories of hospitals have a considerable length of hospital working experience.

**Table 3. Trainings/Seminars/Workshop Attended by the Respondents**

Trainings/Seminars/Workshop Attended	Private Hospitals		Public Hospitals	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
None	1	5 %	4	20 %
1-3	5	25 %	3	15 %
4-6	4	20 %	9	45 %
7 and above	10	50 %	4	20 %
Total	20	100%	20	100%

Complementing the above findings are the results on the number of trainings or seminars attended by the respondents. It was found out that half of the respondents (50%) from the private hospitals have attended at least 7 healthcare seminars and approximately half of the respondents (45%) from the public hospitals have attended around 4 to 6 healthcare seminars. Generally speaking, both the private and public hospitals are served by professionally qualified healthcare staffs who are capable of handling clinical services and delivering health care services to patients.

### 3.2 Results on Hospitals' Level of Preparedness

In order to address the very purpose for which the present study has been conducted, the seven key components which have been selected from the preparedness checklist proposed by WHO have been categorized into three main criteria namely, guidelines and standard operating procedures, resources and facilities, and manpower each of which as a set of sub-criteria. Both the selected private and public hospitals have been assessed based on these sets of criteria.

#### 3.2.1 Private Hospitals' Level of Preparedness on Possible Cases of EVD

The first set of criteria on which the private hospitals were assessed refers to the guidelines and standard operating procedures. As the table below shows, the selected private hospitals have been consistently assessed as "quite a bit prepared" and "very much prepared" on the four sub-criteria of admission protocol (mean=3.05), transfer protocol (mean=3.20), handling of contaminated items (mean=3.30), and basic hygiene (mean=3.60). On the whole, these private hospitals have been rated as "very much prepared" (3.28) on this set

of criteria. This only means that these private hospitals can be considered fully prepared for possible cases of EVD in terms of implementing appropriate guidelines and standard operating procedures.

**Table 4. Weighted means obtained in assessing the private hospitals' level of preparedness on possible cases of EVD in terms of guidelines and standard operating procedures**

ASSESSMENT CRITERIA	Private Hospitals		
	Mean	SD	Verbal Interpretation
1. Admission protocol from frontline facility to assessment unit	3.05	0.825	Quite a bit prepared
2. Transfer protocol from assessment unit to treatment unit	3.20	0.894	Quite a bit prepared
3. Handling of contaminated items (clothes, bed, beddings, and needles)	3.30	0.864	Very much prepared
4. Basic hygiene (handwashing, PPE application)	3.60	0.680	Very much prepared
<b>Mean of Means</b>	<b>3.2875</b>		<b>Very much prepared</b>

As regards the second set of criteria that is resources and facilities, table 5 reveals that the selected private hospitals have been consistently rated again as “quite a bit prepared” and “very much prepared” on the ten sub-criteria of quarantine area (mean=2.65), medical supplies (mean=3.15), basic hygiene and sanitation equipment (mean=3.70), sterilization equipment (mean=3.60), personal protective equipment kits (mean=3.50), good running water and electricity facilities (mean=3.50), laboratory unit (mean=3.50), waste management facility (mean=2.85), hospital vehicles (mean=2.55), and budget (mean=3.65). These hospitals have been generally assessed as “very much prepared” (3.26) on this set of criteria. This finding then complements the results on the first set of criteria indicating that these selected private hospitals can be considered fully prepared for possible cases of EVD in terms of resources and facilities.

**Table 5. Weighted means obtained in assessing the private hospitals' level of preparedness on possible cases of EVD in terms of resources and facilities**

ASSESSMENT CRITERIA	Private Hospitals		
	Mean	SD	Verbal Interpretation
1. Quarantine Area (Isolation Unit with bed, bed mattress and bedlinens)	2.65	1.03	Quite a bit prepared
2. Medical Supplies	3.15	0.812	Quite a bit prepared
3. Basic Hygiene and Sanitation Equipment (soap, alcohol, and disinfection solutions)	3.70	0.470	Very much prepared
4. Sterilization Equipment (autoclave and disinfection soaking solutions)	3.60	0.598	Very much prepared
5. Personal Protective Equipment Kits (mask, gloves, gown, and goggles)	3.50	0.512	Very much prepared
6. Good running water and electricity facilities	3.50	1.00	Very much prepared
7. Laboratory Unit for diagnostic examinations of EVD	3.50	0.760	Very much prepared
8. Waste Management Facility (Incinerator)	2.85	1.039	Quite a bit prepared
9. Hospital Vehicles/Ambulance	2.55	1.234	Quite a bit prepared
10. Budget	3.65	0.670	Very much prepared
<b>Mean of Means</b>	<b>3.265</b>		<b>Very much prepared</b>

