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Evaluation of the Use of Health Information System in Decision Making in Non Governmental Organizations – Gaza Governorates

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Evaluation of the Use of Health Information System in Decision Making in Non Governmental Organizations – Gaza Governorates

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Dedication

To my beloved parents, my mother in law for their believing in me, and to my wife and my kids; Khaled, Lana and Mohammad for their endless support, patience and understanding

And

To everyone who contributed to get this study a reality. Thank you.

Akram Hasan Nassar

Declaration

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

Signed ……..

Akram Hasan Nassar

25 June 2011

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Abstract

The demand for timely, accurate and relevant information for decision making in health is more than ever before. In a fragmented health system like the Palestinian one, where resources are scarce and health problems are complex, the need for information is even more crucial than elsewhere. Little is known about the extent of use of information in decision making in the Non-Governmental Organizations (NGOs) in the Gaza Strip. This study aims to examine the extent to which local health NGOs follow an evidence-based decision making approach through using health information systems (HIS).

The study utilized descriptive, analytical cross sectional design with a quantitative approach. Two interviewed questionnaires were used for data collection from two diverse sources; the NGO as an organization (organizational questionnaire) and the managers working in these organizations (individual questionnaire). In this census study, of the eligible 24 health NGOs, 21 NGOs had positively responded. Response rate among managers was 83.3%. The developed questionnaires were based on the Health Metrics Network (HMN) assessment tool for national HIS with adaptation to fit the Palestinian NGO context. The overall reliability coefficient for both the organizational and the individual tools were very high (0.954 & 0.904 respectively).

Findings revealed adequate total HIS performance for the organizational questionnaire (57.65%) and the individual (managers) one as well (62.02%). Low performance was found regarding the use of indicators (40.47% &48.6%; organizational then managers respectively) and in the HIS data sources (53.46% & 47.27%) whereas HIS data management (61% & 68.4%) and the information dissemination and use in decision making showed high results (69.13% & 60.96%). Lesser performance was found in the evaluation of HIS resources (52.11% & 69.48%) and in HIS information products (64.0% & 45.53%). However, the main strengths could be summarized in the highly positive managers' attitudes, the young age of most of the NGOs managers, the effective internal communications and the commitments of top managers towards computerization of the system. The main weaknesses were the lack of HIS policies & regulations, lack of HIS training activities, inadequate standardized use of performance indicators, poor use of external data sources, inadequate data presentation capacities at the operational levels and inadequate information sharing with the community. Participants working in hospitals revealed lower perceptions in all HIS components in comparison to other groups with statistically significant differences ($P<0.05$). Similarly, computer users elicited higher HIS performance than non-users at all components with statistical significant differences ($P<0.05$). Top managers elicited higher scores in information products and the availability of resources than mid and low level managers and the differences reached statistically significant levels ($P < 0.05$).

To enhance the information based decision making, the researcher recommends developing a set of indicators and supporting their monitoring. Also, enhancing a culture conducive to the use of information in decision making is essential. Last but not least, reinforcing capacity building skills in HIS is extremely important.

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List of Abbreviations

ANOVA	Analysis of Variance
DM	Decision Making
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GIS	Geographic Information System
HIS	Health Information System
HMIS	Health Management Information System
HMN	Health Metrics Network
IMR	Infant Mortality Rate
IT	Information Technology
MAS	Palestinian Economic Policy Research Institute
MOH	Ministry of Health
NECC	Near East Council of Churches
NGO	Non Governmental Organization
OCHA	UN Office for Coordination of Human Affairs
OECD	Organization for Economic Cooperation & Development
oPt	Occupied Palestinian territory
PCBS	Palestinian Central Bureau of Statistics
PHC	Primary health care centre
PHIC	Palestinian Health Information Centre
PNA	Palestinian National Authority
PNGO	Palestinian Non Governmental Organization Network
PRISM	Performance of Routine Information System Management
RHINO	Routine Health Information Network
RHIS	Routine Health Information System
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
UN	United Nation
UNFPA	United Nation Population Fund
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
WFP	World Food Program
WHO	World Health Organization

Chapter 1

Introduction

1.1 Background

More than ever before, the demand for timely, accurate, and relevant information for decision making is increasing. The spectrum of the use of information in health ranges from setting priorities for strategic planning, to clinical diagnosis and management of illnesses, quality management of services, prevention and control of epidemics, human resource management, commodity management, and program evaluation and research (Stansfield et al., 2006). Palestinian Non-Governmental Organizations (PNGOs) have been established with the mission of preventing and reducing health gaps and inequities and to alleviate the health consequences of poverty in the Palestinian society (Palestinian Economic Policy Research Institute-MAS, 2008). The success of Non-Governmental Organizations (NGOs) in the Gaza Strip is highly dependent on the existence of information to detect the problems, design solutions and track progress of the implemented actions.

