Deanship of Graduate Studies
Al- Quds University

Assessment of the Effectiveness and Performance of Blood Bank Services in Gaza Governorates during the War on Gaza

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MPH Thesis

Jerusalem– Palestine

1431 / 2010

Assessment of the Effectiveness and Performance of Blood Bank Services in Gaza Governorates during the War on Gaza

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A Thesis Submitted in Partial Fulfillment of Requirements for the Degree of Master of Public Health/Epidemiology

Al-Quds University

1431 / 2010

Dedication

To soul of my Father who taught me how to love knowledge,

To my merciful mother for her unlimited presents

To my husband for his tolerance circumstances

To my lovely kids: Al-mohand, Lara, Aseel and Abdallah

Who brighten my ways, To my brothers and sisters

To my closed friends Jehad and Tahanii

This study could not have been achieved without them

Khitam Abu- Zinada- Natil

Declaration:

I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed:

Khitam Abu- Zinada- Natil

Date: 15 November 2009

Acknowledgment

Thanks are extended to my supervisor *Dr. Yehia Abed,* Associated Professor, Al-Quds University and Health Consultant, for his guidance, supervision, concern and encouragement in carrying out this research work. He has been a constant source of inspiration in all stages of this work. I am highly indebted to him for his valuable advice, kind concern and continuous guidance.

I also owe a world of especial thanks to *Dr. Bassam Abu Hamad* for his motivation, support and guidance through the study. I would like to acknowledge all academic and administrative staff of the school of public health for their guidance and support.

I am thankful to all experts, who helped me in reviewing the questionnaire especially Director General of laboratories & blood banks *Dr. Randa El- Khoudari,* to *Dr. Jehad El hissi* and *Dr. Abed El-Raoof El-Manaama,* also thanks to *Dr. Zakaria Al Astal* the director of Khan Younis hospital laboratory for his constructive criticism.

I would remiss if I didn't thank **my colleges** at blood banks for their willingness to participate and help in this study. Thanks go to my leaders *Mr. Mohamed Shams* Director of PHC laboratories and *Mr. Moneer El- Zaza* my direct leader for their encouragement. Lots of thanks go to laboratory medical staff of Shohda'a Jabalia Clinic especially to *Mr. Saeed Abed* for his help and support, *Mr. maamon Ferwana & Miss Jumana Adass.*

I would like to thank all my friends and colleagues for their encouragement and support especially *Miss Reem Abu Shomar, Ms jamalat majdalawi, Dr. Sawsan Hamad & Dr. Elena El-Hadad.* Thanks for *Mr. Jebreel Abu Hamad & Mr. salam Mahdi* who helped me of secretarial work and computer skills.

Finally I owe a world of thanks to my sister *Inaam* and her husband *Mr. Jawad Mahdi* who helped me in bachelor way.

Abstract

Globally, effectiveness of blood bank services plays a vital role in rescuing people's life. In particular, during the last war on Gaza, the performance of the blood banks was critical for meeting the emerged demands. This study aims at assessing the performance of blood bank services in Gaza Governorates during the war on Gaza in order to appraise strengths and challenges encountered.

The design of this study is across sectional. All blood banks and hospitals involved in treating war casualties were included. Data collected through a questionnaire and an observatory checklist. The population of study included 116 respondents who completed the questionnaire plus 13 observational checklists. Data collected by the researcher and all participants were positively responded.

This study shows that blood banks had faced shortage in the required blood units, fresh frozen plasma, required instruments, screening kits, alcohol 70% and the needed disposables. The shortage of blood units was more prominent in the north of Gaza with the south being the least affected with statistically significant differences between the two locations. Around 90% of respondents perceived the total number of staff wasn't sufficient for working during crisis. Similarly, the great majority 87% of respondents perceived the number of blood donation chairs as not sufficient to accommodate the extra ordinary number of donors during the war. blood donations was intensified during the war and the media was actively manipulated to recruit blood donors. The main reported strength points in the blood banks performance were extending working hours 81%, obtaining large number of blood units 75% and rapid responsiveness 43.8%. In contrary, the main reported weakness points were lack of instruments and equipment 81.3%, poor communication among the involved parties 56.3%, insufficiency of laboratory kits 43.8% and lack of administrative support 37.5%. As resulting of impaired accessibility during the war 25% of staff and 18.7% of mangers were unable to reach their work.

The study recommends that the working condition should be improved by providing needed instruments, supplies and equipping the laboratories with the needed human resources. To ensure the availability of the need blood units, the service by the current central blood bank located in Gaza City should be expended to cover all Gaza Governorates

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List of Abbreviation

ABC	Americans' Blood Centers
AHMAC	Australian Health Ministers' Advisory Council
AIDS	Acquired Immune Deficiency Syndrome
ANOVA	Analysis of Variance
ARC	American Red Cross
B.C	Before Christ
B.C.A	Blood Centers of American
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
Dec	December
EC	European Council
Feb	February
GDBS	Global Data Base on Blood Safety
GEH	Gaza European Hospital
GG	Gaza Governorates
GS	Gaza Strip
IBTO	Iranian Blood Transfusion Organization
IOF	Israeli Occupation Forces
Jan	January
KSA	Kingdom of Sudia Arabia
MOH	Ministry of Health
NACO	National AIDS Control Organization
NBS	National Blood Service
NBTS	National Blood Transfusion Service
NGO's	Non Governmental Organizations
NHS	National Health Services
Nov	November
PCBS	Palestinian Central Bureau of Statistics
PHC	Primary Health Care
RBCs	Red Blood Cells
SPSS	Statistical Package for Social Science
SS	Statistical Significant
TTIs	Transfusion Transmissible Infections
UHWC	Union of Healthy Work Committees
UN	United Nations
UNRWA	United Nation Relief and Work Agency
US	United State
WB	West Bank
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

Chapter 1

Introduction

1.1 Research background

The war on Gaza Governorates needs a model to promote solutions for managing rapid surge problems during a mass casualty event. On December 27, 2008, the beginning of Israeli war on Gaza Governorates produced a situation where instantly killing 296 people and more than 520 injured (Al-Mezan, 2009a).

That period nearly 1380 martyrs and 5380 were injured, around 2000 were admitted in patients at the closest facility hospitals in Gaza Governorates hospitals between 23 days (World Health Organization- WHO, 2009).

Federal resources should not be expected to arrive sooner than 72 hours from the time of aggression. Resources can be delayed by the time taken to deploy them and by responding to multiple communities (Centers for Disease Control and Prevention- CDC, 2004).

American Association of Blood Banks- AABB *et al* (2003) believes that there are no currently identified scenarios in which the immediate need for blood or blood components would be beyond the capabilities of the blood community to meet. The single greatest risk of domestic disasters is not lack of supply, but disruption of the blood system.

It is imperative to estimate the requirement of blood to set the targets for collection of blood. Major problems encountered in achieving the targets were social and cultural factors, myths and misconceptions, weak management of donor programs, inadequate resources and inappropriate use of blood (WHO, 2001a).

The recruitment of new donors, retention of existing donors is essential for an adequate supply of blood and blood components at all times. The retention of donors depends not only on the continuing commitment to offer their free gift, but also on the satisfaction experienced at blood donor sessions (Ranasinghe and Harrison, 1999). Blood banking is better prepared for disasters and shortages at the federal level; the importance of the blood supply in disaster planning has been recognized in several ways.

As blood donor recruiters rightly emphasize, acute 'day-of' needs must be met with what is in hand but what if blood supplies were insufficient or could not be replenished? (Ramsey, 2008).

WHO (1993) said that the goal of blood transmission services is to provide effective blood and blood products, which are as safe as possible, accessible at reasonable cost and adequate to meet needs and demands, where blood is required primarily for the management of bleeding as a complication of trauma or pregnancy. The highest ratios apply to hospitals with more specialized needs as complex surgical.

For many years blood transfusion using donated blood has been accepted medical therapy for blood loss and severe anemia. However, growing recognition of the benefit of blood transfusion and community concern about the safety of donated blood has changed this perception. This has led to the rise of alternatives to blood donation (Australian Health Ministers' Advisory Council- AHMAC, 2000).

The steady tightening of access the criteria of blood donors increases the risk of excess demand for blood. It is still technically impossible to reproduce artificially blood

components. If new donors are not successfully recruited on a regular basis, blood shortages can become a central health care problem. Moreover there is evidence that many latent donors never contemplated becoming an active donor (Riedel *et al*. 2000).

The first four days after the disaster experience revealed crucial missteps in the development of a post-event plan for blood product management, and need development of a detailed disaster preparedness and response plan that include addresses issues of donation, distribution, communication, transportation, and coordination. The current plan requires Transfusion Organization to convene a disaster task force immediately as the main coordinator of all disaster preparedness and response activities (Abolghasemi *et al.* 2008).

Following the events of the war on Gaza 2008- 2009 lessons to be learned, the blood community would recognized the need to evaluate its actions in response to the tragedy and develop recommendations relating to its response to future disasters.

1.2 Problem statement

The most difficult problems involve disruption or interference of the blood supply system historically; blood supply needs during disaster response have been met with the quantity of blood products available at that time. Facilities currently maintain about a three-day supply of blood products which may need to be expanded to a seven-day supply (CDC, 2004).

Typically, fewer casualties require blood products than the total number of victims. Local communities have limited sources of blood products. If faced with a surge increase in demand, blood products will likely be transported from blood centers outside the local area.

After a disaster, the public usually responds by volunteering to donate larger quantities of blood products than are needed. An influx of blood donors could tax collecting and processing efforts (Abolghasemi *et al.* 2008).

When resources (personnel, equipment and supplies) are unnecessarily applied to collecting and processing unneeded products, the resources cannot process and distribute available and urgently needed products to those in urgent need. The media must continuously provide the community with reliable information about need and supply of blood products. There are limited personnel with the training, education, and skills to process and administer blood products within treating facilities. Additional qualified laboratory personnel may be needed to process request for blood products. Nursing personnel may be needed to administer blood products. There may be limited methods of transporting or transferring blood products from the supplier to destination during a disaster. So a plan must be continually perfected and tested by means of regular, institutionalized simulations and drills.Whole blood is an essential part of the armamentarium for treating casualties produced by war (WHO, 2001a).

1.3 Justification of the study

The importance of this study is to display the need of the blood community to evaluate its actions in response to the war on Gaza Governorates December 27, 2008, examine "lessons to be learned," and develop recommendations relating to its response to the tragedy, beside assist blood centers, hospital B.B., and transfusion services in preparing for and responding to future disasters and acts of the war on Gaza affecting the blood supply. The study is intended to facilitate coordination among these facilities, national blood organizations, and local government officials, in the event of a disaster, to determine medical need for blood, facilitate transportation, if needed, of blood from one facility to another and communicate a

common message to the national blood community and the public about the status of the blood supply in the disaster-affected community. Only a comprehensive plan comprising vulnerability assessment, mitigation, and closely organization at the local, regional and national level will ensure an adequate response in disaster situations and guarantee the timely and cost-effective recovery and reconstruction of the affected facility. Really there is no doubt that we need to assessment of the effectiveness and performance of the blood community during disasters in order to develop recommendations that avoid the blood supply services from breakdown.

1.4 Aim

To improve the effectiveness and performance of B.B. services and minimize the shortages and gaps of working in future disorder situation.

1.5 Objectives

1.5.1 General objective

To assess the effectiveness and performance of B.B. laboratories in Gaza Governorates during the war on Gaza.

1.5.2 Specific objectives

1. To illustrate the status of the B.B. services in the Gaza Governorates including distribution and appropriateness of staffing and equipment.
2. To appraise the methods used for managing blood donations processes including donors, donated units, hazards, media.
3. To evaluate the documentation system encountered in the donations, screening and distribution processes.

4. To appraise areas of strength and areas of weaknesses in the B.B.services faced during the last war in Gaza.
5. To conclude lessons learned from this disaster in order to improve B.B.services in similar crisis.

1.5.3 Research questions

1. How are the B.B. distributed around Gaza Governorates?
2. What are the characteristics of B.B. staffs and directors?
3. What about applied registries, document system, safety and security concerns?
4. How are hazardous substance issues testing?
5. What types of communication are among B.B. and how B.B. connects with hospitals?
6. How are B.B. deal with increase demand of blood units and blood components?
7. What is model in which is more used to eliminate the shortages?
8. How are B.B. deals with internal and external donations?
9. Where are the strength areas and weakness areas of B.B. services?
10. What are lessons learned from this disaster to catalyze the development of a permanent preparedness and response plan?

1.6 Context of the study

The demographic and political situations have a great influence at all sides of our life that make us to live under specific health conditions; the health status is one of the first issues that are affected by the situation.

The next paragraph will present little information about health status regarding the demographic and political situation in Gaza Strip of Palestine, which the study will conduct.

1.6.1 Demographic and population

1.6.1.1 Palestine History

In ancient history Palestine was known the land of Canaan; the Philistines entered the land of Canaan from Crete about 1250 B.C. and settled in the coastal areas. They were the people, who gave Palestine its name (Annex 1). Palestine was under the Ottoman Turks in 1914 (Abedl Munem, 2009).

In 1916 Britain and France signed the Sykes-Picot Agreement, which divided the Arab region into zones of influence, Palestine was to be internationalized and in1917 first National Conference which known as "The Balfour declaration" expressed that Britain would use its best endeavors to facilitate the establishment in Palestine of a national home for the Jewish. The Palestinians held a six-month General Strike to protest against the confiscation of land and Jewish immigration in1936 next to the British government allowed Jewish immigration and offering independence for Palestine within ten years, however the United Nations (UN) in 1947 approved the partition under which the Palestinian Arabs, who accounted for 70% of the population and owned 92% of the land, were allocated 47% of the country which known UN resolution 181, finally 1948 British forces withdrew from

Palestine in May and the Zionists proclaimed the state of Israel without defining its borders. Arab armies moved to defend the Palestinians. The Zionists controlled 77% of Palestinian land and the West Bank was put under Jordanian administration and the Gaza Strip under Egyptian administration (Thomas, 1999).

Afterwards, Jordanian and Egyptian lost their administrative in 1967, where Israel launched a war of aggression against Egypt, Jordan and Syria and occupied the West Bank, Gaza Strip, the Golan Heights and the Sinai Peninsula (Abedl Munem, 2009).

As a result of the Israeli occupation, in December 1987 the Palestine Uprising- the first Intifada- in the Occupied Territories began (Thomas, 1999).

The second Intifada in year 2000 draw most of the attention to emergencies, the economic and political crisis continued to plague the health sector for years (Abed, 2007a).

Gaza Strip (GS) is located on south of Palestine on the Mediterranean area, it has 51 kilometers border with Israel and 11 km with Egypt. GS is a narrow land (Annex 1) furthermore has high density of population where approximately 1,416,543 persons lived in 365 sq. km; in fact GS is classified into five Governorates , Gaza North, Gaza City, Mid-Zone, Khan-Younis and Rafah (Palestinian Central Bureau of Statistics-PCBS, 2009).

The Israeli authorities continued their policy of invasions to Palestinian occupied territories using gun shoot, tanks bulldozers and military warships and fighter planes as well as the policy of political assassinations. The Israeli occupation forces continued aggressions against the lives, safety and freedom of movement medical crews operating preventing them reaching the martyrs and the wounded to save their lives and transfer to health care centers so we hope MOH to double health services and facilities. Both MOH and other

sectors apply the B.B. services in based hospitals, each governorate is almost self sufficient blood and products with few exchange among them in GS there are 7 B.B., 6 belong to MOH and 1to NGO's facility in addition MOH laboratories and B.B. directorate is responsible for overall blood transfusion services, the NGO's B.B. are under MOH supervision beside must follow the same rules and regulation as MOH B.B. as (MOH, 2006).

On other hands MOH owns and operates 10 hospitals in GG which mostly received the largest number of martyrs and injured beside that, there are 10 NGO's hospitals in GG but only two of them received martyrs and injured which known Al-Awda and Al-Quds Hospital. Annex 8 shows distribution of these hospitals and B.B. centers, there are three hospitals in North of Gaza; they are Bite-Hanon Hospital, Kamal Edwan Hospital and Al-Awda Hospital, in Gaza there are Central B.B. Society, Al-Quds Hospital and Shifa Medical Hospital, this hospital is the main hospital in Gaza Governorates which give the highest health services, then there are Shohda'a Alaqsa Hospital in Mid-Zone of Gaza Governorates, in Khan- Younis there are Nasser Hospital, Abu Jehad (GEH), and B.B. society finally there are two hospitals and one B.B. in Rafah, they called Abu Yosif El Najar Hospital and Tal El Sultan Hospital and B.B. Society (MOH, 2006).

1.6.2 War on Gaza (27 December 2008 – 18 January 2009)

According to Al Mezan's investigations, they wrote in late December 2008, the Israeli Occupation Forces (IOF) launched a major offensive, unprecedented in scope and brutality, against Gaza Governorates during Operation Cast Lead. The offensive was launched at approximately 11.30am on Saturday 27 December 2008, with a surprise air strike campaign carried out by 80 warplanes. This attack targeted the majority of police stations and

security premises throughout Gaza, in addition to numerous other targets. Lasting just five minutes, this attack was devastating, due to its timing, scale and types of weaponry used. It became clear in the first moments of the attack that the IOF intended to inflict a high level of destruction and killing. From the outset of the offensive, the IOF did not appear to pay any concern to the fate of civilians, many civilians were therefore killed in these places, and several school children were killed in these attacks. The offensive continued with intense air, artillery and naval attacks on the Gaza Strip until 2am on 18 January 2009 after the Israeli Government had declared a unilateral ceasefire. IOF attacks concentrated primarily on North Gaza district and Gaza district although less intense attacks were carried-out across the Gaza Strip. This 22-day IOF systematically targeted civilian objects without apparent military necessity, including residential homes; targeted groups of civilians gathered in one place; willfully killed civilians, even those trying to flee their area of residence after the start of the ground invasion which commenced in the early hours of 3 January 2009; and deliberately targeted internally displaced persons in their shelters. The IOF also targeted prayers in the mosques and at the entrance to the mosques and used civilians as human shields. Medical teams, ambulances and civil defense teams became the direct target of IOF attacks along with civilians attempting to rescue the injured and remove the bodies of their killed relatives and neighbors. Journalists and media outlets were also targeted by IOF in an attempt to obscure the truth of the crimes they were perpetrating. Several Palestinian journalists were killed. The Israeli authorities also imposed a blockade which prevented the entry into Gaza of foreign media teams. Civilian infrastructure, water networks, sanitation networks and mosques became a direct target of IOF attacks. The IOF also used internationally prohibited weapons, or legal weapons in an illegal way, such as the wide spread use of white phosphorus in residential areas (Al-Mezan, 2009b).

The great burden of caring for traumatized patients and injured fell on the health system in Shifa hospital of Gaza town. All hospitals received a total of >520 injured patients within the first 24 hours of beginning of the war, resulting increase demands of blood units (MOH Website, 2008).

That period nearly 1380 martyrs and 5380 were injured, around 2000 were admitted in patients at the closest facility hospitals in Gaza hospitals between 23 days (WHO, 2009).

1.6.3 Blood Bank Services in Palestine

According to MOH (2006) there are 26 B.B. in Palestine (WB: 19/GS: 7). Seven B.B. belong to MOH, twelve to NGO's and private hospitals in west bank (WB). While, in Gaza Governorates (GG) there are one belongs to NGO's facility (the Central B.B. Society with 2 branches is only NGO's blood bank) and others banks to MOH. Services of B.B. are mostly hospital based. Each governorate is almost self sufficient of blood and blood products with minimal exchange among them. In Palestine MOH laboratories and B.B. directorate is responsible for overall blood transfusion services. Private and NGO's B.B. are supervised by MOH and follow the same regulations and rules as MOH B.B. do.

1.7 General Review of the Study Chapters

Asses the effectiveness and performance of B.B. services in Gaza Governorates during the war on Gaza will be addressed in five chapters starting with an introduction that had been discussed in the previous section. In chapter two, the researcher provided a literature review to address the need for assessing the effectiveness and performance of B.B. in war and describes performance of B.B. in other countries during crisis or war; also some definitions, at the end of this chapter conceptual frame work will illustrate factors affect

and affected by B.B. effectiveness and performance while conducting a time study. Chapter three will illustrate methodological aspects considered when conducting the study, which include: study design, study population, study place, ethical consideration study instrument, pilot sample, data collection, processing and analyzing the data and limitation of the study.

Through Chapter four, the researcher presents the main study results of the statistical analysis, which involves results about employee's perception about B.B. environments and structure, also the result display the shortages faced B.B and donations, on the other hand the results are discussed in the same chapter. Finally conclusion and recommendations will be presented in chapter five.

CHAPTER 2

LITRATURE REVIEW

Chapter 2

Literature review

Conceptual Framework

The factors that affect and affected by B.B. services will be illustrated using a brief summary and a diagram

2.1 Factors Affecting and Affected by B.B. Services in Gaza Governorates

The following diagram (Figure 2.1) presents factors related to working environment and employees' characteristics that affect and affected by B.B. services. As a result, they may affect the provision of performance and effective B.B. services. Factors of B.B. environmental include sufficient area, sufficient equipment, waste management and B.B. documents, on other hand employees' characteristics affect B.B. services like staffs' and directors' socio-demographic, staff skills and behaviors, directors' and staffs' perceptions,. Beside that, during war there are a lot of issues faced directors of B.B like viability of screening kits, decrease in staff numbers, increase demand of blood units and blood component and other problems.

Resulting of war on Gaza which began in 27 Dec 2008 to 18 Jan 2009 at 2 am (Al-Mezan 2009b), Performance of B.B. in Gaza Governorates faced challenges but internal and external donations supported and assisted B.B services in Gaza Governorates to face challenges, shortages and increase demand of blood units. All B.B. in Gaza Governorates supplied hospitals which received martyrs and Causalities of blood and blood Components for treating and saving their life.