As regards the private hospitals' level of preparedness on possible cases of EVD in terms of manpower, table 6 also yields almost the same pattern of findings as those revealed in tables 4 & 5. In terms of manpower referring to trained hygienists/cleaners (3.0), infection control committee (2.85), and staff training committee on EVD case management (2.8), the selected private hospitals have been rated as quite a bit prepared. In terms of having trained doctors, nurses and other healthcare staff (3.3) and laboratory personnel (3.3), these hospitals have been rated as very much prepared. In general, the selected private hospitals have been rated as quite a bit prepared (3.05) in terms of manpower. This indicates that these private hospitals have hired human resources who are professionally qualified to perform proper health care and services to their respective patients.

**Table 6. Weighted means obtained in assessing the private hospitals' level of preparedness on possible cases of EVD in terms of manpower**

ASSESSMENT CRITERIA	Private Hospitals		
	Mean	SD	Verbal Interpretation
1. Trained Doctors, Nurses and other Healthcare Staff	3.30	0.732	Very much prepared
2. Laboratory Personnel	3.30	0.732	Very much prepared
3. Trained Hygienists / cleaners	3.00	0.917	Quite a bit prepared

4.	Infection Control Committee (monitoring personnel)	2.85	0.988	Quite a bit prepared
5.	Staff Training Committee on EVD Case Management	2.80	1.105	Quite a bit prepared
<b>Mean of Means</b>		<b>3.05</b>		<b>Quite a bit prepared</b>

On the whole, although additional preparation might be needed for private hospitals, it was reported that these private hospitals are fully prepared for possible cases of EVD in the city of Misurata. These findings generally contradict the assumption of the present study which states that both private and public hospitals in Misurata City are not fully prepared for possible cases of EVD.

### 3.2.2 Public Hospitals' Level of Preparedness on Possible Cases of EVD

The present study actually takes two assumptions concerning the level of preparedness of both the private and public hospitals on possible cases of EVD. The first assumption is that both the private and public hospitals are not fully prepared on possible cases of EVD. The second assumption is that private hospitals are more prepared than public hospitals in terms of guidance and standard operating procedures, resources and facilities, and manpower. It was reported that the findings regarding the level of preparedness of public hospitals on possible cases of EVD seem to support the study's first assumption.

**Table 7. Weighted means obtained in assessing the public hospitals' level of preparedness on possible cases of EVD in terms of guidelines and standard operating procedures**

ASSESSMENT CRITERIA	Public Hospitals		
	Mean	SD	Verbal Interpretation
1. Admission protocol from frontline facility to assessment	2.50	0.945	A little bit prepared
2. Transfer protocol from assessment unit to treatment	2.45	0.887	A little bit prepared
3. Handling of contaminated items (clothes, bed, beddings, and needles)	2.30	0.923	A little bit prepared
4. Basic hygiene (handwashing, PPE application)	2.70	1.341	Quite a bit prepared
<b>Mean of Means</b>	<b>2.4875</b>		<b>A little bit prepared</b>

Regarding the public hospitals' level of preparedness on possible cases of EVD in terms of guidelines and standard operating procedures, table 7 reveals different findings from the findings in the private hospitals' level of preparedness. In terms of admission protocol from frontline facility to assessment (2.5), transfer protocol from assessment unit to treatment (2.45), and handling of contaminated items (2.3), the selected public hospitals have been rated as a little bit prepared. In terms of basic hygiene (2.7), these hospitals have been rated as quite a bit prepared. On the whole, it was reported that these selected public hospitals had been generally rated as a little bit prepared (2.4875) in terms of guidelines and standard operating procedures. The findings are supportive of the first assumption of the present study that public hospitals are not fully prepared on possible cases of EVD.

**Table 8. Weighted means obtained in assessing the public hospitals' level of preparedness on possible cases of EVD in terms of resources and facilities**

ASSESSMENT CRITERIA	Public Hospitals		
	Mean	SD	Verbal Interpretation
1. Quarantine Area (Isolation Unit with bed, bed mattress and bedlinens)	1.90	0.852	A little bit prepared
2. Medical Supplies	2.25	0.850	A little bit prepared
3. Basic Hygiene and Sanitation Equipment (soap, alcohol, and disinfection solutions)	2.75	1.118	Quite a bit prepared
4. Sterilization Equipment (autoclave and disinfection soaking solutions)	2.70	1.174	Quite a bit prepared
5. Personal Protective Equipment Kits (mask, gloves, gown, and goggles)	2.50	1.235	A little bit prepared
6. Good running water and electrical facilities	2.35	1.039	A little bit prepared
7. Laboratory Unit for diagnostic examinations of EVD	1.70	1.031	Not at all prepared
8. Waste Management Facility (Incinerator)	1.75	1.118	Not at all prepared
9. Hospital Vehicles/Ambulance	2.30	1.031	Not at all prepared
10. Budget	2.60	0.994	Quite a bit prepared
<b>Mean of Means</b>	<b>2.28</b>		<b>A little bit prepared</b>



As regards the public hospitals' level of preparedness on possible cases of EVD in terms of resources and facilities, table 8 yields inconsistent findings. In terms of resources and facilities referring to quarantine area (1.9), medical supplies (2.25), personal protective equipment kits (2.5), and good running water and electrical facilities (2.35), the selected public hospitals have been rated as a little bit prepared. Although these hospitals have been rated as quite a bit prepared in terms of basic hygiene and sanitation equipment (2.75), sterilization equipment (2.7), and budget (2.6), they have been otherwise rated as not at all prepared in terms of laboratory unit for diagnostic examinations of EVD (1.7), waste management facility (1.75), and hospital vehicles/ambulance (2.3). In general, it was reported that these selected public hospitals had been rated as a little bit (2.28) prepared in terms of resources and facilities. These findings therefore are supportive of the study's first assumption that public hospitals are not fully prepared for possible cases of EVD.

**Table 9. Weighted means obtained in assessing the public hospitals' level of preparedness on possible cases of EVD in terms of manpower**

ASSESSMENT CRITERIA	Public Hospitals		
	Mean	SD	Verbal Interpretation
1. Trained Doctors, Nurses and other Healthcare Staff	2.75	0.966	Quite a bit prepared
2. Laboratory Personnel	2.50	1.192	A little bit prepared
3. Trained Hygienists / cleaners	2.30	1.080	A little bit prepared
4. Infection Control Committee (monitoring personnel)	1.75	0.786	Not at all prepared
5. Staff Training Committee on EVD Case Management	1.80	1.056	A little bit prepared
<b>Mean of Means</b>	<b>2.22</b>		<b>A little bit prepared</b>

Like the pattern of findings shown in table 8, table 9 also reveals inconsistent findings regarding the public hospitals' level of preparedness in terms of manpower. As can be seen, in terms of having laboratory personnel (2.5), trained hygienists/cleaners (2.3), and staff training committee (1.8), the public hospitals have been rated as a little bit prepared. Although these hospitals have been rated as quite a bit prepared in terms of having trained doctors, nurses and other healthcare staff (2.75), they have been otherwise rated as not at all prepared in terms of having an infection control committee (1.75). Broadly speaking, the selected public hospitals have been generally rated as a little bit prepared (2.22) in terms of manpower.

The finding on this part of the analysis does not complement the findings obtained from the respondents' profile which indicates that most of the hospital staff from the selected public hospitals are generally equipped with the knowledge and skills they need to render proper care and services to patients. This contradiction was attributed to the fact that a considerable number of public hospital staffs have not actually attained the same level of expertise acquired by most of the hospital staffs from the selected private hospitals. Furthermore, some aspects of the assessment in terms of manpower do not simply refer to hospital staffs' level of education and expertise but to the creation and presence of healthcare committees for handling special functions such as infection control committee and EVD case management staff training committee. This was attributed to the limitations and constraints in the functions performed by the hospital administrative officials.

On the whole, it was reported that the public hospitals are not really prepared for possible cases of EVD. This general finding then supports the assumption of the study which states that public hospitals are not fully prepared for possible cases of EVD.