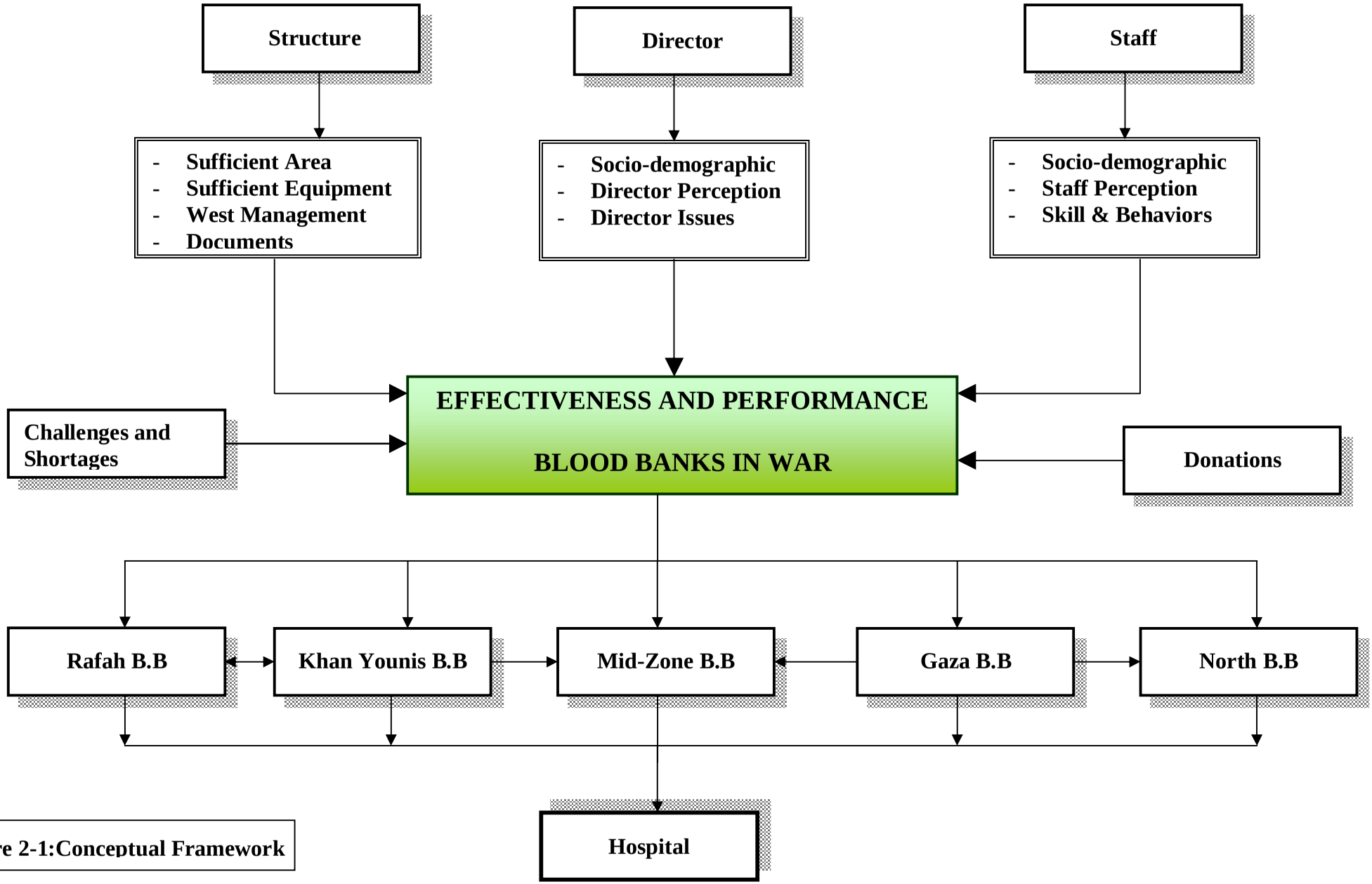

Figure 2-1:Conceptual Framework

2.2 Definitions

Blood Bank (B.B.)

B.B. (Blood Centre) is defined as a building or location specifically for collecting blood, component production, testing, storage, distribution… etc. In blood centre, the space allocation, type and number of equipment, amount of consumables and the number and category of staff will vary with the quantum of blood collected and processed per annum. The scope of the centre will also depend on the size, local requirements and modus operandi. Large hospitals with attached medical colleges or specialized medical institutions should have centers with all facilities to ensure adequate and efficient provision of blood. On other hand the small hospital based centre can receive their blood supplies from regional or larger hospital centre in the area and may be provided only basic laboratory facilities for controlled storage of whole blood and blood components (NACO, 2007).

National Blood Center

Some of the public view the blood supply as a bank holding units of whole blood indefinitely until the need dispense them arises (Glynn *et al*. 2003).

However, the blood supply is actually a complex pipeline, involving elaborate donor screening, variable collection processes, shipment, separation, testing, distribution, and short-term storage. Blood supply has become both safer and increasingly expensive. This progress has required progressively more centralized processing centers. The added efficiency and economies scale come with the inherent drawback of interdependency, longer turnaround times, and time and expense long-distance shipping. Unlikely blood cannot be stockpiled into a national strategic reserve.

Blood components, on the other hand, include several types of products with variable shelf lives and storage requirements. This reason; the main blood supply is actually maintained within the donor, as a living blood reserve (Bianco, 2001).

Goodman *et al* (2003) described national B.B. as collection centers routinely depend on a good faith effort by donors to attend a blood drive during a shortage. In turn, hospital B.B. and transfusion services rely on blood centers to efficiently supply the blood components needed for patient care. In other hand blood collection centers face increased transfusion transmitted disease testing, chronic blood supply shortages, fluctuating demand, and tight budget restraints.

In optimizing operations, efficiency is vital. Operational efficiency is the best possible use of in put resources, employees, volunteers, budget, and donor population to produce maximum output of blood product, units and blood components. Although the smallest blood centers had complex inefficiencies which size alone could not correct (Pitocco and Sexton, 2005) the larger blood centers could improve efficiency by downsizing or dividing into smaller centers (Pereira, 2006).

Types of Donors

Voluntary Blood Donor (Non-Remunerated)

A person who gives blood, plasma or other blood components of his, her own free will and doesn't receive payment for it, either cash or kind which could be considered a substitute for money, this includes time off work. Voluntary blood donation refers to unpaid (non-remunerated) blood donation (NACO, 2007).

Categories of Voluntary Blood Donor (Non-Remunerated)

New Voluntary Donor

A voluntary non-remunerated blood donor who has never donated blood before

Lapsed Voluntary Donor

A voluntary non-remunerated blood donor who has given blood in the past but does not fulfill the criteria for a regular donor.

Regular Voluntary Donor

A voluntary non-remunerated blood donor who donates blood on a regular basis without any break for a longer duration between two donations or a voluntary non-remunerated blood donor who has donated at least three times, the last year and continues to donate regularly at least once per year (NACO, 2007).

Family Replacement Blood Donor

A donor who gives blood when it is required by a member of the patient's family or community This may involve a hidden paid donation system in which the donor is paid by the patient's family (NACO, 2007).

A family replacement donor is one who gives blood when it is required by a member of his, her family or community. This often involves coercion or payment which compromises the safety of the blood.

A member of the family or a friend of the patient who donates blood in replacement of blood needed for the particular patient without involvement of any monetary or other benefits from any source (Sujatha Rao, 2007).

Paid Professional Blood Donor

A donor whose donates blood in exchange of money or other form of payment (NACO, 2007)**.**

Forced Blood Donor

A person who is not willing to donate blood on his, her own but is being forced by their superiors or employer for donation, there is always a fear of losing ones own job or promotion (Sujatha Rao, 2007).

Autologous Blood Donor

A patient who donates his/her blood to be stored and rein fused, if needed during surgery to avoid or reduce the need for an allergenic blood transfusion. The patient themselves acts as a blood donor (NACO, 2007).

Aphaeresis Donor

A donor who donates only one of their blood components through the process of cell separation this donor may be either voluntary or replacement donor (Sujatha Rao, 20007).

2.3 Introduction

Life-saving resource of blood from donors to recipients, blood is a unique resource in that it is supplied through volunteer donors (Cant, 2006). Donate blood save a life (NACO, 2007). Cant (2006) wrote blood is not something that can be manufactured or produced by machines. It must be given by healthy, charitable adults who are willing to donate their own blood for the use of complete.

World Health Organization slogan is "*safe blood starts the donor security*". World Health Organization accords high priority to availability of adequate safe blood throughout the world. Realizing its universal importance the theme of World Health Day for the year 2000 was dedicated to safe blood with thought provoking slogan of "*Safe blood starts with me. Blood saves life*"(Sujatha Rao, 2007).

Formal recognition of blood transfusion as an essential part of patient care by the World Health Organization started more than 30 years ago with the adoption of resolution WHA28.72 (1975) by the World Health Assembly, the resolution called on Member States to promote national blood transfusion services, based on voluntary non remunerated donations, and to promulgate laws to govern their operation. This was based on recognition of the essential role of blood transfusion as a life-saving procedure in modern medical practice. Governments of Member States were therefore expected to take the responsibility of ensuring that the transfusion of blood and blood products was well regulated and coordinated. This would guarantee the highest standards of quality and prevent transfusion-transmissible infections (TTIs) and other life-threatening complications (Tapko, *et al.* 2007).

2.4 History and experience of B.B. and Blood Transfusion

The first transfusion of citrated blood was performed on November 14th 1914 but despite this, transfusion of blood was considered to be too difficult and unsuited for the stress of war conditions until 1917 when the doctors from the United States of America reinforced the knowledge that blood could be safely transfused spread throughout the Armies (Keynes, 1922).

The Canadian surgeon Robertson, used uncross matched whole blood transfused by syringe directly from donor to recipient to demonstrate the life-saving potential of transfusion and the need to resuscitate the badly injured with something more than normal saline. He served in Canadian arm from October 1915 to the end of 1917 and wrote articles describing series of cases of transfusion during war I (Stansbury and Hess, 2009).

The use of donated blood has been used since the 1930s and was regarded for many years as beneficial and free of risk. Blood transfusion is an established process for treating blood loss and severe anemia. All hospitals should have clear guidelines about the situations in which to transfuse donated or pre-donated blood to prevent and manage bleeding (AHMAC, 2000).

2.5 Performance of B.B. during Wars and Disasters

2.5.1 World War I

The scientific basis for blood banking was discovered just before World War I in 1913then published a series of cases that showed that ABO typing largely prevented the accidents and disasters of transfusion. The next year, three separate individuals described the use of citrate as an anticoagulant. These discoveries were converted into the tools of modern blood banking, hemagglutination blood typing, and RBC storage solutions, and sent to the battlefield in 1915 and 1916 by institute student. Then blood transfusion became the accepted resuscitation therapy in the British Expeditionary Force where many American hospitals and physicians were attached in March 1918.

There is no record of how many transfusions were performed in World War I. Reviewing Medical History of the Great War, the general staff and consultants concluded that blood transfusion was the most important medical development of the war and clearly credit the invention to Robertson (Hess and Thomas, 2003).

2.5.2 World War II

Hess and Thomas (2003) wrote based on their World War I experience, British entered World War II with a functioning blood transfusion system based on the Robertson model. US decided that blood transfusion was too difficult and dangerous so US medical officers

working in parallel with British hospitals in North Africa, India, the South Pacific quickly recognized that they lost injuries while British physicians were saving by use of blood transfusion. Blood Program World War II is the best primary source on the US military blood program and blood product development. By August 1944, the situation reached a crisis. However Europe and the Pacific needed more blood than could reasonably be supplied from their areas, supply of whole blood reached by air at that time. Since World War II, blood donation has been a symbolic gesture of national solidarity (Schmidt, 2002).

The American Red Cross emerged during the World War II era as a supplier of blood. In 1940, a national blood collection program was created, with participation from the American Red Cross helping to collect about 13 million units during the war (AAB.B. 2005). In 1947, after the end of World War II, the Red Cross president, Basil O'Connor, declared that the American Red Cross would develop a blood collection program to control all United States blood donation facilities (Robert, 2004).

2.5.3 War on Gaza

The great burden of caring for traumatized patients and injured fell on the health system in Shifa hospital of Gaza town. All hospitals received a total of >520 injured patients within the first 24 hours of beginning of the war, resulting increase demands of blood units (MOH Website, 2008).

That period nearly 1380 martyrs and 5380 were injured, around 2000 were admitted in patients at the closest facility hospitals in Gaza hospitals between 23 days (WHO, 2009).

According to Al Mezan's investigations, Medical teams, ambulances and civil defense teams became the direct target of IOF attacks along with civilians attempting to rescue the injured and remove the bodies of their killed relatives and neighbors (Al-Mezan, 2009b).

2.5.4 Lebanon Wars

Allam, *et al* (1983) have described the activities of the American University of Beirut Hospital during the Lebanon Civil Wars in 1974 to 1975 and 1982 during this time, the top three floors of the hospital were destroyed by artillery, the hospital was unable to obtain regular supplies of blood bags, and gunmen were frequently in the B.B. attempting to expedite service. However, under these conditions, B.B. staff purposefully supplied only type specific or universal donor whole blood and concentrated their efforts on finding donors. They provided more than 17,000 units for almost 2500 admitted casualties, in addition to their regular patients, over 24 months of emergency operation.

2.5.5 Iran Earthquake

Expose to earthquake disaster resulting potential difficulties in the areas of transportation, communication, and coordination so future responses under a formally designated disaster plan is expected to level of function and effectiveness (Abolghasemi *et al*. 2008).

Iran is one of the most disaster-prone countries in the world (Sabzehchian *et al*. 2006).

Blood transfusion plays a critical role in the provision of medical care for disasters due to man-made and natural hazards. Well-documented is the short-term increase in blood donations following national disasters, some aspects of blood transfusion during disasters remain under study (Abolghasemi *et al*. 2008).

WHO (2004a) reported that health facilities in the area of Iran nearly were destroyed and approximately 50% of the health personnel were to be dead or missing.

Treatment of blood loss, resuscitation, emergency surgical interventions, and medical life-saving support activities consumed the capacities of neighboring hospitals and healthcare units. The disaster response by the Iranian Blood Transfusion Organization (IBTO) following the earthquake and the post-disaster review of the disaster preparedness and response plan follow (Abolghasemi, 2005).

2.6 Donors' recruitment

Minimize waiting period and by thank you smile, thank you letters and donor felicitation could you keep retaining donors. WHO (2000) has identified indicators to assess donor recruitment, these pertain to an identifiable set of donor selection criteria, defined standard operating procedures, maintenance of confidentiality, appointment, designation of donor recruitment officer, development of donor motivational program and donor counseling. In addition WHO (2000) recommended that donor retention is very important for getting regular and repeated voluntary blood donors for safe blood transfusions, on other hands donors should be retained by giving them special care, a feeling of being an important person and reducing will go a long way in retaining voluntary non-remunerated.

Abolghasemi *et al* (2008) wrote great influx of donors post-disaster is one of the main challenges; the mainstays of the donor management strategy of the task force include communicating a unique message to the population about the need for emergent donation and registration of first-time blood donors to ensure the timely call-up if necessary so that all considerations taken by the task force address the main drawbacks of the previous experiences in areas of communication, transportation, and coordination.

The main problems in developing proper donor recruitment program were identified as the lack of a national policy, plan, promotional and educational material and inadequate donor database. To overcome all these deficiencies by enhance long and medium-term programs in donor recruitment. Programs for donor motivation should be able to realistically assess community needs. There should be adequate and qualified staff, marketing and communication skills should be appointed. Staff should be give donors special care, a feeling of being an important person, reducing waiting time, in addition thanks by smile and letters (WHO, 2001a).

A clean environment, use of sterile materials and aseptic precautions give satisfaction to the donor and stimulate him to come for repeat donation but a dirty environment makes the donor unhappy and discourages him to come again for blood donation. In addition post-donation care of the blood donor is also an essential activity for donor retention (WHO, 2000).

A considerable proportion of the increase in disaster donations is driven by the large increase in the number of first-time donors. The return rate of highly motivated, first-time donors during disasters is as low as the usual return rates. Although the usual low return rate means missing a considerable portion of donors, the increased number of first-time donors is an opportunity to increase the absolute number of returning donors (Glynn *et al.* 2003).

Sujatha Rao (2007) explained recruitment of safe donors is a challenging task. It is necessary people realize that, blood donation is their responsibility. No blood bank, hospital or government can sustain health care without adequate blood from donors.
Voluntary blood donors are the cornerstone of a safe and adequate blood supply and blood products.

The National Blood Service (NBS) in England depends entirely on the generosity of voluntary non remunerated blood donors in maintaining its national blood supply. The demand for blood is increasing annually. In addition to the recruitment of new donors, retention of existing donors is essential for an adequate supply of blood and blood components at all times. The retention of donors depends not only on the continuing commitment to offer their free gift, but also on the satisfaction experienced at blood donor sessions (Ranasinghe and Harrison, 2000).

Major disasters such as the 1977 Chicago railroad tragedy, the 1995 Oklahoma City bombing, the 1999 Columbine school shooting, and the September 11, 2001, attacks have prompted massive mobilization of the donor population in United Stat of American (USA) (Starr, 2002 and Schmidt, 2002).

2.7 Factors in Blood Availability

There is now a high level of concern in the community, and in the medical profession, about the safety of transfused blood (McGrath, 1995).

Developed countries use approximately one unit of RBCs for every 20 members of their population every year. Thus the US with a population of 280 million, collects approximately 14 million units of RBCs each year. Britain with 60 million, approximately 3 million, and Israel with 6 million, approximately 300,000 units almost all of this blood is used locally to provide routine medical care and treat victims of injury. Disasters and war both create additional injury victims in need of blood and remove individuals from the donor population (Hess and Thomas, 2003).

Community citizen are reasonably will informed about blood and aware of different blood groups. There is general lack of awareness about the frequency with which blood can be donated. Health problems or negative advice from doctors, lack of time and fear of getting AIDS were the major reasons given for not donating blood. Moreover there is general lack of awareness about community's self sufficiency through voluntary non-remunerated donations (Aken, 1994).

The health service circular better blood transfusion described the action required by National Health Services (NHS) trusts and clinicians to improve quality within transfusion practice and highlighted the need for treatment with blood components. Information on the use of blood and the characteristics of transfusion recipients is limited. There is no population based information on transfusion available for the United Kingdom. Collection of such data may improve the understanding of fluctuations in demand, help to predict future trends in blood, and define the potential value of techniques such as per operative cell salvage. These benefits will help in planning to meet challenges to the blood supply (Wells *et al*. 2002).

2.8 Management of Blood Shortage

During times of crisis the recruitment plan has the potential to mitigate many of the major problems faced, recently IBTO has concluded experience of a donor recruitment plan as a result mainstays of the recruitment plan include informing the media and the public about the importance of donors and their regular donation, registering contact information, and contacting donors and asking them for donation on determined intervals, later These issues will be tested, monitored, and evaluated during regularly scheduled exercises and planning document reviews after crisis (Schmidt, 2002).

Details of the requirement and procurement of blood supply for natural and man-made disasters were discussed that good networking between all B.B., hospitals and donor services, and an effective communication network are essential to meet the challenges arising from such disasters. Also an identified list of safe donors was important (WHO, 2000).

Sujatha Rao (2007) wrote that the key to recruiting and retaining safe blood donors is good epidemiological data. A pleasant environment in the blood bank, good donor care, polite and effective communication between staff and donors are all important factors for the retention of blood donors.

American Association of B.B. (2005) reported that the current plans which provide for the blood collection center in the affected area to communicate with the contact person of the customer hospitals to assess the need for blood and blood products. The assessment helps determine if the needed blood products could be provided from the local inventory; if there is need for assistance from outside sources, the task force will activate the appropriate centers of the assisting district. The task force also will recognize there is a need for emergent, mass collection of blood.

As the response was disproportionate to the medical need, the social value of blood donation at once became far more important to the community than its medical value (Jones, 2001).

Most transfusion services are aware of the need to cost-effectively manage their blood component inventory and have developed routine techniques to maximize efficiency while minimizing wastage (Pereira, 2005 and Chapman *et al*.2004).

However, few hospitals B.B. have organized a viable contingency plan for continued operations and self-sufficiency in case of an interruption of the blood supply chain for even a few days. Emergency situations include acts of bioterrorism, mass casualties that deplete blood supplies, major storms that in capacitate blood delivery systems, and outbreaks of infectious disease or seasonal shortages that limit the available donor population. Disaster planning optimally encompasses all of these major disasters, as well as effectively manages the expected seasonal blood shortages and temporary increases in demand due to intensive patient care needs. Cyclical blood shortages are common and well known to hospital B.B. (McCarthy, 2007and Nightingale, 2003) affecting management of trauma victims, the chronically ill, and patients awaiting elective surgery by America's Blood Centers' (ABC).

Individual B.B. can reduce the risk associated with unforeseeable crises by initiating comprehensive disaster plans to both reduce blood usage and extend blood supplies during periods of product scarcity Threats to national and local blood supplies in America mandate development of an effective blood management system for emergency preparedness and efficient blood inventory management. Seasonal or acute blood shortages could be compounded by the unavoidable distribution inefficiencies of the blood pipeline during an emergency (Erichson *et al.* 2008).

2.9 Insufficiencies of Emergency Blood Collection (Challenges)

During emergencies and disasters blood center inefficiencies are compounded (Schmidt, 2002).

U.S accounting office in 2002 explained that emergent massive blood collection however is generally both unneeded and wasteful. Military and blood industry experts agree that the victims of these disasters are unlikely to need more blood than is already available on the shelves, in fact during the aftermath of September 11, major backups and long waiting

lines. In addition the stress on the collection system caused the error rate to balloon; some blood centers reported that 20 percent of collections did not meet regulatory requirements. Partially tested blood labeled “for emergent use only” occupied valuable storage space, consumed personnel and testing resources degree, eventually wasted (Pereira, 2006 and Schmidt, 2002).