### 3.2.3 Comparison between private and public hospitals level of preparedness

Table 10 below reveals that in comparing the data between the private and public hospitals regarding their level of preparedness on possible cases of EVD in terms of guidelines and standard operating procedures, the selected private hospitals' mean of means (3.2875) is higher than that of the selected public hospitals (2.4875). Although significance level is generally set at .05 level in social science research, the finding on this part of the analysis reveals that the difference has been found to be highly significant at .001 significance level. This finding clearly indicates that in terms of guidelines and standard operating procedures, the preparedness level of private hospitals is higher than that of the public hospitals. This finding affirms the hypothesis of the present study that there is a significant difference between the private and public hospitals' level of preparedness in terms of guidance and standard operating procedures.

**Table 10. T-test of difference between mean of means of the selected private and public hospitals in terms of guidelines and standard operating procedures**

Hospital Category	Mean of Means	Standard Deviation	Standard Error	Difference between means	T-ratio	Prob
Private	3.2875	0.23229	0.11614	0.8	+5.61	***
Public	2.4875	0.1652	0.0826			

Legend:

- \* significant at .05 level
- \*\* significant at .01 level
- \*\*\* significant at .001 level

**Table 11. T-test of difference between mean of means of the selected private and public hospitals in terms of resources and facilities**

Hospital Category	Mean of Means	Standard Deviation	Standard Error	Difference between means	T-ratio	Prob
Private	3.265	0.43337	0.13704	0.985	+5.39	***
Public	2.28	0.38239	0.12092			

As regards level of preparedness on possible cases of EVD in terms of resources and facilities, table 11 also reveals that the private hospitals have a higher mean of means (3.265) than the public hospitals (2.28). Like the finding in table 10, the difference between mean of means of private and public hospitals is significant at .001 level of statistical significance. This finding affirms the hypothesis that there is a significant difference between the private and public hospitals' level of preparedness in terms of resources and facilities.

**Table 12. T-test of difference between mean of means of the selected private and public hospitals in terms of manpower**

Hospital Category	Mean of Means	Standard Deviation	Standard Error	Difference between means	T-ratio	Prob
Private	3.05	0.23979	0.10724	0.83	+3.72	**
Public	2.22	0.43675	0.19532			

Like the foregoing findings in tables 10 and 11, table 12 also reveals that the private hospitals have obtained substantially higher mean of means (3.05) than the public hospitals (2.22) in terms of manpower. Apparently, the difference between mean of means of private and public hospitals in terms of manpower has been found to be statistically significant at .01 level of significance. This finding indicates that with regard to level of preparedness on possible cases of EVD in terms of manpower, private hospitals are more prepared than public hospitals.

On the whole, the consistent findings affirm the study's hypothesis that there is a significant difference between the private and public hospitals' level of preparedness in terms of guidelines and standard operating procedures, resources and facilities, and manpower. It was reported that private hospitals are significantly more prepared than the public hospitals in Misurata city.

#### IV. Conclusions

From the foregoing results and discussions, sound conclusions could be drawn. First, most of the hospital staff in the private and public hospitals are generally equipped with the knowledge and skills needed for proper patient care and related hospital services which is highly preferred in all hospital settings. Second, the private hospitals are very much prepared for possible cases of EVD in terms of guidelines and standard operating procedures, resources and facilities, and manpower. This partly contradicts the study's assumption that both the private and public hospitals are not prepared for possible cases of EVD. Third, public hospitals are not fully prepared for possible cases of EVD in terms of guidelines and standard operating procedures, resources and facilities, and manpower. This partly affirms the study's assumption that both the private and public hospitals are not prepared for possible cases of EVD. Fourth and last, there is a significant difference between the private and public hospitals' level of preparedness in terms of three categories: guidelines and standard operating procedures, resources and facilities, and manpower. More specifically, private hospitals are significantly more prepared than public hospitals for possible cases of EVD in these three categories. The overall findings here shall become a significant contribution to the literature in research which deals with the difference between the kind of services delivered by private and public hospitals as well as those which deals with hospitals' preparedness in cases of an emerging disease outbreak.

## V. Recommendations

Considering the conclusions presented above, the present study recommends the following:

- That nursing students be encouraged to participate in trainings, lectures, and seminars focusing on health awareness programs to keep themselves updated of the newest trend in health care system.
- That nurses from private and public hospitals be given workshops on infection control and be trained to practice professional self-sufficiency for emerging clinical cases particularly a contagious disease like Ebola virus disease.
- That school administrators establish the necessary communication with the Ministry of Health in order to coordinate the implications of this study to the hospitals in Libya.
- That a comprehensive national health service program including the creation of a special health monitoring group and rapid response teams be developed in order to achieve a more effective preparedness action plan as mandated to all African countries.