In fact blood collection after national disasters usually takes two days to reach B.B., too long of a delay to be of immediate use to victims. Worse, inefficiencies and errors that occur during a massive blood donor surge compromise the entire system, cause substantial wastage of blood products, and damage public relations (Gaul and Flaherty, 2001).

Hess and Thomas (2003) reported disasters and war also increase the inefficiencies in a blood supply system. Supplying the US peacekeeping force in Bosnia with RBCs for five years from 1995 to 2000 required approximately 5600 units to ensure that the 79 units actually used were available when needed but most of the units close to outdate.

Threats could disrupt the operations of hospitals and B.B.: attack with bio agents, disruption or nuclear materials or an epidemic an earthquake or problems no one has yet considered. As blood donor recruiters rightly emphasize, acute day of needs must be met with what is in hand, but if blood supplies were insufficient or could not be replenished **(**Ramsey, 2008).

American Association of B.B. (2003) during any disaster or acute increase in demand, regional blood centers poll area hospitals to determine the immediately available supply. Needed units are then recalled from unaffected hospitals to regional centers, to be redistributed to affected hospitals.

This system provides the flexibility to acutely provide blood components to affected areas, yet leaves regional centers secondarily under applied. Thus, local disasters have a ripple-type impact on entire regional areas, often depleting the supplies of the surrounding areas and creating further shortages. Some have argued that the resulting negative public relations resulting from this mismanagement decreased blood donations for the following year. Obviously, there are serious drawbacks to poorly controlled mass blood collections in the wake of disasters (Jones, 2003).

Since the September 11 attacks, the task force has aimed to improve disaster preparedness by maintaining adequate inventories, controlling donation rates, and improving communication and transportation avenues for emergency blood inventory management (Erickson *et al.* 2008).

In addition this review confirms the adequacy of normal blood inventory of developed countries to meet the needs in the aftermath of a large-scale, injury-creating disaster. Threats to national and local blood supplies in America mandate development of an effective blood management system for emergency preparedness and efficient blood inventory management. Seasonal or acute blood shortages could be compounded by the unavoidable distribution inefficiencies of the blood pipeline during an emergency (Erickson *et al.* 2008).

Tapko (2007) defined the challenges to blood safety in the African Region have been exacerbated by in adequate supply, high clinical demand, and unregulated use of blood in many countries. This situation is further complicated by the high prevalence of TTIs there. WHO African Region needs high demand for safe blood related to the high maternal and child morbidity and mortality resulting lack of blood. Other conditions requiring blood include chronic anemia, acute blood loss such as surgery, road traffic accidents, trauma and other

forms of violence. This high demand is increasing exposure to the high prevalence of HIV, HBV and HCV that restricts the eligibility of adults to donate blood and increases the discard of donated blood units that are found to be positive to the markers for these diseases. The possibility of transmitting these transfusion-transmissible infections via blood transfusion emphasizes the need to ensure the safety of blood.

2.10 Transportation of Blood to Affected Area

AAB.B. (2003) wrote if the task force determines that the affected B.B. needs assistance like blood delivered and then the blood collectors with access to the most rapid means of transportation will be contacted to ship blood to the affected B.B. A representative of the task force as American Red Cross (ARC), ABC, Blood Centers of America (BCA) and AAB.B. will contact the blood collectors with access to the most rapid means of transportation to the affected B.B and facilitate a shipment of blood to the affected B.B.
The independent centers were able to maintain some control in the blood banking market, but the Red Cross is still an integral part of blood collection today (Robert, 2004).

Meanwhile, in Gaza Governorates after coordination with Israeli military, the last allowed only Red Cross and Palestinian Red Crescent to enter affected area, so Red Cross and Palestinian Red Crescent are the most rapid means of transportation and contacted to transport blood to the B.B in affected area (Director of Central B.B. Society in GG, September 2009, Interview).

AAB.B. (2003) explained the B.B. responsible for shipping the blood should utilize the hierarchy of transportation options. However, delivery locations will be arranged prior to shipment so the task force representative will confirm the appropriate delivery point with the affected B.B. In some cases, the initial delivery point will be an alternate airport or

staging area for other emergency supplies being delivered to the affected area. Furthermore the affected B.B is responsible for picking up the shipment at the pre-arranged location by discussion with the task force representative and may need to utilize local law enforcement authorities or emergency service personnel to pick up and deliver the shipment to hospitals. In addition storage capacity at affected B.B and hospitals should be considered, blood may need to be delivered to multiple locations if storage is an issue.

AAB.B. (2003) added in some cases resulting of disaster related effects on local infrastructures as highways closed the B.B. located closest to the affected B.B may not have the most rapid means of transporting blood.

2.11 Clinical Use of Blood

The transfusion of whole blood is not encouraged. It is mainly indicated in cases of exchange transfusion or severe acute blood loss volume. Patients need to be given only the component of blood that is clinically indicated to ensure the rational and appropriate use of this vital, yet scarce therapeutic agent, and to minimize complications to patients. This requires adequately sensitized clinicians, the preparation of blood components as well as the availability of plasma volume expanders. Therefore, countries need to develop and implement national guidelines for clinical use of blood (WHA28.72, 1975).

Blood should be transfused only when required to save a life. The decision to transfuse should be based on an estimate of the patient's risk for developing complications of inadequate tissue oxygen delivery. Therefore, the decision has also shown that blood transfusion improves survival only if given immediately at the time that it is needed. In Kenya the indications for blood transfusion are urgent conditions in a patient with acute blood loss. As a general rule, less than 15% loss of blood volume results in minimal

symptoms; 15 to 30% of blood volume results in tachycardia; 30 to 40% in signs of shock; and greater than 40% in signs of severe shock. Some patients with underlying diseases may require transfusion at 30 to 40% volume blood loss (Sujatha Rao, 2007).

Cant (2006) wrote whole blood is an extremely complex resource with many uses. When blood is donated at a blood center, blood is typically separated into its components, red blood cells, white blood cells, platelets, and plasma. Each component serves a different purpose. Requires red blood cells and platelets in case of an accident victim typically needs only red blood cells. The quantity of each product needed also varies as well as the usable lifespan of each product once donated. On other hand important aspect to blood donation is the process of testing for infectious diseases. Once blood is donated, it is sent to testing labs that usually perform 11 to 12 tests, 9 of which are required by the World Health Organization. If any diseases are identified in the blood, the sample is immediately discarded and donors should be known.

2.12 Basic Functions of Blood Transfusion Centre

Organizing the service, recruitment of donors, collection, processing, storage and distribution of blood and blood components, in addition operate laboratory investigations, participation in clinical use of blood and blood components, teaching and training, finally research and development (NACO, 2007).

Sujatha Rao (2007) defined B.B. organization centre for blood involves designing the premises, procurement of equipment, reagents and consumables, personnel management and continuing medical education. The blood centers should develop an interface with those involved in clinical transfusion practice. Adherence to bio safety precaution and provision of good working environment should also form an essential part of the

organization of a blood centre. However blood collection can be done either at a static donor session at the blood centre or at outdoor mobile donor sessions. In addition to guidelines for indoor collection of blood, standard operating procedures should also be provided for outdoor donor sessions, which should be monitored. Outdoor collections organized at railway station, in open grounds, gardens and other places with unclean environment, may lead to contamination of blood and should therefore be discouraged.

2.13 Safe Blood

The availability of blood for any community is heavily dependant on the type of blood donors who provide the raw materials for the services. The recommended types of donors are regular voluntary non-remunerated blood donors; these donors are dedicated and motivated community members who volunteer to donate blood on a regular basis. They ensure the continuous availability of blood stocks at the B.B. for patient use as required. Safe blood is blood that has been tested and found negative for HIV, HBV, HCV and syphilis, in addition to appropriate compatibility testing for the intended patient under appropriate medical circumstances. A quality assurance system is required at all stages of the blood transfusion chain (Tapko, 2007)

2.14 Role of Media

Both print and electronic media are important tools for marketing. The print media is in the form of newspapers, posters, billboards etc. whereas the electronic media covers all aspects of radio program and television, as well as telephone information services and the creation of web sites. As result all components of the media can be effectively used to send messages about blood donation to all categories of the public (WHO, 2000).

Sujatha Rao (2007) described Mass media as approach for raising the awareness of the people and sensitizing them towards their participation is the most effective way to mobilize voluntary blood donation. All channels of media therefore, have to be utilized fully through a regular and sustained publicity campaign with a professional approach. To mobilize the media Sujatha Rao (2007) classified media into three approaches:

2.14.1 Mass Approach

Newspaper advertisements, articles, supplementary articles in periodicals, journals, house magazines, stickers, posters, hoardings, radio programs and TV spots should be used extensively.

2.14.2 Group Approach

Use of audio visual aids like posters, stickers, folders and hoardings are useful.

2.14.3 Personal Approach

Letters, face-to-face discussion, distribution of campaign material, newsletters, bulletins, telephone requests for repeat donation or on call donations and emergency donations give good results (Sujatha Rao, 2007).

2.15 Quality Monitoring and Quality Control in Blood Bank

Quality control implies the activities of verification and testing to determine the product and service conformity with the respective specifications. All quality control procedures should be properly validated before use. Quality control should be integrated in all processes involved in the product and service quality and safety. On other hand quality control results should be properly documented, demonstrating that the process has been performed under control and in line with specified requirements. The processing of blood

components is associated with a series of specificities, stability, efficacy, active substance concentration, safety and sterility of units should control in each of them (Vuk, 2009).

Thus a system of statistical monitoring of various parameters has to be established to maintain a constant quality level. The procedures of statistical process control are performed in a way and to the extent defined by standards, blood component specifications and respective SOPs. Irrespective of the sampling method, the quality control sample should be representative by its composition. The sample identification and traceability should be ensured throughout the process of quality control. The sampling of blood components to be used in transfusion therapy should be so performed as not to impair the sampled product integrity. The results of blood component quality control should be statistically processed by use of appropriate statistical methods. When the results of quality control vary from the requirements, appropriate corrective or preventive measures should be introduced (EC, 2005).

Laboratory tests are of utmost importance for the safety of blood components. All laboratory testing procedures should be validated and suitability of test reagents confirmed before routine use. Each donation should be tested according to respective legal requirements. There should be written procedure describing procedures to resolve discrepant results. Blood and blood components that have reactive results in a screening test for infectious markers should be excluded from therapeutic use and be stored separately or destroyed. Appropriate confirmatory testing should take place. In case of repeatedly reactive results, appropriate management of the donor should take place, including informing the donor and clear follow-up procedures (EC, 2005).

Blood group serology testing should include procedures for testing specific groups of donors. The quality of the laboratory testing should be regularly assessed by the participation in a formal system of proficiency testing (Vuk, 2009).

CHAPTER 3

METHODOLOGY

Chapter 3

Methodology

This chapter shows the study methods and materials of the research that was undertaken. It addresses the following items: study design, study population, eligibility criteria and study setting. Also it includes the instruments which were used in this study, piloting, data collection process and data analysis. Finally, it presents ethical consideration and limitation of the study.

3.1 Study Design

The research study conducted on analytical, descriptive, cross-sectional study based, on all B.B. centers in Gaza Governorates 2009. It had been selected because this method useful one for the type of descriptive the study variable, furthermore cross-sectional study have particularly important role in planning and evaluating public health programs and a community based cross-sectional study is the most suitable study design to achieve the study objectives however in this way the objectives of the study would be accomplished in short time and low cost (Abed, 2007b).

3.2 Study Population

The target of this study included sixteen (16) B.B directors' and all one hundred employees who work direct or indirect in B.B. centers and hospitals which received martyrs and injures in Gaza Governorates at the time of study comprise the study population among 13 centers which are distribute over the geographical districts of Gaza Governorates.

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3.3 Eligibility Criteria

3.3.1 Inclusion Criteria for Centers

All medical staff working direct or indirect in B.B. centers governmental sectors and NGO's.

All employees working direct or indirect in B.B. of hospitals which received martyrs and injures from "December 27, 2008 to Jan17, 2009 (the last day of the war on Gaza)" in Gaza Governorates governmental and NGO's sectors.

Directors of B.B. and labs included B.B. who was in this position during war.

3.3.2 Exclusion Criteria for Centers

1. All B.B. employees of hospitals which operate surgical operations but not received casualty people and martyrs, in that period NGO's or governmental hospitals in Gaza Governorates as El-Wafa hospital, El-Ahli hospital and others.
2. Any employee who has not direct responsibilities in B.B. works such secretaries and cleaners will exclude from employee survey.
3. Any technician who works in laboratories outside the B.B. works.

3.4 Study Setting

The researcher conducted at all B.B. centers and hospitals which received martyrs, and injures from" the beginning to the end of war on Gaza Governorates including both governmental and NGOs B.B.

3.5 Study Instruments

In this study the researcher used these instruments to reflect B.B. managing and situation in both governmental and NGOs B.B. during the war on Gaza, after modifications for WHO questionnaire Global Data Base on Blood Safety [GDBS] (WHO, 2004b), the questionnaire contain three parts (Triangulation questionnaire).

1. The first part designed to ask about technical part which included questions about type of functions blood donors and blood collection screening transfusion transmission infections. In fact GDBS questionnaire is designed to collect and analyze data from all 192 Member States of WHO in order to enable each country to assess its own situation and monitor its progress in relation to other countries and to regional and global trends (WHO, 2004b).
2. The second part of this tool applied by in depth interview director of B.B. "16 experts" for filling about working in these places, this part contained questions relate to that specific period which known as the War on Gaza, in additional it included group of key information questions asking about organization management, challenges face the organization, shortages, what lessons learned from this disaster and how catalyze the development of a permanent preparedness and response plan.
3. Finally, the third part of the tool is an observational checklist to get information about blood component, storage area, transportation documents, available material for waste and data from B.B. records. In additional, this research would be submitted to obtain the master degree.

3.6 Validity of Instruments

The measurement of what is supposed to be measured is validity which is also the extent of unbiasedness of a measure (Garson, 1999). Questionnaire was designed by using WHO Questionnaire GDBS (WHO, 2004b) modifies after reviewing relevant literature. It also was reviewed by group of experts in the filed of B.B., management and public health. As a result, some items changed, added, modified and deleted (validity of expert).

3.7 Piloting

A pilot of six staff questionnaires and two director questionnaires conducted to examine the suitability of used instruments and to detect if there is a need for modification before starting data collection. Accordingly, a minor change made to the questionnaire. The pilot sample included in the study because of the small sample size. In addition, the researcher displayed and asked the pilot study every question which was added after modification.

3.8 Data Collection

The data were collected using those previously mentioned instruments from 13 B.B. centers and hospitals (Annex 8), the researcher collected data by utilize interview structure employee's questionnaire for all the B.B. staff working direct or indirect, the second tool applied by in depth interview director of B.B. "16 experts" for filling the second part of this tool. Finally the third part of the tool is an observational checklist was filled by the researcher the overall time needed to collect the data was eighty-one days (from July12, 2009 to September 30, 2009).

3.9 Response Rate

The response rate was high and reached 100% of the study population. This reflects employee's concern about the subject.

3.10 Data Management

3.10.1 Data Entry

The next steps were used for data entry.

1. Coding the questionnaire and checklist.
2. The data was entered after over viewing of the fill data.
3. Designing data entry model used the computer statistical program which known as statistical package for social sciences, version 13 (SPSS).
4. The variable was coded then entered onto the computer.
5. After that the data was cleaned to ensure correct enter of data constructing frequency tables and random selection of questionnaire and checklist to ensure that accurate data entry was performed. As a result some data entry errors were found and corrected.

3.10.2 Data Analysis

Data analysis was accomplished by the researcher with assist and support from supervisor.

- Start by frequency for all variables.
- Descriptive and summaries for data, means, ranges, median and standard deviations
- Cross tabulation for specific study variables.
- Advanced statistical analysis was used to explain the relationship between the study variables, including:
    - t-test
    - ANOVA for difference between means
    - Chi-square test

§ P value equal or less than 0.05 was considered statistical significant, with confidence interval (CI) of 95%.

3.11 Ethical Consideration and Procedures

The researcher got commitments to all ethical consideration require conducting the research.

- First, ethical approval obtains from both Al-Quds University and Helsinki Committee (Annex4) to carry out the study.
- Second, an approval letter with two proposals and questionnaires copies sent to the general director of Human Resources Development and Hospitals General Administration of MOH (Annex5).
- Third an approval letter sent to director of central B.B. societies in Gaza Governorates (Annex6).
- Finally an approval letter sent to executive director of UHWC (Annex7).

3.12 Limitations of the Study

- Limit time available to conduct the study.
- Limit MOH and scientific resources like text and journals specific to B.B.
- Absence of computerized health information system in B.B. centers may lead to recall bias and time consume.
- This study is cross sectional which use for descriptive purpose but in this way that is difficult to say which comes before outcome or exposure.

CHAPTER 4

RESULTS AND DIESCSSION

Chapter 4

Results and Discussion

This chapter displays a descriptive assessment of effectiveness Gaza B.B. centers and their employee's performance during the war on Gaza; and the analysis of the data presented and discussed. Meanwhile descriptive results related to all B.B. centers in Gaza Governorates including both MOH and NGO's B.B. were extracted from the observational checklist while results related to employees were extracted from interview questionnaire. In addition, some results were taken from in depth director interview questionnaire. Further, analysis using ANOVA, chi square test and examination of significance at level 0.05 was performed.

4.1 Descriptive Statistics

4.1.1 B.B. Centers

4.1.1.1 Distribution of B.B. by Governorates and Sector

Figure 4-1 shows distribution of these 13 B.B. centers which present blood services over the 5 Governorates in Gaza with lowest quota for Mid-Zone only one B.B. which presents (7.6%) of B.B., while Gaza city, North Gaza, Khan Younis and Rafah have the same quota that equal three B.B. in each governorate which present (23.1%) of B.B.

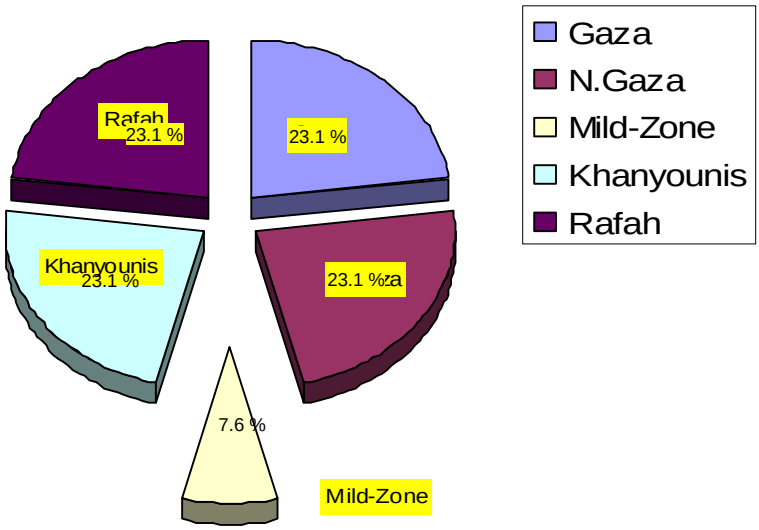

Figure 4-1: Distribution of B.B by Gaza Governorates.

As shown by figure (4-2) two sectors in Gaza Governorates are responsible to the B.B. centers "MOH and NGO's" with highest quota for MOH, 8 B.B. which rate (61.5%). On other hand, 5 B.B. related to NGO's which rate (38.5%).

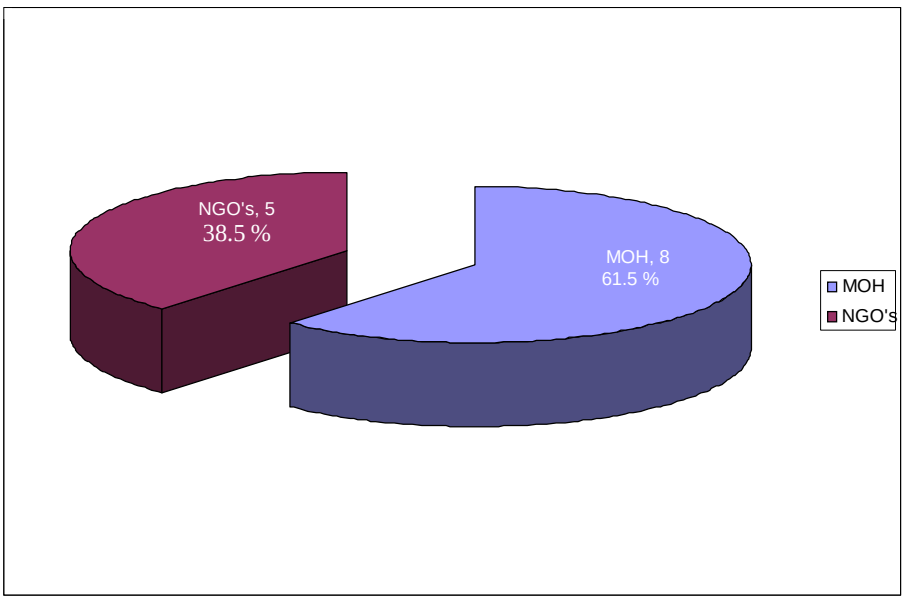

Figure 4-2: Distribution of B.B by Sector

4.1.1.2 Activity, Services, Category and Donor Types of B.B.

4.1.1.2.1 Activity and Services of B.B.

Table (4.1) summarizes that the activities and services of B.B. centers vary. The blood grouping activity is common used among all B.B centers. On the other hand, the major numbers of B.B. centers collect and donate blood, these reach 11 B.B. with rate (84.6%) and in addition to 10 B.B. centers present therapeutic transfusion and cross matching, which reach (76.9%). Finally 6 of the subjects do screening and component separation technique and seven of these don't screening and component separation technique which represents (53.8%).