## References

- [1]. WHO (2014). Ebola virus disease Fact sheet No. 103". [viewed 17 June 2015]. Retrieved from <http://www.who.int/mediacentre/factsheets/fs103/en/>
- [2]. WHO (2015). Ebola Virus Disease Consolidated Preparedness Checklist. Emergencies Preparedness Response. World Health Organization. [viewed 15 February 2015]. Retrieved from <http://www.who.int/csr/resources/publications/ebola/ebola-preparedness-checklist/en/>
- [3]. Nall R, Cherney K, Krucik G., and Healthline Medical Team (2014). Ebola Virus and Disease. [viewed 12 February 2015]. Retrieved from <http://www.healthline.com/health/ebola-hemorrhagic-fever#Symptoms3>
- [4]. Tamfum JJ., Mulangu, Masumu J., Kayembe M., Kemp A., and Paweska J. (2012). Ebola virus outbreaks in Africa: Past and present. [viewed 19 February 2015]. Retrieved from [www.ojvr.org/index.php/ojvr/article/download/451/517](http://www.ojvr.org/index.php/ojvr/article/download/451/517), doi, 10.4102/ojvr.v.79.i2451
- [5]. Ruzek, edited by Sunit K. Singh, Daniel (2014). *Viral hemorrhagic fevers*. Boca Raton: CRC Press, Taylor & Francis Group. p. 444. ISBN 9781439884294.
- [6]. Goeijenbier M, van Kampen JJ, Reusken CB, Koopmans MP, Van Gorp EC (2014). "Ebola virus disease: a review on epidemiology, symptoms, treatment and pathogenesis". *Neth J Med* v.72 (9): 442–8. PMID 25387613.
- [7]. Center for Disease Control (CDC, 2014). *About Quarantine and Isolation*". [viewed 3 July 2015]. Retrieved from [www.cdc.gov](http://www.cdc.gov)
- [8]. Fauci, A. (2014). Examining the Public Health Response to the Ebola Outbreak. National Institute of Allergy and Infectious Diseases. [viewed 12 February 2015]. Retrieved from <http://docs.house.gov/meetings/IF/IF02/20141016/102718/HHRG-113-IF02-Wstate-FauciA-20141016.pdf>
- [9]. U.S. Department of Health and Human Services (2012). Healthcare System Preparedness. [viewed 15 May 2015]. Retrieved from <https://www.llis.dhs.gov/hseep>
- [10]. Haynes, B.R., Taylor, W.R., and D.L. Sackett (1979). *Compliance in Health Care.*: Johns Hopkins Univ. Press. Baltimore, MD. US
- [11]. Reid, R. (1996), "Why don't they stay changed?", *Canadian Journal of Cardiology*, Vol. 11, pp. 26-9.
- [12]. Kelman, H. (1967), "Assignment of responsibility in the case of Lt. Calley: preliminary report on a national survey", *Journal of Social Issues*, Vol. 28, pp. 177-212.
- [13]. Batenburg R., Neppelenbroek M., and Shahim A. (2014). A maturity model for governance, risk management and compliance in hospitals. *Journal of Hospital Administration*, Vol 3, No 4. [viewed 14 July 2015]. Retrieved from <http://www.sciedu.ca/journal/index.php/jha/article/view/3283>
- [14]. Cronin, J. J. & Taylor, S. A. 1992, "Measuring service quality: A reexamination and extension." *Journal of Marketing*. vol. 56, no. 3, pp. 55-68.
- [15]. Irfan, S.M. & Ijaz, A. 2011. "Comparison of service quality between private and public hospitals: Empirical evidences from Pakistan." *Journal of Quality and Technology Management*. pp. 91-114.
- [16]. Parasuraman, A., Zeithaml, V.A., & Berry, L.L. 1988. "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality." *Journal of Retailing*. vol. 64, no. 1, pp. 12-40.
- [17]. Andaleeb, S.S., 2000. "Public and private hospitals in Bangladesh: service quality and predictors of hospital choice." *Health Policy & Planning*. 15(1): 95–102.
- [18]. Taner, T., & Antony, J. (2006). Comparing public and private hospital care service quality in Turkey. *Leadership in Health Services*, 19(2), 1-10.