4.1.1.2.2 Category of B.B. by Director's Opinion

Beside that, (Table 4.1) display 25% of directors categorized their centers as central B.B in Gaza Governorates. A fact was considered by Dr Randa El-Khoudary, General Director of laboratories and B.B. that there is no central B.B. in Gaza Governorates (General Director of laboratories and B.B., September 2009, Interview). In other hand, 75% of the directors categorized their centers, hospital B.B. and 37.5% categorized their centers NGO's B.B. In fact, all of them agreed with staff that, there is no national B.B in Gaza Governorates

4.1.1.2.3 Types of Donor

When directors of those receive donor had asked about donor types, all received family replacement donor, the result come by deference with Mosharraf Hossain and his group reported that Bangladesh have 15% family replacement donors (WHO,2001a). In other hand 93.3% receive voluntary non-remunerated, 86.7% received regular donor, but there is no voluntary remunerated type (Table 4.1). This finding came similar with Khanpoo and her group reported Thailand has 94% voluntary non-remunerated among donors (WHO, 2001a)

Table 4.1: Activity, Services, Category and Donor Types of B.B.

Item	Yes		No		Total	
	n.	%	n.	%	n.	%
Activity and Services of B.B.						
Collection & Donation	11	84.6	2	15.4	13	100
Blood grouping	13	100	0	0	13	100
Screening	6	46.2	7	53.8	13	100
Component separation	6	46.2	7	53.8	13	100
Therapeutic transfusion & cross matching	10	76.9	3	23.1	13	100
Category of B.B. by Director's Opinion						
Central B. B.	4	25	12	75	16	100
Hospital B.B.	12	75	4	25	16	100
NGO's B.B.	6	37.5	10	62.5	16	100
National B.B.	0	0	16	100	16	100
Type of Donors						
Voluntary non-remunerated	14	93.3	1	6.7	15	**100**
Voluntary remunerated	0	0	15	100	15	**100**
Family replacement donor	15	100	0	0	15	**100**
Regular donor	13	86.7	2	13.3	15	**100**

4.1.2 Characteristics of the study population

4.1.2.1 Employees' Residency

4.1.2.1.1 Staffs by provinces

This study conducted to include one hundred and two employees who are technically responsible for B.B. centers direct or indirect which are distributed over the five geographical district of Gaza Governorates, but two of these staff didn't share, one of them killed in war when he finished his work, other left her work. As shown by the following table (4.2) most of staff were from Khan Younis 30% followed by Gaza City 22% , the same was from Mid-Zone 22% , North Gaza 14% , where Rafah represented the least score 12% .

4.1.2.1.2 Directors by Provinces

The study was included sixteen directors of B.B. centers who managed their responsibilities for B.B. centers direct or indirect which are distributed over the five

geographical district of Gaza Governorates, as shown by the following (table 4.2) the majority of directors were from Gaza city 37.5% followed by Khan Younis 25%, Mid-Zone, North Gaza and Rafah represented the same score 12.5% .See table (4.2)

Table 4.2: Distribution of B.B.' Employees by Governorate

Places of residences	Frequency (No)	Percentage (%)
Staff by Governorate		
North Gaza	14	14
Gaza	22	22
Mid- zone	22	22
Khan Younis	30	30
Rafah	12	12
Total	**100**	**100**
Director by Governorate		
North Gaza	2	12.5
Gaza	6	37.5
Mid- zone	2	12.5
Khan Younis	4	25
Rafah	2	12.5
Total	**16**	**100**

4.1.2.2 Employees' Socio- demographic Characteristics

4.1.2.2.1 Classify Staffs by Socio- demographic

As described in the following table (4.3), males represent 61% of B.B. staff and 39% were female, this study didn't come in agreement with Abu Shomar (2007) in Gaza she explained that the females were higher percentage than male in PHC laboratories indicating that work in PHC more interested to female related to night shifting in B.B. also difference found in USA where clinical laboratory professions are female- dominant and represent 79% indicating that even in USA female to be more interested field than males (Lindler and Champan, 2003). On the other, hand the majority of staff were married 77% and 53% of the subjects were below 35 years old. The mean age of the subject was 35.29 years with stander deviation (SD) 7.47 years, median 34 years and range 34 years old.

4.1.2.2.2 Classify Directors by Socio- demographic

Table (4.3) shows the majority of B.B. directors were males 81.2% and 18.8% were females. A consistent finding with this result was reported in Gaza where females tend to hold managerial title in PHC laboratories less than males Abu Shomar, 2007. Seemingly the culture effects are responsible about the dominant- males to have managerial position and her family is the first priority for women, also these finding are similar to Thabet (2004) finding about managerial position in Gaza hospitals. In addition, all got married and 75% of the subjects were above 45 years old. The mean age of the subject was 47.25 years with stander deviation (SD) 5.2 years, median 48.5 years and range 18 years old.

Table 4.3: Distribution of B.B.' Employees by Socio- demographic Characteristics

variables	Frequency (No)	Percentage (%)
Staff Socio- demographic		
Gender		
Male	61	61
Female	39	39
Total	**100**	**100**
Marital status		
Single	23	23
Married	77	77
Total	**100**	**100**
Age		
Below 35years	53	53
35-45 years	39	39
Above45years	8	8
Total	**100**	**100**
Director Socio- demographic		
Gender		
Male	13	81.2
Female	3	18.8
Total	**16**	**100**
Marital status		
Single	0	0
married	16	100
Total	**16**	**100**
Age		
Below 45years	4	25
Above45years	12	75
Total	**100**	**100**

4.1.2.3 Employees' Status (Qualification and Specialty)

4.1.2.3.1 Staff's Qualification and Specialty

The highest numbers of the staff scores58% hold a bachelor degree, 34% hold a diploma, and only 8% hold post graduate (Figure4-3).This result is similar to Abu Shomar (2007) in Gaza that she explained 56.8% of PHC laboratory technician hold a bachelor degree, 39.5% hold a diploma and only 3.9% hold post graduate. However, the researcher observed staff with bachelor degree perform tasks to those hold a diploma as well as who hold post graduate, Barros (1988), suggests that the staff who are less qualified run the duties more skilful than the qualified and a highly educated.

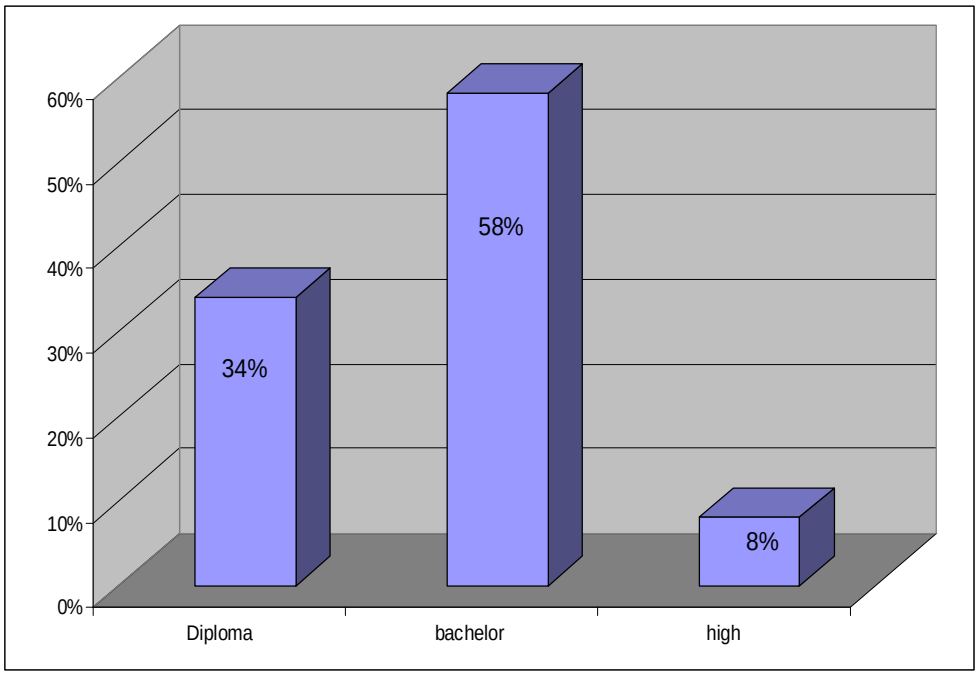

Figure 4-3: Distribution of Staff by Qualification.

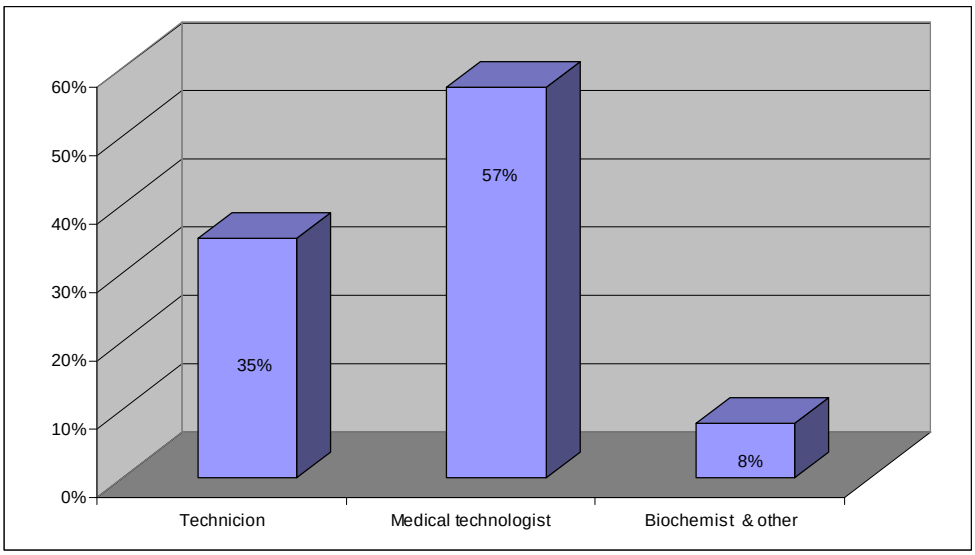

Figure 4-4: Distribution of Staff by Specialty.

Further more, 57% of the staff was medical technologist, 35% were medical technicians and 8% were from other specification such as microbiologist, biochemist, chemist and biologist (Figure 4-4).

4.1.2.3.2 Director's Qualification and Specialty:

Figure (4.5) below shows director's qualification, this group is divided into three categories according to their qualifications, 50% of staff hold a bachelor degree and below such as diploma, 43.8% hold high diploma and master degree only 6.2% hold post graduate PhD.

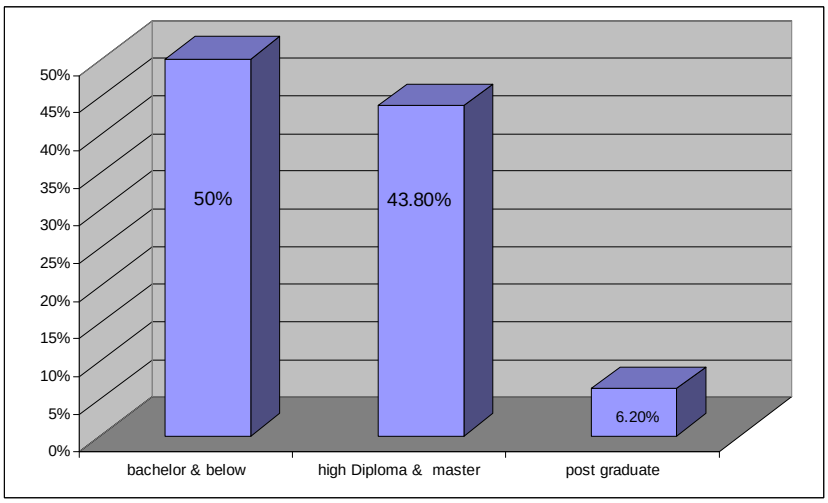

Figure 4-5: Distribution of Directors by Qualification.

Further more, 50% of the staff was medical technologists only 6.2% of them were medical technicians, 25% were biochemist technicians and 25% were of other specifications microbiologist and others (Figure4-6)

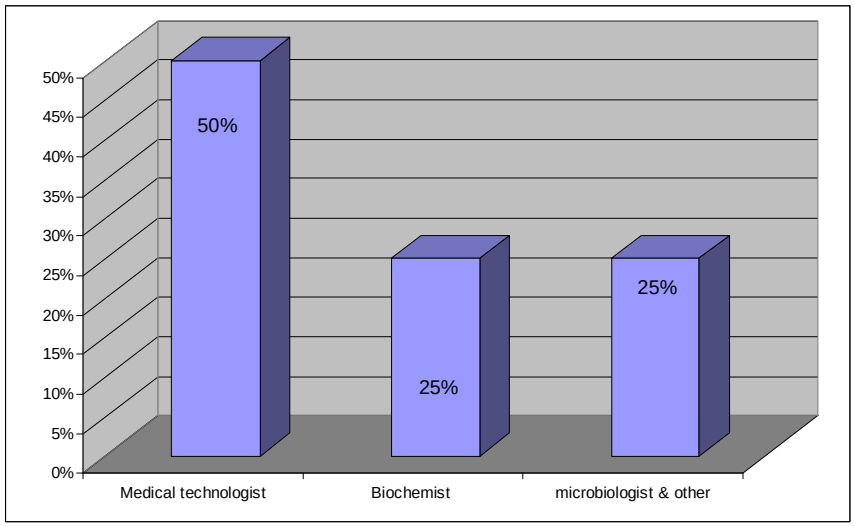

Figure 4-6: Distribution of Directors by Specialty.

4.1.3 Available Number of Rooms, Donation Chairs and Total Staff in B.B.

4.1.3.1 Available Rooms

Table (4.4) displays 6% have no available room, 50% have one to two available rooms in B.B. and 44% have three to four available rooms. As a result 10% agreed with total B.B. area is sufficient for B.B. activity but 90% disagreed.

Available Number of Donation Chairs

As shown in (Table 4.4) there are 10% have no of any donation chair, 38% have one to two donation chairs, 17% have between three to four donations chairs and 35% have five donation chairs. In addition 87% disagreed that number of donation chairs were sufficient for working during crisis, but 13% agreed.

Available Number of Total Staff

61% have one to three staffs, 14% have four to five staffs, 8% have eight staffs and 17% have eighteen staffs. In other hands, 89% disagreed number of total staff was sufficient for working during crisis but 11% agreed (Table 4.4).

Table 4.4: Available Number of Rooms, Donation Chairs and Total Staff in B.B.

Available Rooms	Yes		No		Total	
	n.	%	n.	%	n.	%
No rooms	6	6	94	94	100	100
1 – 2 rooms	50	50	50	50	100	100
3 – 4 rooms	44	44	56	56	100	100
Total area of B.B. sufficient for B.B. activity	10	10	90	90	100	100
Available Donation Chairs						
No chairs	10	10	90	90	100	100
1 – 2 chairs	38	38	62	62	100	100
3 – 4 chairs	17	17	83	83	100	100
5 chairs	35	35	65	65	100	100
Number of donation chairs sufficient for working during crisis	13	13	87	87	100	100
Number of Total Staff						
1 - 3 staff	61	61	39	39	100	100
4 – 5 staff	14	14	86	86	100	100
8 staff	8	8	92	92	100	100
18 staff	17	17	83	83	100	100

4.1.4 Employees' Perceptions about the Current Situation of B.B

4.1.5.1 Staffs' Perceptions

Staffs' participant was asked about their B.B. centers, there pointed out that, 100% had B.B. shared by lab. In another hand when participant were asked about number of B.B. centers in Gaza Governorates are sufficient 74% disagreed but 26% agreed , meanwhile 44% agreed that distribution of B.B. centers in Gaza Governorate meet increase blood units demand during war on Gaza but 56% disagreed (Table 4.5).

4.1.4.2 Directors' Perceptions

Furthermore, directors' answer were 62.5% agreed that the number of B.B. centers in Gaza Governorates are sufficient and 68.8% distribution of B.B. centers in Gaza Governorates meet increase blood units demand during war on Gaza. In addition 75% directors confirmed the application of quality control system in blood transfusion services (Table 4.5).

Table 4.5: Employees' Perceptions about the Current Situation of B.B

Item	Yes		No		Total	
	n.	%	n.	%	n.	%
Staffs' Perceptions						
B.B. shared by lab	100	100	0	0	100	100
Number of B.B. are sufficient	26	26	74	74	100	100
Distribution of B.B. meet increase demand in war	44	44	56	56	100	100
Directors' Perceptions						
Number of B.B. are sufficient	10	62.5	6	37.5	16	100
Distribution of B.B. meet the demands in war	11	68.8	5	31.3	16	100
Quality control system	12	75	4	25	16	100

4.1.5 B.B. Employees' Perceptions about Documents

4.1.6.1 Staffs' Perceptions about Documents

Table (4.6) describers about 53% of perception said there were written donor selection criteria, 97 % keep record for rare blood groups, 95 % have record for discarded blood units and 73 % have record for discarded blood units in war.

4.1.5.1 Director's Perceptions about Documents

However 68.8% of director's told there is no national guidelines on transportation of blood and blood products, the same score said there is no national guidelines on storage of blood

and blood component, in other hand 56.3 % said there was planed polices for blood transfusion during disaster (Table 4.6).

Table 4.6: B.B. Documents on Employees' Perceptions

Item	Yes		No		Total	
	n.	%	n.	%	n.	%
Staffs' Perceptions						
Written donor selection criteria	53	53	47	47	100	100
Keep record for rare blood groups	97	97	3	3	100	100
Have record for discarded blood units	95	95	5	5	100	100
Have record for discarded blood units in war	73	73	27	27	100	100
Director's Perceptions						
National guidelines on transportation of blood and blood products	5	31.3	11	68.8	16	100
National guidelines on storage of blood &blood component	5	31.3	11	68.8	16	100
there is planed polices for blood transfusion during disaster	9	56.3	7	43.8	16	100

4.1.6 Staffs' Knowledge

4.1.6.1 Staffs' Skills and Behaviors

Table (4.7) below shows 16 staffs' participant 16.5% of those receive donors, reuse same blood bag after puncture fail, but 81 of the same subject above 83.5% do not reuse same blood bag after puncture fail. In fact 60.8% used new blood bag after puncture fail in war but 39.2% do not used new blood bag after puncture fail in war**.** On the other hand staffs' participant transport blood components in temperature monitored equipment are 32% but 68% aren't use temperature monitored equipment, meanwhile 92% use ice boxes for transporting blood units .In addition table (4.7) shows only 9% staffs' participant got orientation and training for emergencies but 91% of all staff not got**.**

4.1.6.2 Material for Biohazards Waste in and after War

In war 59% of participant discarded materials biohazardus waste by incinerate, 48% sent material to other hospital for incineration, 34% others emptied in sewage system, 33% discarded in general waste and 21% emptied in sink. In other hand all described no changes after war in every procedures mention above. See (Table 4.7)

Table 4.7: Staff Skills and Behavior

Item	Yes		No		Total	
	n.	%	n.	%	n.	%
Staff Skills and Behavior						
reuse same blood bag after puncture fail	16	16.5	81	83.5	97	100
used new blood bag after puncture fail in war	59	60.8	38	39.2	97	100
Transport blood component in temperature monitored equipment	32	32	68	68	100	100
Use ice boxes for transporting blood units	92	92	8	8	100	100
Get orientation &training for emergencies	9	9	`	91	100	100
Material for Biohazards Waste in and after War						
Discarded in general waste	33	33	67	67	100	100
Incinerate	59	59	41	41	100	100
Emptied in sink	21	21	79	79	100	100
Emptied in sewage system	34	34	66	66	100	100
Sent to other hospital for incineration	48	48	52	52	100	100
Available material for biohazards waste after war	No change					

4.1.7 Technique Use for Blood Units in Emergencies

4.1.7.1 Using Screening Test in Emergencies

Regarding screening technique (HIV, HBs Ag , HCV) use in emergencies about 95% of B.B. staff do not use ELISA screening technique, 76% do not use rapid screening technique but 24% use rapid screening technique, otherwise 57% of the subject utilize IMX screening technique and 43% do not utilize, meanwhile 43% utilize Axsym screening technique but 57% do not utilize, in additional above 22% claimed absent screening technique. See table (4.8). Comparing with the status of India Janhathman reported B.B used screening test for both HIV and HBs Ag but not for HCV, Mr Abdul Ghafoor and Ms Sharefa Manike explained in Maldives used screening test for both HIV, HBs Ag and for HCV (WHO, 2001a).

4.1.7.2 Action in Positive Initially Reactive Screen Resulted

Participants were asked about action had taken in case of positive initially reactive screen test resulted in war there answered pointed out 81% did not accept test result, 75 % repeated the test, 21% refer samples to other places, and 14% do not do the test, in the other side there were no changes after war. See table (4.8).

4.1.7.3 Action in Repeatedly Reactive of Units

When participants were asked about action in case repeatedly reactive of blood units in war there answered pointed 47% refer specimens for confirmation in war, 83% discarded the unit in war, after war 54% refer specimens for confirmation and 85% discarded the unit. Meanwhile, 85% treated confirmed negative blood unit as positive result of screening test and 15 % used the units in war. See table (4. 8).

Table 4.8: Technique Use for Blood Units in Emergencies

Screening Test	Yes		No		Total	
	n.	%	n.	%	n.	%
Screening Test Use in Emergencies						
ELISA	5	5	95	95	100	100
Rapid	24	24	76	76	100	100
IMX	57	57	43	43	100	100
Axsym	43	43	57	57	100	100
None	22	22	78	78	100	100
Action in Positive Initially Reactive Screen Resulted						
result accepted	**19**	**19**	**81**	**81**	**100**	**100**
Repeat the test	**75**	**75**	**25**	**25**	**100**	**100**
Refer to other places	**21**	**21**	**79**	**79**	**100**	**100**
Don't do the test	**14**	**14**	**86**	**86**	**100**	**100**
Action in case of positive initially test resulted after war	**No change**					
Action in Repeatedly Reactive of Blood Units						
Refer specimens for confirmation in war	47	47	53	53	100	100
Discarded in war	83	83	17	17	100	100
Refer specimens for confirmation after war	54	54	46	46	100	100
Discarded after war	85	85	15	15	100	100

Action to confirmed negative blood unit after initial positive in war						
Treat as positive result	85	85	15	15	100	100
Use	15	15	85	85	100	100

4.1.8 Communication and Transport Ways

4.1.8.1 Communicate Ways with other B.B.

Table (4. 9) shows 86% supply other B.B of blood units, telephone was the highest means used for communicate with other B.B. centers in and after war. As a result of war the personal access was very difficult and dangerous so family means scored 21%, but after war reached 63% score, while 11% used fax in war and 17% used fax after war. Otherwise 18% used other ways to communicate with B.B. center in war as personal mobile, but after war 5% used the last mean.

Table 4.9: Communicate Means with other B.B.

Mean	Yes		No		Total	
	n.	%	n.	%	n.	%
Supply other B.B. of units	**86**	**86**	**14**	**14**	**100**	**100**
In war						
By family	21	21	79	79	100	100
Telephone	100	100	0	0	100	100
Fax	11	11	89	89	100	100
Others	18	18	82	82	100	100
After war						
By family	63	63	37	37	100	100
Telephone	100	100	0	0	100	100
Fax	17	17	83	83	100	100
Others	5	5	95	95	100	100

4.1.8.2 Ways to Transport Blood to other B.B.

Figure (4-7) summarize ambulance was the highest means used for transport blood and blood component since reached 100% in/ after war because ambulance have pre coordination from the Israeli arm to reach affected area also ambulance have signs and

color could the warplane distinguish ambulance from other traffic means and ambulance is the faster mean to prepare blood units, bus for employees reached 32% to transport blood units in war to hospital and 23% after war, furthermore 12% transported blood units by family of causality from the store to the hospital in war but 75% used family after war.

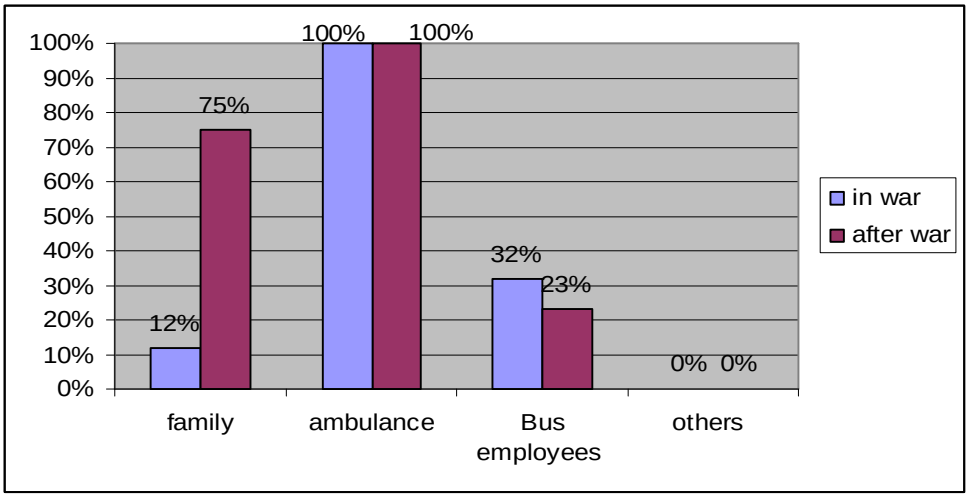

Figure 4-7: Means for Transporting Blood Component to other B.B

4.1.9 Challenges Faced B.B. in / after War (Shortages)

4.1.10.1 Shortages of Power Supply and Water

Figure (4-8) present 30% faced shortage of water supply in war, 98% faced shortage of power supply in war, however 47% claimed shortages power supply less than 30 minutes and 53% claimed more thane 30 minutes shortage power supply. Regarding to shortage power supply more than 30 minutes 80.4% of those used generators to save electricity for B.B. refrigerators 13.7% asked for supplying urgent new generator from UNRWA instead of one breakdown, others about 5.9% didn't open B.B. refrigerators door for keeping suitable temperature more time for blood units, these actions were similar to that in WHO (1992) which suggests in case of power cut use emergency generator, alternative places of storage must be available for blood and plasma, or B.B. should ask for assistance from others like hospital authorities or local assembly.

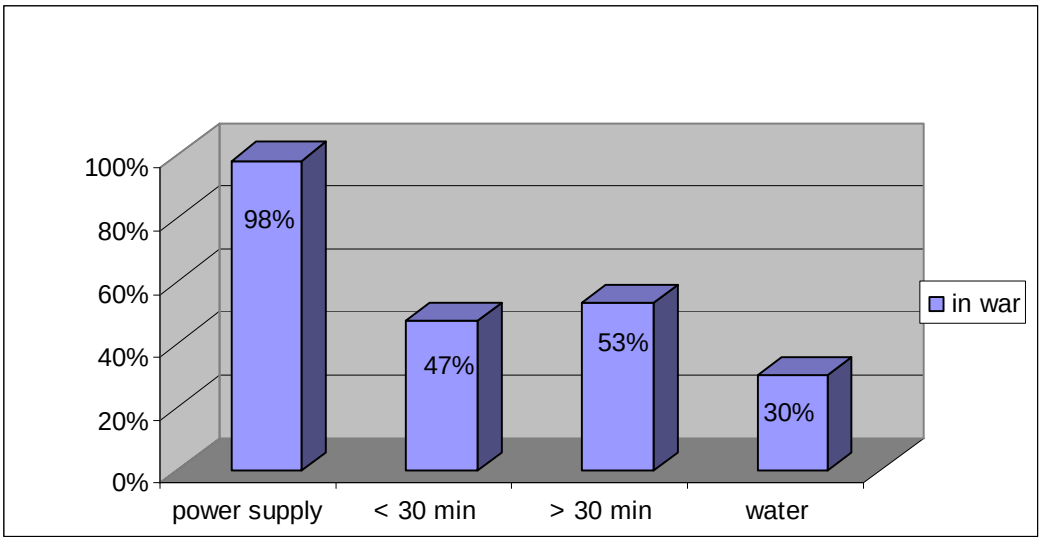

Figure 4-8: Shortages of power supply and water Faced B.B. in and after War

4.1.9.2 Shortages Faced Performance in War

Figure (4-9) shows 26% faced shortages of blood units, 39% faced shortages of O-Negative (O-ve) blood units, 34% faced shortages of fresh frozen plasma and 28% faced shortages of cryoprecipitate in war. Otherwise about requirement shortages 72% faced shortages of instrument for separate blood components, 80% had not enough capacity of refrigerator of B.B refrigerator, 74% faced shortages of staff and only 5% faced other shortages like fuels.

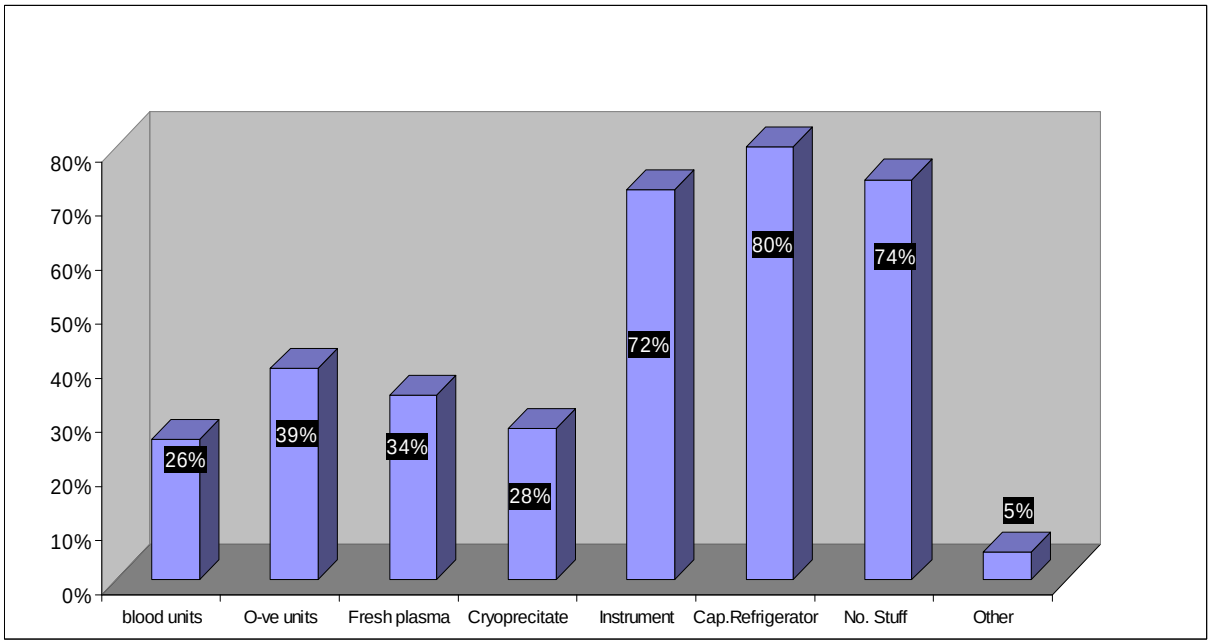

Figure 4-9: Shortages Face B.B Performance in War

4.1.9.3 Stocks Consumable

Figure (4-10) presents stocks consumable ran out during war, about 46% screening kits ran out, 16% blood bags ran out, this finding came in deference with Hess and Thomas (2003) wrote in Iraq blood bags consumable ran out in the first gulf war. However 9% faced blood group typing reagents ran out, 24% faced alcohol concentrate 70% ran out finally 5% faced others ran out. Next to 29% agreed, there were changes in stocks consumable ran out after war but 71% disagreed.

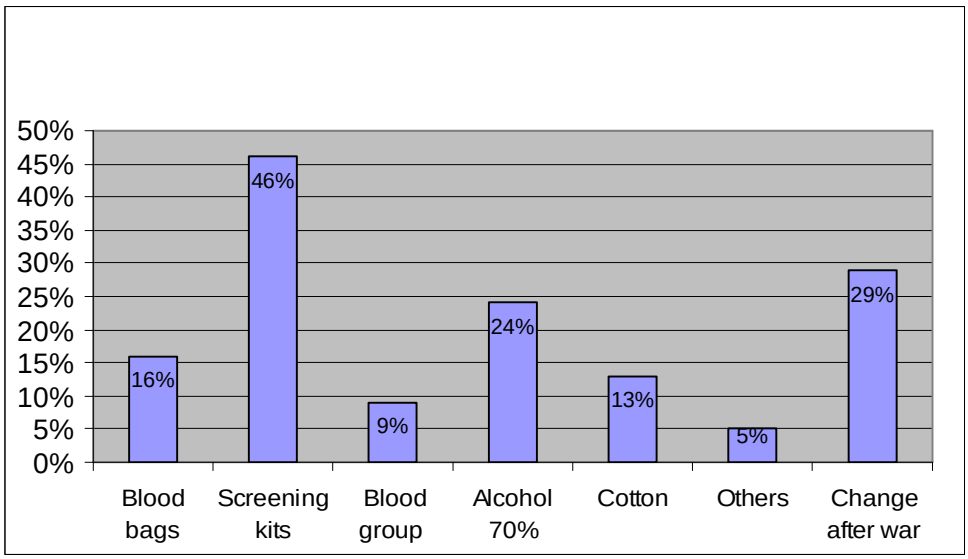

Figure 4-10: Stocks Consumable Ran out in War

4.1.10 Staff' Solutions to Compensate Shortages in War

4.1.10.1 Action to Absorb Shortage of Screening Kits

Regarding shortages of screening kits in war, 77% sent blood sample tubes to other lab for screening, 41% performed rapid test, 16% stopped issuing blood, 9% applied pooling of several samples for testing, 7% issued blood without testing and 16% applied other ways. Behind that 23% agreed that, there were changes about shortages of screening kits after war (table 4.10).

4.1.10.2 Action to Compensate Shortages of Blood Units

Table (4.10) displays 61% had mobile donor camping during war but 39% did not have, 80% of those who had mobile donor camping during war were in mosques, 20% were in community or street only 6.7% were in university and other.

Furthermore, donations from Arab and regional country reached, 96% received blood units from a broad, 46.9% of those who received donations tested all abroad blood units which

were used for screening technique but 37.5% of those applied pooling of several samples for testing.

Table 4.10: Action to Absorb Shortage of Screening Kits and Blood

Action	Yes		No		Total	
	n.	%	n.	%	n.	%
Absorb Shortage of Screening Kits						
In war						
Stop issuing blood	16	16	84	84	100	100
Perform rapid test	41	41	59	59	100	100
Pooling of several samples	9	9	91	91	100	100
Sent sample tube to other lab	77	77	23	23	100	100
Issue blood without testing	7	7	93	93	100	100
Other ways	16	16	84	84	100	100
After war						
Changes about shortages of screening kits	23	23	77	77	100	100
Compensate Shortages of Blood in War						
Mobile donor camping	61	61	39	39	100	100
Receive abroad blood units	96	96	4	4	100	100
All abroad units tested	45	46.9	51	53.1	96	100
Apply pooling	36	37.5	60	62.5	96	100

4.1.11 Director Issues

4.1.11.1 Availability of Screening Kits in War

When asked directors of B.B about number of availability screening kits (HIV, HBs Ag and HCV) during war, their answers were 37.5% have no screening kits, 25.1% have only one to two kits, 18.8% have five to seven kits and the same answer 18.8% have between eight to twelve kits. Meanwhile, no one have expire kits (Table 4.11).

4.1.11.2 How Staff Reached Work in War

Resulting of war and cutting Gaza Governorates in part by Israeli arm, reached work for any employees were very difficult and strongly dangerous, so 43.8% of directors answered,

staff couldn't reach the work and stayed at home, other 18.8% answered their staff worked in nearest health center to their home but 37.4% described all of their staff reached the work [see table 4.11].

Table 4.11: Availability of Screening Kits and Staffs' Action to Reach Work in War

No. Of Kit	Yes	
	n.	%
Screening Kits		
No kit	6	37.4
1-2 kits	4	25
5.7 kits	3	18.8
8 – 12 kits	3	18.8
How Did Staff Reach Work?		
Stay at home	7	43.8
Worked in nearest health center	3	18.8
All reach the work	6	37.4
Total	16	100

4.1.11.3 How Compensated Staff Absent in War

Table (4.12) displays 87.5% of directors described shortages of staff were under control in war, 43.8% recruited more staff, 56.3% did not recruit more staff, 44.4% of those recruited more staff had technician from primary health care (PHC) employees, 66.7% among those recruited training technician, 44.4% sent ambulance to bring technician who couldn't reach their work. Resulting of war 25% had technician can't reach their work. Furthermore, 75% of all directors described shortages of equipments had been under control and 68.8% saved safe transport means for blood units to affected area. In another hand, (Table 4.12) shows 75% of B.B. staff attended work every day in war but 25% did not attend, while 81.3% B.B. directors attended work every day in war but18.7% didn't attend.

4.1.11.4 Deal with Increase of Blood Units' Demand

Increasing the number of injuries, resulting increase of blood unit's demand, so directors should manage urgent situation and deal perfectly with increase blood unit's demand, as a

result 93.8% of directors compensated blood unit's demand by volunteer donors, 37.5% by camping in war, 75% were supplied from other local B.B, 31.3% encourage volunteers inside hospital in war. In addition 87.5% received blood units from regional country in war. Meanwhile difference resulted after war about 87.5% compensated increase blood units demand by volunteer donors, 37.5% by camping, 75% by supplying from other local B.B. and encourage volunteers inside hospital but no one were supplied blood units from regional country (Table 4.12)

Table 4.12: Director Solution to Compensate Shortages of Staff and Increase Demand of Blood Units in War

Action	Yes		No		Total	
	n.	%	n.	%	n.	%
How Compensated Staff Absent in War						
Shortages of staff under control	14	87.5	2	12.5	16	100
Recruiting more staff	7	43.8	9	56.3	16	100
Technician from PHC	4	44.4	5	55.6	9	100
Training technician	6	66.7	3	33.3	9	100
Sent ambulance to bring technician	4	44.4	5	55.6	9	100
Technician can't reach	3	25	9	75	12	100
Shortage of equipments under control	12	75	4	25	16	100
Save safe transport means for blood units to affected area	11	68.8	5	31.3	16	100
Staff attended work every day	75	75	25	25	100	100
Director attended work every day	13	81.3	3	18 .7	16	100
Deal with Increase of Blood Units' Demand						
By volunteer donors	15	93.8	1	6.3	16	100
By camping	6	37.5	10	62.5	16	100
From other local B.B.	12	75	4	25	16	100
Volunteers inside hospital	5	31.3	11	68.8	16	100
From regional country	14	87.5	2	12.5	16	100
After war						
By volunteer donors	14	87.5	2	12.5	16	100
By camping	6	37.5	10	62.5	16	100
From other local B.B.	12	75	4	2.5	16	100
Volunteers inside hospital	4	25	12	75	16	100
From regional country	0	0	16	100	16	100

4.1.12 B.B and Media

4.1.12.1 Cooperation B.B with Media

When directors were asked about cooperation between their B.B and media 62.5% employed media for telling community the current situation and the same employed media to recruit more donors (Table 4.13)

4.1.12.2 Types of Media Use

Table (4.13) displays 70% of those using media are using radio as means for informing public, 44.4% are using T.V and 90% are using other means as posters but no one using newspaper

4.1.12.3 How Telling Media?

Table (4.13) tells (90% of those who using media are using interview for telling media, 63.6 are using telephone, no one of those are using fax. In other hand 68.8% of all directors are using other ways.

Table 4.13: B.B. and Media (Cooperation, Types &How Telling)

Action	Yes		No		Total	
	n.	%	n.	%	n.	%
Towards community	10	62.5	6	37.5	16	100
Donors' recruitment	10	62.5	6	37.5	16	100
Types of Media						
Radio	7	70	3	30	10	100
TV	4	44.4	5	55.6	9	100
Newspaper	0	0	10	100	10	100
Others	9	90	1	10	10	100
Means for Telling Media						
Interview	10	90	1	90.1	11	100
Telephone	7	63.6	4	36.4	11	100
Fax	0	0	11	100	11	100
Others	11	68.8	5	31.3	16	100

4.1.13 Donation in War

4.1.13.1 Donation Types

About donation, directors' answers were, 87.5% received donations in war, the major donation was blood units, all of those received donation were got blood units, 64.3% received blood components, 14.3% received supported staff, 71.4% received disposables and 57.1% received others like instruments, reagents, microscopes…etc (Table 4.14).

4.1.13.2 Sources of Donation

Table (4.14) below summarizes sources of donation, 71.4% of those directors received local donation, 57.1% received national donation, all of those received regional donation and 42.9% received international donation.

4.1.13.3 Name of Country Sent Donation

Table below explores the role of countries supplied B.B. In fact, all of those received donations, listed donations from Egypt and Jordan, also 78.6% of those received donations from Kingdom Sudia Arabia (KSA) but 21.4% received donations from Lebanon. In addition 78.6% listed donations from other countries like Sudan, Turkey...etc (Table 4.14).

Table 4.14: Types and Sources of Donation

Type	Yes		No	
	n.	%	n.	%
In war				
Receive donation	14	87.5	2	12.5
Supported staff	2	14.3	12	85.7
Disposables	10	71.4	4	28.6
Blood units	14	100	0	0
Blood component	9	64.3	5	35.7
Other	8	57.1	6	42.9
Sources of Donation				
Local	10	71.4	4	28.6
National donation	8	57.1	6	42.9
Regional donation	14	100	0	0
International donation	6	42.9	8	57.1
Name of Country Sent Donation				
Egypt	14	100	0	0
Jordan	14	100	0	0
Lebanon	3	21.4	11	78.6
KSA	11	78.6	3	21.4
Others	11	78.6	3	21.4

4.1.13.4 Egypt Donation

Table (4.15) below informs that directors who received donation received 100% blood units from Egypt, 64.3% received disposable, 35.7 of those received empty blood bags. Finally 28.6% received reagents from Egypt.

4.1.13.5 Jordan Donation

Table (4.15) bellow explains types of donations arrived from Jordan, 100% of those received donation from Jordan received blood units, 30.8% received disposable, 21.4% received empty blood bags but no one received reagents from Jordan.

4.1.13.6 KSA Donation

Furthermore, Kingdom Sudia Arabia (KSA) sent donations, among those received donations, 71% of directors received empty blood bags fro m KSA, 71% received blood

units, 42.9% received reagent from KSA, Finally 21.4% received disposable from KSA [see table 4.15].

4.1.13.7 Classify Abroad Donation

Meanwhile, other regional countries like Sudan, Turkey, Lebanon sent vary of donations, table below describes 57.1% of directors those received donations received reagents from others also the same subjects received disposable, 35.7% of those received blood units and 14.3% received empty blood bags from others country (Table4.15)

Table 4.15: Classify Abroad Donation

Type of Donation	Name of country							
	Egypt		Jordan		KSA		Others	
	n.	%	n.	%	n.	%	n.	%
Blood bags	5	35.7	3	21.4	1	71	2	14.3
Reagent	4	28.6	0	0	6	42.9	8	57.1
Blood units	14	100	14	100	1	71	5	35.7
Disposable	9	64.3	4	30.8	3	21.4	8	57.1

4.1.14 Strength and Weakest Activity of Services in War

Regarding to supportive activity of B.B. services 43.3% had a good balance of blood units could suck the first stroke, also 43.3% had rapid response to supply B.B. in affected area meanwhile 81.3% applied shifting enlargement reached more than 24 hours and their activity as team work, 75% supplied with preparing blood units from regional countries however all told other activity, [see table 4.16].

In another side table (4.16) below shows 56.3% claimed poor communication 37.5% claimed lack administrative follow up and 81.3% claimed absent of screening test reagents, finally all told other reasons of those resulting weakest area of B.B. services in war. This finding come similar with Abolghasemi *et al*. (2008) in Iran critiqued the management of

IBTO was no formal, detailed disaster response plan existed before the earthquake. This was compounded by major disruptions in communication, transportation and coordination between collection centers. The greatest difficulty for the IBTO was not lack of supply, but lack of coordination of the blood supply system.

Table 4.16: Strength and Weakest Activity of B.B. Services in War

Activity	Yes		No		Total	
	n.	%	n.	%	n.	%
Strength Activity						
Balance unit	7	43.8	9	56.2	16	10
Rapid response	7	43.8	9	56.2	16	100
Shifting enlargement	13	81.3	3	18.7	16	100
Donation unit	12	75	4	25	16	100
Other reasons	16	100	0	0	16	100
Weakest Activity						
Poor communications	9	56.3	7	43.8	16	100
Lack administrative	6	37.5	10	62.5	16	100
Insufficient instrument	13	81.3	3	18.8	16	100
No screening kits	7	43.8	9	56.3	16	100
Other reason	16	100	0	0	16	100

4.1.15 B.B. Working Environments

4.1.15.1 B.B. Documents

As observed through the observational checklist that B.B. varies in design and structure. The major observations are related to B.B. storage area, B.B. requirements as documents, incinerator and distiller…etc.

Those are summarize in the following paragraph, regarding availability of recording system, only two B.B. 15.4% have both manual and computer system but eleven 84.6% have manual recording system. Regarding SOPs for collection, storage, processing, 69.2% have SOPs document and 30.8% don't have. This finding come as semi similar with WHO (2001a) classified India, Bhutan and Nepal have SOPs for collection, storage, processing. Meanwhile, B.B. 76.9% have written system for stock, 61.5% have written donor

selection criteria, while 92.3% have all of those record for rare blood groups, 92.3% have record for discarded blood units and record for discard blood units in war show table (4.17)

Table 4.17: B.B Document

Type	Manual		Computer		Mix	
	n.	%	n.	%	n.	%
kind of recording system	11	84.6	0	0	2	15.4
Item	**Yes**		**No**		**Total**	
	n.	%	n.	%	n.	%
SOPs for collection, storage & Processing	9	69.2	4	30.8	13	100
Written system for stock	10	76.9	3	23.1	13	100
Written donor selection criteria	8	61.5	5	38.5	13	100
Record for rare blood groups	12	92.3	1	7.7	13	100
Record for discarded blood	12	92.3	1	7.7	13	100
In war						
Record for discarded blood	12	92.3	1	7.7	13	100

4.1.15.2 Waste Management

On the other hand the major B.B 92.3% used safety boxes for sharp available material for waste, 84.6% used container for fluid procedure, 30.8% used container with disinfectant for glass and 84.6% don't have other procedure (Table 4.18)

Table 4.18: Available Material for Waste

procedure	Yes		No	
	n.	%	n.	%
Safety box for sharp	12	92.3	1	7.7
Container with disinfectant for glassware	4	30.8	9	69.2
Container for fluid	11	84.6	2	15.4
Others	2	15.4	11	84.6

4.1.15.3 Storage Area

4.1.15.3. 1 Number of the Following

4.1.16.3. 1.1 Number of B.B. Refrigerators

Data observed through checklist, there were 38.5% have one B.B refrigerator, 30.8% have two to three B.B refrigerators, 15.4% have four refrigerators and the same numbers have seven to eight refrigerators (Table 4.19).

4.1.15.3.1. 2 Number of B.B. Freezer

Furthermore 23.1% don't have freezer for keeping blood component as fresh frozen plasma, 46.1% have only on freezer and 15.3% have tow number only 15.4% have four to seven number [see table 4.19].

4.1.15.3.1.3 Number of Domestic Refrigerator

Beside that 15.4% of B.B don't have domestic refrigerators but one domestic refrigerators and 23.1% have two number, 15.4% have 4 number and the same number have seven to eight number (Table 4.19).

Table 4.19: Number of B.B. Refrigerator, Freezer and Domestic Refrigerator

Item	Yes	
	n.	%
B.B. Refrigerator		
1 Refrigerators	5	38.5
2-3 Refrigerators	4	30.8
4 Refrigerators	2	15.4
7-8 Refrigerators	2	15.4
Total	**13**	**100**
B.B. Freezer		
No Freezer	3	23.1
1 Freezer	6	46.1
2 Freezer	2	15.4
4-7 Freezer	2	15.4
Total	**13**	**100**
Domestic Refrigerator		
No Domestic Refrigerator	2	15.4
1 Domestic Refrigerator	8	61.5
2 Domestic Refrigerator	3	23.1
Total	**13**	**100**

4.1.15.3.2 Function of Storage Area

4.1.15.3.2.1 Function of B.B. Refrigerators

B.B is numbering B.B refrigerators one, two, and three…etc, (Annex 2), displays storage area of B.B. In all B.B have more than one B.B refrigerator, 2 B.B 15.4% keep test kits and reagents, in B.B. refrigerator number one, five B.B 41.6% keep samples in the same refrigerator while two centers 15.4% keep any expired blood units in it, seven centers 53.8% separate screened units from unscreened in the refrigerators above, four centers 33.3% separate positive blood units from the stock in B.B refrigerator number one. In addition twelve centers 92.3% have inventory list with expiry date.

About B.B refrigerator number 2, one B.B. 12.5% of those have two and more B.B refrigerators keep reagents test kits, blood samples any expired kits and reagent in B.B refrigerators number two, also 12.5% separate positive blood units from the stock into the same refrigerator, furthermore 25% keep any expired blood units into the subject above, Otherwise 50% separate screened units from unscreened into refrigerators number two.

Afterward one B.B 20% of those have three and more B.B refrigerator, keep reagents, kits, blood samples, any expired kit, reagents and any expired blood unit until discarded into B.B refrigerators number three also 20% of those separate above. In addition 40% of those separate screened units from unscreened into the same refrigerator and 5 B.B. 100% of those have inventory list with expiry date for refrigerator number three.

Furthermore, 4 B.B 100% of those who have four and more B.B refrigerators keep test kits, reagents inside refrigerator number four and the same have inventory list with expiry date for refrigerator number four, however 25% used the same refrigerator to keep any expired blood unit and separate screened units from unscreened, the same number used the same refrigerator to separate positive blood units from the stock. Finally 100% of those have

inventory list with expiry date for refrigerator number four and no one use the same refrigerator for keeping any expired kit or reagents.

Regarding, (annex 2) summarizes 50% of those have five B.B refrigerator and more use refrigerator number four for keeping blood samples, any expired blood unit and positive blood units from the stock in the subject, all of those have five B.B refrigerator and more separate screened units from unscreened into B.B refrigerator number five and the same have inventory list with expiry date. Beside that no one store into B.B refrigerator number five any of the following kits, reagents and expired kit or reagents.

Furthermore, all B.B refrigerators have alarm system but there were no alarm system for refrigerator number two in B.B 15.4% one of them known Al Quds-Hospital B.B. On other hand all centers read and record temperature for all B.B refrigerators.

But no one records of times door opened, this result reflect careless behavior, reviewing literature suggests to record the number of times that each door of B.B. refrigerators and freezers is opened during the period of a day, if B.B. staff attach sheet of paper to the door of each one with instructions asking people to make a mark every time they open the door, this make all think more carefully before opening the door (WHO, 1992).

Note: B.B of Shifa hospital labeled one of the eight B.B refrigerator quarter refrigerator use to keep any blood units and blood component until discarded.

4.1.15.3.2.2 Function of Domestic Refrigerator (DR)

Regarding to storage area, table (4.20) shows 9 B.B 75.5% of those have domestic refrigerator, keep test kits, reagent into domestic refrigerators, 7 B.B 58.3% of those have domestic refrigerators put any expired kit, reagent, 58.3% keep inventory list with expiry date, 50% of those read and record temperature, 41.6% of those put food or drink into domestic refrigerators, 33.3% of those keep blood samples into domestic refrigerators, 16.6% of those separate positive blood units from the stock into domestic refrigerators, in

other hand only 8.3% of those use domestic refrigerators to separate screened units from unscreened and the same number have domestic refrigerators alarm system.

4.1.15.3.2.3 Function of Freezer (FZ)

Regarding to storage area, table (4.20) shows all of those have freezer use freezer for keeping blood products, but 10% of that freezer for storing blood samples, meanwhile 100% of those have freezer read and record temperature, all freezers have alarm system. in other hand 70% of those have Freezer keep inventory list with expiry date, finally no one record of times door opened this reflect careless behavior, a review of literature suggests that at the end of every working day, record the number times that each door of your refrigerator and freezer has been opened, do this for at least a week (WHO, 1992).

As a result all B.B scored there were no changes in storage areas during war (Annex 2 and table 4.20) show that.

Table 4.20: Function of Domestic Refrigerator and Freezer

Location	DR	
	N	%
Test kites/reagent	9	75
Blood samples	4	33.3
Food or drink	5	41.6
Read and record temperature	6	50
Any expired kite/reagent	7	58.3
Any expired blood units	1	8.3
Screened units separate from unscreened	1	8.3
Positive blood units separated from the stock	2	16.6
Alarm system	1	8.3
Inventory list with expiry date	7	58.3
Record of times door opened	0	0
Any changes in storage area during war	**No changes**	
Freezer Function		
Blood samples	1	10
Blood products	10	100
Read and record temperature	10	100
Alarm system	10	100
Inventory list with expiry date	7	70
Record of times door opened	0	0
Any changes in storage area in war	**No changes**	

N = Number of B.B. Centers

4.1.16 B.B. Activity by Time

According to B.B statistics table (4.21) below summarizes number of donors, number of units, number of screened units, number of used units and number of discarded units.

4.1.16.1 B.B Statistics in War

4.1.17.1.1 In the First Day of War

Table (4.21) shows the number of donors in the first day of war, list 69.2% B.B had less than100 donors, 30.8% had 100to 500 donors, with mean 87 donors had 150 to in the fist day of war. Furthermore 69.2% B.B got less than100 blood units and 30.8% got 100 to 500 blood units in the first day of war with mean 30.5 units.

As a result76.9% operated screen test for less than 100 blood units 23.1% operated the same tested for 100 to 500 blood units in the first day of war with mean 71.3 units. Regarding to B.B statistics, 92.3% used less than 100 blood units, but one B.B 7.7% reached to 600 blood units using in the first day of war reach mean 75.7 units. In other hand all discarded less than 30 blood units in the first day in war with mean 4.3.

4.1.16.1.2 From 28 Dec to 3 Jan 2009

Table (4.21) displays 92.3% had less than 100 donors, only 7.7% had 150 donors between 28th December to 3 rd January with mean 30.5donors, 61.5% had less than 100 blood units, 23.1% had 100 to 500 blood units while 15.4% had 1150 to 2910 blood units between 28 Dec. to 3 Jan with mean 375.8 units . As a result 92.3% tested less than 100 blood units and 7.7% tested 100 to 500 units in the same period with mean 35 units. Otherwise, 69.2% used less than100 units, 23.1% used between100 to 500units, and only one B.B 7.7% used 800 units among 28 Dec to 3 Jan with mean 137.7 units. In addition 84.6% discarded less than 30 units, 7.7% discarded 31to 80 units and 7.7% discarded 109 units in the time above with mean 16 units

4.1.16.1.3 From 4 Jan to10 Jan 2009

According to 92.3% B.B received less than 100 donors, only 7.7% received 156 donors among 4 Jan to10 Jan. However, 38.5% received less than 100 blood units, 46.2% received

100 to500 blood units, 15.4% received over1000 reached to 1656 blood units among 4 Jan to10 Jan with mean 366.6 units. As a result 84.6% tested less than 100 units for screening tests and 15.4% tested 100 to 500 between 4 Jan to10 Jan with mean 50.6 units. Meanwhile, 53.8% used less than 100units, 30.8% used100 to500, 7.7% used 501to 1000 units and 7.7% used over 1000 in the same time above with mean 260 units, in addition 76.9% discarded less 30 units, 15.4% discarded between 31to 80 units only 7.7% discarded 191 units between 4 Jan to10 Jan with mean 24 units [see table 4.21].

4.1.16.1.4 From the 11Jan to 17 Jan:

As a result of war the time between 11 Jan to17 Jan 2009 known as the last week of war so (Table 4.21) display B.B statistics in the last week of war, regarding 92.3% received less than 100 donors, 7.7% received 300 donors with mean 35.8 donors. However, 23.1% received less one hundred units, 53.8% received from 100 to 500 units; otherwise 23.1% received from 1015 to 2800 units with mean 482 units. However, 84.6% tested less than 100 units for screening test, 7.7% tested between 100 to500 units and 7.7% tested more 500 with mean 64 units , next to s53.8% used less than 100 units, 30.8% used 100 to 500 units while 15.4% used between 501 units to 100 units in the last week of war with mean 205 units .

Furthermore 76.9% discarded less than 20 units, 7.7% discarded 31 to 80 units 7.7% discarded 81 to 200 units and 7.7% discarded more 200 blood units in the time mention above with mean reach 49 units. A fact by questionnaire was confirmed that Jordan sent more than 4000 blood units, this finding did not came agreement with Vietnam war (Hess and Thomas, 2003). By reviewing literature about Vietnam War, Hess and Thomas (2003) reporting US military was sending 10 units of whole blood every 10 days to a small Army surgical hospital in more than 100 casualties. The immediate requirement for 123 units of

blood was met by drawing fresh whole blood from other soldiers and Vietnam civilians in the theater, but in February 1969 the blood program for that effort reached 36,000 units of RBCs per month.

Table 4.21: B.B Statistics in War

No of donors	1st day		1st week		2nd week		3rd week	
	n.	%	n.	%	n.	%	n.	%
< 100	9	69.2	12	92.3	12	92.3	12	92.3
100- 500	4	30.8	1	7.7	1	7.7	1	7.7
501- 1000	0	0	0	0	0	0	0	0
>1000	0	0	0	0	0	0	0	0
Mean	**87.2**		**30.5**		**31.6**		**35.8**	
No of units								
< 100	9	69.2	8	61.5	5	38.5	3	23.1
100- 500	4	30.8	3	23.1	6	46.2	7	53.8
501- 1000	0	0	0	0	0	0	0	0
>1000	0	0	2	15.4	2	15.4	3	23.1
Mean	**10.7**		**375.8**		**366.6**		**482**	
No of screened units								
< 100	10	76.9	12	92.3	11	84.6	11	84.6
100- 500	3	23.1	1	7.7	2	15.4	1	7.7
501- 1000	0	0	0	0	0	0	1	7.7
>1000	0	0	0	0	0	0	0	0
Mean	**71.3**		**35**		**50.6**		**64**	
No of used units								
< 100	12	92.3	9	69.2	7	53.8	7	53.8
100- 500	0	0	3	23.1	4	30.8	4	30.8
501- 1000	1	7.7	1	7.7	1	7.7	2	15.4
>1000	0	0	0	0	1	7.7	0	0
Mean	**75.7**		**137.7**		**260.6**		**205**	
No of discarded units								
< 30	13	100	11	84.6	10	76.9	10	76.9
31- 80	0	0	1	7.7	2	15.4	1	7.7
81- 200	0	0	1	7.7	1	7.7	1	7.7
>200	0	0	0	0	0	0	1	7.7
Mean	5.3		16.1		23.9		49	

4.1.16.2 No of Donors and Used Units before and after War

Regarding to B.B statistics figure (4-11) shows high trends of number of used blood units reached to 8832 blood units during war and resulting of war the demands of blood units increase follow the war for treating causalities so the trend increased in January and reached to 9421 units, which this month had seventeen days of war on Gaza, on other hand

the war cutting Gaza Governorates into parts and access of reaching blood donors to B.B. was very difficult and dangerous, the result shows in figure (4-11) describes decreasing of number of donors reached only to 2408 donors during war. In other hand, war was fallen about 1380 martyrs and 5380 were injured (WHO, 2009) so number of donors still decreased in Jan and reach about 1454 donors, comparison with other months before and after war, war resulting high demand of blood units in January but on other side by comparing the number of donors were decreased. The finding of result explored that regional blood unit's donation compensated the shortages. The result come in difference with GAO (2002) in US after September11, 2001 there were 700,000 units collection and the same after Oklahoma City Bombing units collection reached 20,000 units.

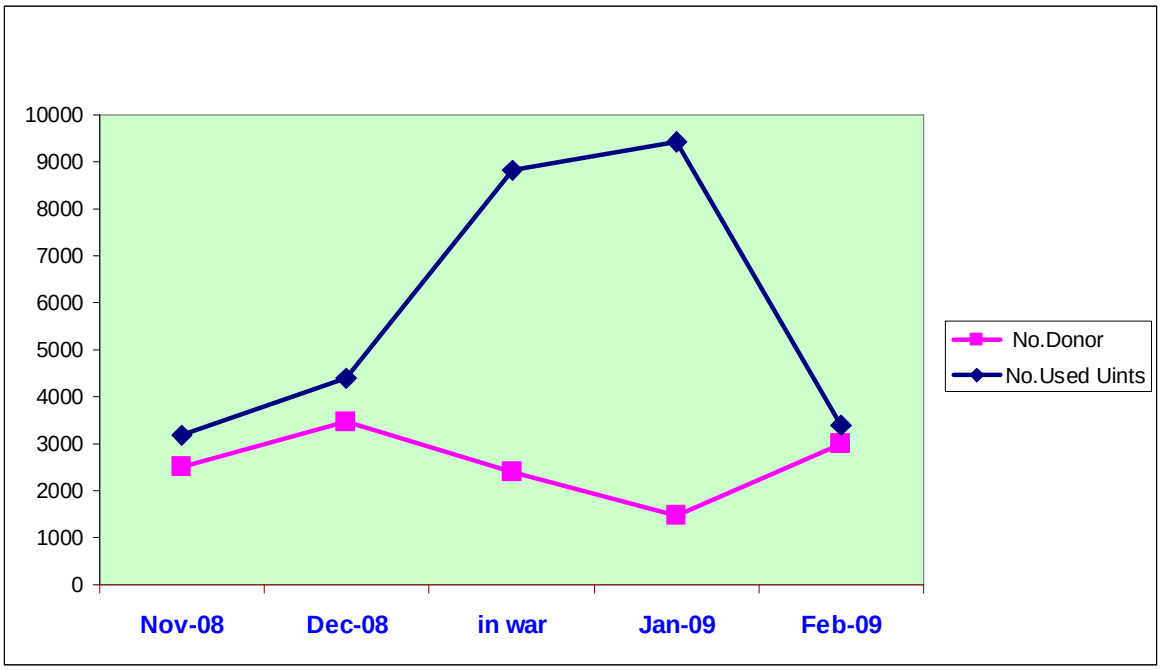

Figure 4-11: No of Donors and Used Units before and after War

4.2 Inferential Statistic: Relationship between

4.2.1 Socio-demographic Factors and Staff Satisfy about Number of B.B.

Table (4.22) shows the relationship between satisfy of staff about number of B.B in Gaza Governorates and selected socio demographic variables. According to, staff residency 14.3% of staff who live in north Gaza were, satisfy, 31.8% who live in Gaza were satisfy and 27.3% of who live in mid-zone were satisfy, 23.3% of who live in Khan Yonis were satisfy and 33.3% of who live in Rafah were satisfy but the difference not reach statistical significant (P-value =0.763). In the other hand 16% of staff that less than 35 years old were satisfies. 17.9% of staff who between 35 to 45 years old were satisfy and 37.5% of staff who age over 45 years old were satisfy about number of B.B are sufficient in Gaza Governorate but the difference not reach statistical significant (P-value= 0.309). Regarding to staff qualification 17.1% of who hold diploma were satisfy, 31.6 of who hold bachelor were satisfy and 25% of who hold post graduate were satisfy, but the difference reach statistical not significant (P-value =0.308).

Table 4.22: Relationship between Socio-demographic& Satisfy of Staff about Number of B.B.

Characteristic	Yes		No		Total	
	n.	%	n.	%	n.	%
According to Address of Staff by Governorate						
North Gaza	2	14.3	12	85.7	14	100
Gaza	7	31.8	15	68.2	22	100
Mid- zone	6	27.3	16	72.7	22	100
Khan Younis	7	23.3	23	76.7	30	100
Rafah	4	33.3	8	66.7	12	100
X^2 =1.85					p-value = 0.763	
According to Staff's Age						
< 35years	16	30.2	37	69.8	53	100
35-45 years	7	17.9	32	82.1	39	100
>45years	3	37.5	5	62.5	8	100
X^2 =2.34					p-value = 0.309	
According to Staff Qualify						
Diploma	6	17.1	29	82.9	35	100
Bachelor	18	31.6	39	68.4	57	100
High+	2	25	6	75	8	100
X^2 = 2.35					p-value = 0.308	

X^2 = Chi- Square

4.2.2 Socio-demographic Factors and Staffs' Satisfy about B.B Distribution

Table (4.23) below presents the relationship between satisfy of staff about distribution of B.B in Gaza Governorate, and socio-demographic variables

4.2.2.1 Staffs' Address

Regarding to staff residency table (4.23) illustrated that staff who live in North Gaza were the lowest group satisfy 14.3% about distribution of B.B. in Gaza Governorate and if met the increase of demand in war, compared with staff who live in Gaza 54.5% but staff live in Rafah 58.3%, in Khan Younis 50% were satisfy and who live in mid zone were 36.4%. These differences were statistically not significant with (P-value 0.093)

4.2.2.2 Work Address

The chi-square test revels positive relationship between address of work and satisfy of staff about distribution of B.B. these difference reached statistical significant with (p-value 0.025), where the lowest ratio was 11.1% among who work in North B.B. but who work in Gaza B.B. were 57.1% and Rafah were 58.3%, see (Table 4.23).

4.2.2.3 Staffs' Gender and Age

Regarding to, gender the table below illustrated that male have lower satisfy 42.6% while female have 46.2% but the differences were statistical not significant with (p-value 0.729). Also the chi-square for trend reveals, increase satisfy among staff age between 35 to 45 years reached 51.3% , the lowest satisfy was among staff which age over 45 years but the differences between three groups not reach statistical significant with(p-value 0.342**),** see (Table 4.23).

Table 4.23: Relationship between Socio-demographic & Staffs' Satisfy about Distribution of B.B.

Characteristic	Yes		No		Total	
	n.	%	n.	%	n.	%
According to Address of Staff by Governorate						
North Gaza	2	14.3	12	85.7	14	100
Gaza	12	54.5	10	45.5	22	100
Mid- zone	8	36.4	14	63.6	22	100
Khan Younis	15	50	15	50	30	100
Rafah	7	58.3	5	41.7	12	100
X^2 =7.96					p-value = 0.093	
Address of B.B. by Governorate						
North Gaza	2	11.1	16	88.9	18	100
Gaza	16	57.1	12	42.9	28	100
Mid- zone	6	40	9	60	15	100
Khan Younis	13	48.1	14	51.9	27	100
Rafah	7	58.3	5	41.7	12	100
X^2 =11.15					p-value = 0.025*	
According to Staff's Age						
< 35years	22	41.5	31	58.8	53	100
35-45 years	20	51.3	19	48.7	39	100
>45years	2	25	6	75	8	100
X^2 =2.14					p-value = 0.342	
According to Staff Gender						
Male	26	42.2	35	57.4	61	100
female	18	46.2	21	53.8	39	100
X^2 = 0.120					p-value = 0.729	

X^2 = Chi- Square *Statistical Significant

4.2.3 Relationship between Staffs' Satisfy about Total Area of B.B

4.2.3.1 Relationship between Staffs' Satisfy and Work Address

According to data shown in the table (4.24) only 5.6% of employee who work in North B.B described that the total area of B.B is sufficient, no one of employee who work in Mid-zon B.B described total area of B.B is sufficient, in addition 3.7% of staff who work in khan-Younis B.B described total area is sufficient, 8.3% of staff who work in Rafah described total area are sufficient, but 25.0% of Gaza B.B Staff described total area is sufficient. The chi- square indicated 10.28 and difference reached statistical significant

(P- value 0.036)

4.2.3.2 Staffs' Satisfy and Staff' Character (Qualify and Gender)

Regarding staff qualify, 37.5 % of staff who hold post graduate described total area of B.B is sufficient, 8.6% of who hold diploma described total area is sufficient, the chi-square indicated 7.36 reached statistical significant between difference with (P-value0.025) However, 15.4% of female described total area of B.B is sufficient, 6.6% of male described total area of B.B is sufficient, the difference between two groups reach not statistical significant with (P-value 0.151) [see table 4.24**]**

Table 4.24: Relationship between Socio-demographic & Staffs' Satisfy about Total Area of B.B.

Characteristic	Yes		No		Total	
	n.	%	n.	%	n.	%
Address of B.B. by Governorate						
North Gaza	1	5.6	17	94.4	18	100
Gaza	7	25	21	75	28	100
Mid- zone	0	0	15	100	15	100
Khan Younis	1	3.7	26	96.3	27	100
Rafah	1	8.3	11	91.7	12	100
X^2 =10.28				p-value = 0.036*		
According to Staff's Qualify						
Diploma	3	8.6	32	91.4	35	100
Bachelor	4	7	53	93	57	100
high	3	37.5	5	62.5	8	100
X^2 =7.36				p-value = 0.025*		
According to Staff Gender						
Male	4	6.6	57	93.4	61	100
female	6	15.4	33	84.6	39	100
X^2 = 2.06				p-value = 0.151		

X^2 = Chi- Square *Statistical Significant

4.2.4 Relationship between B.B. Governorates and Challenges Faced B.B.

4.2.4.1 Shortages by Governorate

By comparing the shortages faced B.B, the finding demonstrated the highest shortages faced B.B in North Gaza; the lowest shortages faced B.B in South Gaza, the difference were highly statistical significant (P-value <0.001) as shown in ANOVA (Table 4.25).

4.2.4.2 Documents Status by Governorates

In addition, in South B.B. record and document were in a good condition, but the record and document were not in a good condition in North B.B. but such differences were not statistical significant (P-value 0.161) as shown in ANOVA (Table 4.25).

4.2.4.3 Waste Management and Staff Qualify

Regarding to waste management and staff qualify, staff that hold diploma and bachelor used between three to four procedures to manage waste, while who hold post graduate used one to two procedures but differences not reached statistical significant (P-value 0.228) as shown in ANOVA (Table 4.25).

4.2.4.4 Waste Management by Governorates

Waste management and staff a according to B.B. address, in North B.B. more staff used one to two ways for managing waste but in South B.B. more staff used three to four ways to mange waste, these differences according to ANOVA table were high statistical significant (P- value 0.003) see (Table 4.25).

Table 4.25: Relationship between B.B. Governorates & Challenges Faced B.B.

variables	Mean	F	p-value
Shortage by Governorate			
North Gaza	8.44	38.106	0.000**
Gaza	5.07		
South Gaza	3.28		
Documents Status by Governorates			
North Gaza	2.67	2.204	0.161
Gaza	2.00		
South Gaza	2.86		
Waste Management by staff Qualify			
Diploma	1.29	1.502	0.228
Bachelor	1.23		
High	1.00		
Waste Management by Governorates			
North Gaza	1.00	6.058	0.003**
Gaza	1.14		
South Gaza	1.35		

F=ANOVA **High Statistical Significant

4.3 Employee's Proposition for Future Crises

4.3.1 Staff's Proposition for Future Crises

When staff were asked about their conclusion and recommendation crisis, the answers related to 100% thanks all countries which supplied and all B.B center, 94% hope to have national B.B in Gaza Governorate to facilitate cooperation during normal and abnormal situation. In addition 62% hope to build decentralize B.B for each Governorate in Gaza Governorates and 100% asked for training courses to work in emergency situations. Finally all 100% ask for disaster preparedness and response activities for future (Table 4.26). This finding came in according with in Iran Abolghasemi (2005) and his group reporting the first step of the IBTO was to designate and convene an a disaster task force as the main coordinator of all future disaster preparedness and response activities (Abolghasemi *et al.* 2005).

4.3.2 Director's Proposition for Future Crises

After war directors conclude lesson had been learn form this crisis, 62.5% directors asked for decentralize B.B for each Governorate, 75% asked for increase B.B area and number of rooms supply of suitable instruments and 75% encouraged training courses of how to work in emergency and how to mange crisis, all directors thanked all countries which supplied B.B centers of any type of donations. Finally all asked for disaster preparedness and response activities for future (Table 4.26). This result came in the same with Iran earthquake that post-disaster review determined that there were some deficiencies in the response to the Bam earthquake. The first step of the IBTO was to designate and convene an ad disaster task force as the main coordinator of all future disaster preparedness and response activities (Abolghasemi *et al*. 2005)

Table 4.26: Employee's Proposition for Future Crises

Item	Yes		Total	
	n.	%	n.	%
Staff Proposition				
National B.B.	94	94	94	100
Decentralize B.B.	62	62	62	100
Thank countries supplied B.B.	100	100	100	100
training of working in Emergency situations	100	100	100	100
Disaster preparedness	100	100	100	100
Directors' Proposition				
National Blood Bank	16	100	16	100
Decentralize B.B.	10	62.5	16	100
Increase B.B.	12	75	16	100
Training of working in emergency	12	75	16	100
Thank countries supply B.B.	16	100	16	100
Disaster preparedness	16	100	16	100

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Chapter 5
Conclusion and Recommendations

5.1 Conclusion

B.B. present vital services that could save life for many injure patients and supply hospitals of blood units and blood products to meet needs and demands in all situations. To ensure high effectiveness and performance of B.B. services, it should be well managed. A realistic and accurate assessment of B.B. services is necessary for effective distribution, number and resources of B.B. by Governorates. The primary objective of this study is to assess the effectiveness and performance of B.B. services in Gaza Governorates during the war on Gaza to serve a management tool in crises and normal situation. After a comprehensive review of relevant literature, this tool was accomplished through lessons, challenges and gaps faced B.B. through this crisis.

The literatures reflect the importance of managing B.B. environment, resources, and instruments and develop suitable policy. But unfortunately, there is a precious little research on assessing B.B. during wars.

A comprehensive analysis presents an important finding of this study, shows high trends of number of used blood units reached to 8832 blood units and decreasing number of donors reached only to 2408 donors during war.

There are statistically significant differences in the shortages of B.B. which demonstrated the highest shortages faced north Gaza B.B and the lowest shortages in south Gaza with(p-value <0.001) that, were unfortunately because high number casualties and martyrs due to geography location of north Governorate contact to border. In addition 98% faced shortage of power supply in war, 53% of those shortages reached over 30 minutes, so the staff tried to act alternative solution for saving blood units. On other hand 80% claimed capacity of

refrigerators was not enough to store huge number of regional blood units which has been received in war.

On other hand, there is 89% of the population disagreed that the total number of staff was sufficient for working during crisis but 11% of the population agreed.

There is 87% of the population disagreed that number of donation chairs were sufficient for working during crisis, but 13% of the population agreed and there is 90% of the population disagreed that the total area is sufficient. In addition, there is 87.5% of the directors of the population agreed that the donations were received and there is 62.5% of the directors in the population agreed that the media was employed towards the public

There are statistically significant differences in waste management of biohazards materials between north and south B.B. with (p-value 0.003).

The finding in this study illustrate, there are no statistically significant differences in documents status between north and south B.B. this study revealed 25% of staff didn't attend their work every day during war also 18.7% of B.B. director don't attend their work every day meanwhile 43.8% of directors told that, their staff stayed at home because of the Israeli incursion to some parts of Gaza Governorates which in forced the staff to stay at home during the war. Regarding to communications and coordination among B.B. centers during war 68.8% could save safe transport means for blood units to affected area; the major mean was ambulance in war between B.B. centers.

The study reveals some weakness points were demonstrated by the directors of the population. There were 56.3% in poor communications, 37.5% lack administrative, 81.3% insufficient instruments and 43.8 % number of screening kits. However, some strength points were demonstrated in balance units sucked the first stroke and rapid response of demands to other B.B and hospitals 43.8%, shifting enlargement reached 24 hours and team work activity 81.3% regional donation units 75%.

5.2 Recommendations

After analyzing the data and reviewing the finding, those give the researcher chance to make the following recommendation that may help policy maker in taking decision for improving and developing the current situation in B.B. to presents services more suitable to political situation in Gaza Governorates.

1. Improving working environment by providing B.B. with sufficient space, instruments, standby power supply and number of professional staff.
2. Expansion the current central B.B. located in Gaza City to cover all Gaza Strip Governorates.
3. Blood transfusion services come under great pressure whenever disasters strike. To meet this challenge, the role of blood transfusion services should be well-defined and integrated into comprehensive disaster management programs. SOP must be available for disaster management.
4. Increase and facilitate cooperation and coordination among all B.B centers in Gaza Governorates.
5. In the coordination with ministry of interior that it should issue special cards for all civilians to identify their blood group.
6. Establish a national B.B. center in our home land to facilitate connecting with regional B.B. centers.
7. Establish a decentralized B.B. in North Gaza which the most area contact border.
8. Establish mini B.B. in PHC for collection because PHC have more centers and distribute among Gaza widely.
9. Development of B.B. information system, an electronic network of communication for rapid communication and a retrievable database should be created at national as

well as local levels. Regarding effective communication with administrative should be more strength during crises.

10. Provide B.B. with written national guidelines of blood and blood product issues (storage, transporting and transfusion…etc), in addition written donor selection criteria.
11. Awareness of community and blood donor motivation to voluntarily donate is essential.
12. Every new laboratory employee should receive comprehensive introductory courses before commencing practical laboratory and blood banking issues. These courses should include in service training on the use of instruments, safety measures, challenges faced B.B. services and their solutions this courses should include PHC lab technicians.

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ANNEXES

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Annex 1: Map of Palestine and Gaza Governorates

Annex 2: Location of the following in BB Refrigerators

N = Number of B.B.
1,2,3,4,5 = Numeric of B.B. Refrigerators

Location	1		Total		2		Total		3		Total		4		Total		5		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Test kites/reagent	2	15.4	13	100	1	12.5	8	100	1	20	5	100	4	100	4	100	0	0	2	100
Blood samples	5	41.7	13	100	1	12.5	8	100	1	20	5	100	2	50	4	100	1	50	2	100
Read and record temperature	13	100	13	100	8	100	8	100	5	100	5	100	4	100	4	100	2	100	2	100
Any expired kite/reagent	2	15.4	13	100	1	12.5	8	100	1	20	5	100	0	0	4	100	0	0	2	100
Any expired blood units	6	46.2	13	100	2	25	8	100	1	20	5	100	1	25	4	100	1	50	2	100
Screened units separate from unscreened	7	53.8	13	100	4	50	8	100	2	40	5	100	1	25	4	100	2	100	2	100
Positive blood units separated from the stock	4	33.3	13	100	1	12.5	8	100	1	20	5	100	1	25	4	100	1	50	2	100
Alarm system	11	84.6	13	100	8	100	8	100	5	100	5	100	1	25	4	100	2	100	2	100
Inventory list with expiry date	12	92.3	13	100	8	100	8	100	5	100	5	100	4	25	4	100	2	100	2	10
Record of times door opened	0	0	13	100	0	0	8	100	0	0	5	100	0	0	4	100	0	0	2	100
any changes in storage area during war	**No changes**																			

Annex 3:

B.B Statistics before &after War

No of donors	Nov.		Dec.		Jan.		Feb.	
	n.	%	n.	%	n.	%	n.	%
< 100	8	61.5	6	46.2	10	76.9	5	38.5
100- 500	4	30.8	6	46.2	2	15.4	7	53.8
501- 1000	1	7.7	0	0	1	7.7	0	0
>1000	0	0	1	7.7	0	0	1	7.7
Mean	192		266		111		222	
No of units								
< 100	9	69.2	4	30.8	3	23.1	6	46.2
100- 500	3	23.1	7	53.8	6	46.2	6	46.2
501- 1000	0	0	0	0	1	7.7	0	0
>1000	1	7.7	2	15.4	3	23.1	1	7.7
Mean	215		612		724		258	
No of screened units								
< 100	9	69.2	7	53.8	9	69.2	7	53.8
100- 500	3	23.1	5	38.5	2	15.4	5	38.5
501- 1000	1	7.7	0	0	2	15.4	0	0
>1000	0	0	1	7.7	0	0	1	7.7
Mean	181		253		163		208	
No of used units								
< 100	8	61.5	4	30.8	4	30.8	7	53.8
100- 500	4	30.8	7	53.8	4	30.8	4	30.8
501- 1000	0	0	1	7.7	3	23.1	1	7.7
>1000	1	7.7	1	7.7	2	15.4	1	7.7
Mean	244		339		734		259	
No of discarded units								
< 30	13	100	10	76.9	5	38.5	9	69.2
31- 80	0	0	2	15.4	4	30.8	2	15.4
81- 200	0	0	1	7.7	2	15.4	1	7.7
>200	0	0	0	0	2	15.4	1	7.7
Mean	5.8		22		87		46	

Annex 4:

Palestinian National Authority
Ministry of Health
Helsinki Committee

السلطة الوطنية الفلسطينية
وزارة الصحة
لجنة هلسنكي

14/9/9

التاريخ2009/9/9

Name:

الاسم: ختام أبو زنادة نبيل

I would like to inform you that the committee has discussed your application about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

Assessment of the Effectiveness and Performance of Blood Bank Services in Gaza Governorates during the War on Gaza

In its meeting on September 2009 and decided the Following:-

و ذلك في جلستها المنعقدة لشهر 9 2009

و قد قررت ما يلي:-

To approve the above mention research study.

الموافقة على البحث المذكور عاليه.

Signature

Ministry of Health
Helsinki Committee

Member
عضو

Member
عضو

Chairperson

Conditions:-

- Valid for 2 years from the date of approval to start.
- It is necessary to notify the committee in any change in the admitted study protocol.
- The committee appreciate receiving one copy of your final research when it is completed.

Annex 5:

بسم الله الرحمن الرحيم

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

التاريخ: ٢٠٠٩/٧/١٢

حضرة الاخ/ د. ناصر أبو شعبان المحترم
مدير عام تنمية القوى البشرية – وزارة الصحة
تحية طيبة و بعد ،،،

الموضوع: مساعدة الطالبة/ ختام علي ابو زنادة

يقوم الطالب المذكور بعاليه باجراء بحث بعنوان :

Assessment of the Effectiveness and Performance of Blood Bank Services in Gaza Governorates during the War on Gaza

كمتطلب للحصول على درجة الماجستير في الصحة العامة – مسار وبائيات وعليه نرجو التكرم بالايعاز لمن نرونه مناسب لتسهيل مهمة الطالب في جمع البيانات اللازمة من ادارة المختبرات التابعة لوزارة الصحة.
علما بان المعلومات ستكون لغرض البحث العلمي لدى الطالب و الجامعة فقط وسنطلعكم على النتائج في حينها...

شاكرين لكم حسن التعاون
و اقبلوا فائق الاحترام و التقدير

د. بسام ابو حمد

منسق عام برامج الصحة العامة

نسخة :
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Jerusalem Branch/Telefax 02-2799234
Gaza Branch/Telefax 08-2884422-2884411
P.O. box 51000 Jerusalem

فرع القدس / تلفاكس 02-2799234
فرع غزة / تلفاكس 08-2884422- 2884411
ص.ب. ٥١٠٠٠ القدس

Annex 6:

بسم الله الرحمن الرحيم

Al-Quds University
Jerusalem
School of Public Health

جـامـعـة الـقـدس
القدس
كلية الصحة العامة

التاريخ: ٢٠٠٩/٧/١٢

جضرة الاخ/ ناهض أبو عاصي المحترم
مدير جمعية بنك الدم المركزي
تحية طيبة و بعد ،،،،

الموضوع: مساعدة الطالبة/ ختام علي ابو زنادة

يقوم الطالب المذكور بعاليه باجراء بحث بعنوان :

Assessment of the Effectiveness and Performance of Blood Bank Services in Gaza Governorates during the War on Gaza

كمتطلب للحصول على درجة الماجستير في الصحة العامة – مسار وبائيات و عليه نرجو التكرم بالايعاز لمن تروه مناسب لتسهيل مهمة الطالب في جمع البيانات اللازمة من جمعيتكم الموقرة .

علما بان المعلومات ستكون لغرض البحث العلمي لدى الطالب و الجامعة فقط وسنطلعكم على النتائج في حينها...

شاكرين لكم حسن التعاون
و اقبلوا فائق الاحترام و التقدير

د. بسام أبو حمد

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بسم الله الرحمن الرحيم

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

التاريخ: 2009/7/12

حضرة الأخ/ د. يوسف موسى المحترم
المدير التنفيذي لاتحاد لجان العمل الصحي
تحية طيبة و بعد ،،،،

الموضوع: مساعدة الطالبة/ ختام علي ابو زنادة

تقوم الطالبة المذكورة بعاليه بإجراء بحث بعنوان :

Assessment of the Effectiveness and Performance of Blood Bank Services in Gaza Governorates during the War on Gaza

كمتطلب للحصول على درجة الماجستير في الصحة العامة – مسار وبائيات وعليه نرجو التكرم بالايعاز لمن تروه مناسب لتسهيل مهمة الطالبة في جمع البيانات اللازمة من المراكز الصحية التابعة لمؤسستكم الموقرة.
علما بان المعلومات ستكون لغرض البحث العلمي لدى الطالبة و الجامعة فقط وسنطلعكم على النتائج في حينها...

شاكرين لكم حسن التعاون
و اقبلوا فائق الاحترام و التقدير

د. بسام أبو حمد
منسق عام برامج الصحة العامة

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ص.ب. 51000 القدس

Consent Form I

تقييم فاعلية وأداء خدمات بنوك الدم في محافظات غزة خلال الحرب علي غــزة

عزيزي الموظف/ة:

نشكر مشاركتك بوقتك الثمين في تعبئة الاستبانة ،فهذه المشاركة ستساعد في اتمام دراستي حول تقييم فاعلية وأداء خدمات بنوك الدم في محافظات غزة خلال الحرب على غزة مما يساعد في التغلب على العقبات والاحتياجات التي تواجه خدمات بنوك الدم في أوقات الكوارث و الأزمات .

سيقدم هذا البحث كأطروحة لنيل درجة الماجستير في الصحة العامة –وبائيات واحصاء حيوي- جامعة القدس أبو ديس .

تتعهد الباحثة المحافظة على سرية البيانات

الباحثة : حنان علي أبو زنادة " نتيل"

Consent Form II

Assessment of the Effectiveness and Performance of B.B. Services in Gaza Governorates during the War on Gaza

Dear Participant:

I warmly thank you for spending a little of your time to achieve this Questionnaire**.** Your help will assist in the accomplishment of my study about Assessment of the Effectiveness and Performance of B.B. Services in Gaza Governorates during the Last Israeli Aggression (2008- 2009).

This study is about the partial fulfillment of the Master Degree in Public Health – Epidemiology and Biostate requirement from Al-Quds University, School of Public Health- Palestine.

Researcher:

Khitam A.. Abu- Zinada-Natil"

PART I

Staff B.B.Questionnaire

Serial No._____ Date:_____

A. Personal Data

Name: _____ Name of Hospital/ B.B.: _____

Governorate: _____ Address of staff: _____

Gender : _____ Age/years: _____

Marital Status: 1-q Single 2-q Married
3-q Others

Qualification: 1-q Diploma 2-q Bachelor
3-q High Diploma 4-q Post Graduate

Specialty: 1-q Microbiologist 2-q Technician
3-q Chemist 4-q Biochemist
5-q Medical technologist 6-q Biologist

B. The Effectiveness and Performance of B.B.(B.B) Services during the War on Gaza.

Could you answer the following questions, please?

1- Category of B.B: 1-q Central Blood Bank
2-q Hospital Blood Bank
3-q NGOs Blood Bank
4-q National Blood Bank

	Yes	No
2- Is the B.B. a separate department inside the hospital?	1-q	2-q
3- Is it shared by: laboratory?	1-q	2-q
4- How many rooms are available in the blood bank? _____		
5- Is the total area of B.B sufficient for activity?	1-q	2-q
6- Do you think the number of B.B. centers in Gaza Governorates are sufficient?	1-q	2-q
7- In your opinion, did the distribution of B.B. centers in Gaza Governorates meet the increase of demands on blood units during the war?	1-q	2-q
8.1- Number of donation chairs _____		
8.2- Were number of donation chairs sufficient for working during war?	1-q	2-q

9.1- Number of total staff _____

9.2- Were total number of staff sufficient for working during war? 1- q Yes 2- q No

10- Did you attend to your work every day during war? 1- q Yes 2- q No

11.1- How many numbers of staff were in the working days per shift recently during the war?

Specialist	Shift				
	Morning	Afternoon	Night	Combining	On call
1. Microbiologist					
2. Biochemist					
3. Chemists					
4. Technicians					
5. Medical Technologist					

11.2- How many numbers of staff were in the working days per shift recently after the war?

Specialist	Shift				
	Morning	Afternoon	Night	Combining	On call
1. Microbiologist					
2. Biochemist					
3. Chemists					
4. Technicians					
5. Medical Technologist					

	Yes	No
12- Do you have written donor selection criteria?	1- q	2- q
13- Do you keep a donor record for rare blood groups?	1- q	2- q
14- Do you have any orientation or training program for emergencies?	1- q	2- q

If yes,

14.1- How many times_____

14.2- When (last) _____

14.3- Where (last) _____

	Yes	No
15.1- Did you have mobile donor campaign during war?	1-**q**	2-**q**
15.2- If yes, please tick where did you go?		
• Secondary schools	1-**q**	2-**q**
• University	1-**q**	2-**q**
• Community/Streets	1-**q**	2-**q**
• Others	1-**q**	2-**q**

16.1- What did you do with bio-hazardous waste during war?

	Yes	No
• Discarded in general waste	1-**q**	2-**q**
• Incinerated	1-**q**	2-**q**
• Emptied in sink	1-**q**	2-**q**
• Emptied in sewage system	1-**q**	2-**q**
• Sent to other hospital for incineration	1-**q**	2-**q**
16.2- Were there any changes in last question after war?	1-**q**	2-**q**

(Specify) _____

	Yes	No
17.1- When you fail in puncturing the vein, do you reuse the same blood bag collection?	1-**q**	2-**q**
17.2- Was a new blood bag collection used after vein puncture failure during war?	1-**q**	2-**q**

18.1- Did stocks of any of the following consumable ran out during the war? Please, tick

	Yes	No
• Blood bags	1-**q**	2-**q**
• Screening kits	1-**q**	2-**q**
• Blood group typing reagents	1-**q**	2-**q**
• Alcohol 70%	1-**q**	2-**q**
• Cotton	1-**q**	2-**q**
• Others (specify)_____		

18.2- Were there any changes in previous question after the war? 1-**q** Yes 2-**q** No

(Specify) _____

_____

19- Did you face any shortages of the following During the war?
Please, tick

	Yes	No
• Blood units	1-**q**	2-**q**
• O –ve blood units	1-**q**	2-**q**
• Fresh frozen plasma	1-**q**	2-**q**
• Cryoprecipitate	1-**q**	2-**q**
• Instruments for separation Blood components	1-**q**	2-**q**
• Capacity of refrigerator	1-**q**	2-**q**
• No of staff	1-**q**	2-**q**
• Others (specify)_____		

20.1- What did you do in case of shortage of screening kits during the war?

Action	**HIV**		**HBs Ag**		**HCV**	
	Yes	No	Yes	No	Yes	No
Stop issuing blood	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**
Perform rapid test	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**
Pooling of several samples	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**
Send sample tube to other lab for screening	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**
Issue blood without testing	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**
Others(specify)_____						

20.2 - Were there any changes about last question after war? 1-**q** Yes 2-**q** No

If yes, Please (Specify) _____

21.1- What did you do in case of initially reactive test resulted during war?

Action	HIV		HBs Ag		HCV	
	Yes	No	Yes	No	Yes	No
Results accepted	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**
Repeat the test	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**
Refer to other places	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**
Do not do the test	1-**q**	2-**q**	1-**q**	2-**q**	1-**q**	2-**q**

21.2 - Were there any changes about past question After war ? 1-**q** Yes 2-**q** No
If yes, Please (Specify) _____

22.1- What did you do with repeatedly reactive samples of blood units During the war?

	Yes	No
• Refer specimens for confirmation	1-**q**	2-**q**
• Discarded	1-**q**	2-**q**

22.2- Were there any changes about former question after the war? 1-**q** 2-**q**

If yes, Please (Specify) _____

23- What did you do with the confirmed negative blood units after being initially positive during the war?

	Yes	No
• Treat as positive	1-**q**	2-**q**
• Use	1-**q**	2-**q**

24- Which screening technique did you use in emergencies?

Test	ELISA	Rapid	IMX	None
HIV	1-**q**	2-**q**	3-**q**	4-**q**
HBV	1-**q**	2-**q**	3-**q**	4-**q**
HCV	1-**q**	2-**q**	3-**q**	4-**q**
Others (specify) _____				

	Yes	No
25.1- Is there any record of the discarded blood units?	1-**q**	2-**q**

25.2- Was there any record of the discarded blood units during the war? 1-**q** 2-**q**

	Yes	No
26- Did you have frequent shortages of water during the war?	1-**q**	2-**q**
27.1- Did you have any frequent power supply shortages?	1-**q**	2-**q**
27.2- Did you have any frequent power supply shortages during the war?	1-**q**	2-**q**
If yes, for how long <30 minutes	1-**q**	2-**q**
>30 minutes	1-**q**	2-**q**

If >30 minutes what measure did you take?

_____

	Yes	No
28- Do you supply other B.B centers/hospitals with blood units?	1-**q**	2-**q**

29.1- How do you communicate with other B.B centers? Please, tick

	Yes	No
• By family	1-**q**	2-**q**
• Telephone	1-**q**	2-**q**
• Fax	1-**q**	2-**q**
• Others	1-**q**	2-**q**
• (Specify)_____		

29.2- How did you communicate with other B.B centers during the war? Please, tick

	Yes	No
• By family	1-**q**	2-**q**
• Telephone	1-**q**	2-**q**
• Fax	1-**q**	2-**q**
• Others	1-**q**	2-**q**
• (Specify)_____		

30- Are you transport blood and blood components in temperature-monitored equipment? 1-**q** 2-**q**

31.1- How were blood units transported to other centers? Please, tick

• By family	1-**q**	2-**q**
• By ambulance	1-**q**	2-**q**
• Bus for employees	1-**q**	2-**q**
• Others	1-**q**	2-**q**

- (Specify)_____

31.2- How were blood units transported to other centers during the war? Please, tick

	Yes	No
• By family	1- **q**	2- **q**
• By ambulance	1- **q**	2- **q**
• Bus for employees	1- **q**	2- **q**
• Others	1- **q**	2- **q**
• (Specify)_____		

	Yes	No
32- Do you use ice boxes for transporting blood units?	1- **q**	2- **q**
33- Do you perform a daily routine maintenance of equipment?	1- **q**	2- **q**
If yes, Did you record it?	1- **q**	2- **q**
34.1- Did you reuse tubes, pipette tips, etc.?	1- **q**	2- **q**
34.2- Did you reuse tubes, pipette tips, etc. during the war?	1- **q**	2- **q**
35.1- Did you reuse slides?	1- **q**	2- **q**
35.2- Did you reuse slides during the war?	1- **q**	2- **q**
36- Were units randomly cultured for bacterial contamination?	1- **q**	2- **q**
37- Did you receive blood unites from abroad?	1- **q**	2- **q**
If yes, please answer:		
38- Did all abroad blood units which were used test for screening technique?	1- **q**	2- **q**
39- Did you apply pooling of several samples?	1- **q**	2- **q**

40- General comments on your observations?

_____

_____

_____

_____

Your cooperation is highly appreciated

Researcher: *Khitam A. Abu- Zinada-Natil*

PART II

Director B.B. Questionnaire

Serial No._____	**Date:**_____

A. Personal Data

Name: _____ Name of Hospital/ B.B.: _____

Governorate: _____ Address: _____

Gender : _____ Age/years: _____

Marital Status: 1- **q** Single 2- **q** Married
3- **q** Others

Qualification: 1- **q** Diploma 2- **q** Bachelor
3- **q** High Diploma 4- **q** Master Degree
5- **q** Post Graduate

Specialty: 1- **q** Microbiologist 2- **q** Biochemist
3- **q** Chemist 4- **q** Medical technologist
5- **q** Biologist

B. The Effectiveness and Performance of B.B.(B.B) Services during war in Gaza Governorates.

Could you answer the following questions, please?

1- Category of B.B: 1- **q** Central Blood Bank
2- **q** Hospital Blood Bank
3- **q** NGOs Blood Bank
4- **q** National Blood Bank

2- Please tick, what are the activities of your blood bank?

	Yes	No
• Collection	1- **q**	2- **q**
• Donation	1- **q**	2- **q**
• Screening	1- **q**	2- **q**
• Component separation	1- **q**	2- **q**

- Blood grouping and cross matching 1-**q** 2-**q**
- Therapeutic transfusion 1-**q** 2-**q**
- Others (Specify)_____ 1-**q** 2-**q**

3- What kind of blood donation does your B.B collect? Please, tick

	Yes	No
• Voluntary non-remunerated	1-**q**	2-**q**
• Voluntary remunerated	1-**q**	2-**q**
• Family replacement	1-**q**	2-**q**
• Regular	1-**q**	2-**q**

4- Is there quality control system in the blood transfusion services? 1-**q** 2-**q**

5- Is there SOPs for the collections, storage, processing and issue of blood and blood products?	Yes	In process	No
	1-**q**	2-**q**	3-**q**

6- Are there national guidelines on the storage of blood and blood components?	Yes	No
	1-**q**	2-**q**

7- Are there national guidelines on the transportation of blood and blood components? 1-**q** 2-**q**

8- Does your B.B. center transport blood and blood components in temperature -monitored equipment? 1-**q** 2-**q**

9- Are there planned polices for blood transfusion during the disasters? 1-**q** 2-**q**

10- Is there an emergency power supply in case of power failure? 1-**q** 2-**q**

11- Do you think the number of B.B. centers in Gaza Governorates are sufficient? 1-**q** 2-**q**

12- In your opinion, did the distribution of B.B. centers in Gaza Governorates meet the increase of demands on blood units during the war? 1-**q** 2-**q**

13- Did you have a system for stock (written)?	Yes	No
	1-**q**	2-**q**

C. About shortages during war in Gaza

14- What did you do in case of shortage of screening kits? 1-**q** Omit 2-**q** Other

Please (Specify) _____

_____

15- Availability of screening kits during war

screening kits	HIV	HBs Ag	HCV
Number available			
Number of expired kits			

16- Did you attend to your work every day during war? 1- q Yes 2- q No

17- Was the shortage of staff under control? 1- q Yes 2- q No

Please (specify) _____

18.1- Did you succeed in recruiting more staff during the war? 1- q Yes 2- q No

18.2- How was that done?
Please (Specify)

_____

_____

19- What about staff that were not able to reach their work during the war?

_____

_____

20- Could you secure safety transport means for transporting the blood units to affected area during the war? 1- q Yes 2- q No

21- Was there any shortage of equipments under control during the war? 1- q Yes 2- q No

22.1- How does your B.B deal with increase of blood units' demand?

_____

_____

22.2- How did your B.B deal with increase of blood units' demand during war?

_____

_____

Yes No

23- Is there any cooperation between your B.B. and

media towards the community? 1-**q** 2-**q**

24- Did your B.B. employ the media in donor's recruitment? 1-**q** 2-**q**

25- What kind of media did your B.B utilize? 1-**q** Radio 2-**q** T.V 3-**q** Newspaper 4-**q** Others

26- What the means did your B.B use for telling the media about shortages of blood units? 1-**q** Interview 2-**q** Telephone 3-**q** Fax 4-**q** Others

	Yes	No
27.1- Did your B.B receive any donations during the war?	1-**q**	2-**q**

27.2- If yes, what was nature of the donations please tick

• Supported staff	1-**q**	2-**q**
• Disposables	1-**q**	2-**q**
• Blood units	1-**q**	2-**q**
• Blood components	1-**q**	2-**q**
• Other (specify)_____	1-**q**	2-**q**

28- After how many days of the war starting were the first donations received?

_____

29- The source of the donations that you received was:

• Local donation	1-**q**	2-**q**
• National donation	1-**q**	2-**q**
• Regional donation	1-**q**	2-**q**
• International donation	1-**q**	2-**q**

30- What were the countries names which sent donations?

_____

_____

31- Count types of donations from every country, please?

_____

_____

_____

_____

32- Were there any orientation or training program for lab tech in other departments about blood transfusion?

Yes 1- **q** No 2- **q**

33- Was there a national haemovigilance plan after the war?

Yes 1- **q** in process 2- **q** No 3- **q**

34- Could you mention the most 3 supportive activities strength of B.B. services during the war, Please?

_____

_____

_____

35-Could you mention the weakest 3 areas of B.B. services during the war, Please?

_____

_____

_____

36- What lessons had been learned from this crisis?

_____

_____

Your cooperation is highly appreciated

Researcher:

Khitam A. Abu-Zinada- Natil

PART III

Assessment of the Effectiveness and Performance of B.B. Services in Gaza Governorates during the War on Gaza

Observational Checklist

Name of Hospital/ B.B.: _____

Head of B.B. center (Supervisor): _____

Date of visit: _____

A. Please check the following for accuracy of the information about the B.B. center (if you have more, please add):

	Seen	Not seen
1- Does B.B have SOPs for the collections, storage, processing and issue of blood and blood products?	1-q	2-q
2- Does B.B have a written system for stock?	1-q	2-q
3- Does B.B have written donor selection criteria?	1-q	2-q
4- Does B.B keep a donor record for rare blood groups?	1-q	2-q
5.1- Is there any record of the discarded blood units?	1-q	2-q
5.2- Was there any record of the discarded blood units during the war?	1-q	2-q

	Manual	Computerized	Mixed
6- What does the kind of recording system B.B. use?	1-q	2-q	3-q

7- Does B.B. have available material for waste?

	Seen	Not seen
• Safety box for sharps	1-q	2-q
• Container with disinfectant for glassware	1-q	2-q
• Container for fluid waste	1-q	2-q
• Others (specify)_____		

	Seen	Not seen
8- Is there a functioning incinerator in the facility?	1- **q**	2- **q**
9- Is there a functioning water distiller (distillation unit)?	1- **q**	2- **q**

B. Storage Area

10.1- Please check all refrigerators and freezers in the B.B.
(Y = Yes, N = No, N/A = not applicable)

Refrigerators/Freezer	**B.B. Refrigerator**					**Domestic Refrigerator**	**Freezer**
Number							
Number functioning							
• Location	1	2	3	4	5		
1- Test kites/reagent							
2- Blood samples							
3- Blood products							
4- Food or drink							
5- Read and record temperature							
6- Any expired kite/reagent							
7- Any expired blood units							
8- Screened units separate from unscreened							
9- Positive blood units separated from the stock							
10- Alarm system							
11- Inventory list with expiry Date							
12- Record of times door opened							

	Yes	No
10.2- Were there any changes in storage area during the war?	1- **q**	2- **q**

If yes, please list changes:

_____

_____

C. Data from B.B. Records

11.1- Please for completing the following table upon examining B.B. record during war in Gaza Strip (2008-2009)

Month	# of donors	In		Out	
		# Units	# bags screened	# used bags	# discarded units
First day					
From 28 Dec to 3 Jan.					
From 4 to 10 Jan.					
From 11 to 17 Jan.					

11.2- Please for completing the following table upon examining B.B. record (2008-2009)

Month	# of donors	In		Out	
		# Units	# bags screened	# used bags	# discarded units
November					
December					
January					
February					

Name of person completing checklist _____ Signature _____

A lot of thanks

Researcher:

Khitam A. Abu- Zinada- Natil

Annex 9: B.B. Were Included in the Study ٍSample

Serial no	Lab& blood bank	Type of functions	Sector	Governorate
1	Bite-Hanon Hospital	Compatibility& Transfusion	MOH	Gaza North
2	Al-Awda Hospital	Compatibility& Transfusion	NGO's	Gaza North
3	Kamal Edwan Hospital	Compatibility& Transfusion	MOH	Gaza North
4	Shifa Medical Hospital	Collect, Compatibility Distribute& Store	MOH	Gaza
5	Central B.B. Society	Collect, Store & Distribute	NGO's	Gaza
6	Al-Quds Hospital	Compatibility &Transfusion	NGO's	Gaza
7	Shohda'a Alaqsa Hospital	Collect, Compatibility &Transfusion	MOH	Mid-Zone
8	Nasser Hospital	Collect, Compatibility Distribute& Store	MOH	Khan Younis
9	B.B. Society	Collect, Store& Distribute	NGO's	Khan Younis
10	Abo Jehad (GEH)	Collect, Compatibility Distribute& Store	MOH	Khan Younis
11	Abu Yosif El Najar Hospital	Compatibility& Transfusion	MOH	Rafah
12	Tal El Sultan Hospital	Compatibility& Transfusion	MOH	Rafah
13	B.B. Society	Collect, Store& Distribute	NGO's	Rafah

(MOH, 2006)

ملخص الدراسة

تقييم فاعلية وأداء خدمات بنوك الدم في محافظات غزة خلال الحرب على غـــــزة

تلعب خدمات بنوك الدم دورا حيويا لانقاذ حياة الناس، ليس فقط في محافظات غزة، بل أيضا في جميع أنحاء العالم. فبالرغم من الحرب على محافظات غزة، كانت بنوك الدم بارعة في فعاليتها وأدائها.

تهدف الدراسة إلي تقييم فاعلية وأداء خدمات بنوك الدم في محافظات غزة خلال الحرب الأخيرة على قطـــاع غـــزة وتقيم قوتها في مواجهة التحديات ، كانت الددراسة مقطعية شملت جميع بنوك الدم و بنوك دم المستشفيات التـــي شاركت في استقبال و علاج جرحي الحرب .

شملت الدراسة 116 من الأفراد، مئة من الموظفين الذين عملوا بشكل مباشر أو غير مباشر في مراكز بنوك الـــدم وقت الحرب و16مديرا يعملون في بنوك الدم ، قام الباحث بتعبئة الاستبانة وذلك باجراء مقابلة مـــع المـــوظفين و المدراء والجزء الاخير من الإستبانة فكان لتقييم بيئة العمل.

أظهرت نتائج أن بنوك الدم واجهت نقص في كميات وحدات الدم اللازمة و بلازما الـــدم و الاجهـــزة و المعـــدات الخاصة ببنوك الدم و مواد الفحص و مواد التعقيم كالكحول الايثيلي تركيز 70 % و كـــذلك المـــستلزمات الطبيـــة اللازمة كالقطن والشاش المعقم . كما أظهرت نتائج الدراسة بأنه توجد فروق ذات دلالة إحصائية تدل علـــى أعلـــى نقص في عدد وحدات الدم ظهر جليا في بنوك دم شمال غزة وأدنى نقص في جنوب غزة، هناك حوالي 90٪ تقـــر أن العدد الإجمالي للموظفين كان غير كافيا للعمل خلال الأزمة، هناك 87٪ يعتبرون أن عدد كراسي التبرع بالـــدم كانت غير كافية للعمل خلال الأزمة و استخدمت وسائل الإعلام في ابلاغ المجتمع للتبرع بالدم.

أظهرت الدراسة بعض نقاط القوة والتوازن، فظهرت في المخزون الكافي من وحدات الـــدم اســـتطاع امتـــصاص الضربة الأولي من الحرب.حيث كانت إطالة ساعات الدوام نسبتها 81.3٪ وبلغت نسبة وحدات الدم المتبرع بها من الدول المجاورة 75٪، كما أن هناك استجابة سريعة للبنوك الأخرى تمثلت بـــ43.8٪ ، و علي العكـــس مـــن ذلك أظهرت الدراسة أنه كان هناك بعض نقاط الضعف 81.3٪ وصفوا المعدات والأجهزة بأنهـــا كانـــت غيـــر كافية، 56.3٪ ضعف في الاتصالات، 43.8٪ وصفوا قلة أو غياب مواد الفحص ،37.5٪ شكوا من غياب الهيئة الإدارية.

توصي الدراسة بتحسين بيئة العمل وتزويد بنوك الدم بما يلزمها من معدات وأجهزة وطواقم مدربة، كما وتوصـــي بتوسيع خدمات بنك الدم المركزي الحالي بما يكفل تيسير وتوفير العدد الكافي من وحدات الدم ومكونات الدم لتغطية احتياجات جميع محافظات قطاع غزة .