With the diminished ability of the governmental health facilities to provide services due to lack of resources, the patients' load on NGOs has significantly increased in the recent years (PNGO, 2009). This patient shift places an extra burden on these NGOs and a challenge for them to respond to the needs of population by expanding their services and introducing new selective services that are needed without distorting the framework of the Palestinian health system. All these facts indicate the need to determine the priorities of the population in Gaza and to identify the vulnerable groups to ensure their access to the services needed, which eventually require accurate information. These organizations should also maintain effective alternative strategies/scenarios due to the deteriorated political situation, which will first of all increase their efficiency. They have to develop systems that enable rational review of their mechanisms of service delivery coordination and information sharing among these organizations. Evidence-based decision making and planning based on an effective Health Information System (HIS) will provide the best solution and enable informed reallocation of the already scarce resources. The following

study attempts to ascertain to which extent the health NGOs in the Gaza Strip use evidence based practices in decision making and planning.

1.2 Research problem

An effective decision making process is essential for every organization to ensure accomplishing its goals. Evidence based decision making can prevent the organization from destructive subjective perceptions and facilitates the organization's leaders with the knowledge needed for appropriate decisions (Davis, 1991).

In a fragmented health system like the Palestinian one, where resources are scarce and health problems are complex, it is even more crucial than elsewhere. Unfortunately, the system in general is characterized by a scarcity of useful, valid and timely information which makes any attempt to constructive planning almost an impossible mission (Hamad, 2009). Many experts' reports highlighted that inadequate coordination among different providers, lack of timely routine reporting, and contradicted statistics in vital areas contribute to confusion rather than to stability and effectiveness.

In the recent years, health NGOs in the Gaza Strip gradually widened the scope of their services and increased their investments in HIS developing. On the other hand, little is known about the effectiveness of these investments and the extent of use of information in these organizations. This study attempts to tackle this vague area and to analyze the current information status in the NGO sector. It is anticipated that this study will explore the obstacles for the application of an appropriate HIS in decision making in NGOs and identify some positive points to build on in order to enhance the development of supporting environment and culture for the use of information-based decision making in the future.

1.3 Justification of the study

There is global consensus about the importance of evidence based decision making for the performance and efficiency of health organizations. Some health experts assume that decision-making is generally judgmental rather than information based in the fragmented Palestinian health care system with poor information sharing, coordination and communications among health providers (PNGO, 2009). In addition to the Ministry of

Health (MOH), the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) and the private for profit sector, the NGOs are the fourth major health provider in Palestine representing 28.3% of the available primary health care centers and 31.6% of all hospital beds (MOH, 2008). The high volume and responsibilities of this sector makes it imperative for their leadership to rely on accurate, timely and relevant information in their decisions to ensure the sustainability and efficiency of their organizations especially as there is a trend among most fund agencies towards information based, sector-wide approach in the planning and priority setting.

Although most NGOs define their role in promoting accessibility to vulnerable and marginalized people and bridging the gaps and the perceived inequalities in the health system (PNGO, 2009), most of them have no clear mechanisms to identify their potential beneficiaries, their geographical distribution or classification of their needs & poverty level (MAS, 2008). The development of effective information system with clear performance indicators should be placed as a top priority of these organizations (PNGO, 2009). There is indeed a felt political awareness among NGOs leadership about the importance of the use of HIS and the necessity to introduce modern computerized information systems. Some of them have already practical steps towards introducing such systems. But the shift to new modern information systems without studying all factors affecting its utilization like the environmental, behavioral, cultural and organizational preparedness could lead to negative results and frustrations. The first step in improving the application of HIS is to assess and review the existing system in order to identify the strengths and gaps and later to design a framework to develop the system (World Health Organization-WHO, 2006).

The role of the applied HIS in supporting decision making in NGOs in the Gaza Strip is unclear. As the researcher spent about ten years of his professional career working in a local health NGO he felt committed to tackle this unclear area and to analyze the current information status in the NGO sector. This study should be the corner stone on which the development of HIS in NGOs will be built on and against which the performance of the system will be evaluated in the future. As recommended by the WHO–Health Metrics Network (HMN) the process of HIS strengthening should go in 5 phases beginning with the assessment phase followed by the coordination & leadership, planning, implementing of HIS strengthening activities and monitoring & evaluation (WHO, 2006). By identifying the weaknesses & strengths in their information systems the findings of the study would

persuade organizational leaderships, donors and other stakeholders to continue the process towards strengthening the applied HIS in NGOs. The improved understanding of the status of health information and its role in evidence based decision making in one of the most important components of the health care system will be essential for the planning of a comprehensive national information system in the future, which is necessary for better utilization of resources and linking services to the needs of the population.

1.4 Aim of the study

This study aims to assess the current status and the use of health information in decision making process within NGOs in the Gaza Strip, in order to identify the barriers for HIS strengthening and to make suggestions for corrective measures with the vision of promoting HIS utilization in decision making.

1.5 Objectives

- To assess the status, components and features of HIS within NGOs
- To identify the current role of health information in decision making process in NGOs.
- To examine the variations among different NGOs in practicing information based decision making.
- To determine the barriers of using HIS in decision making in NGOs.
- To develop recommendations to improve HIS and to enhance its role in decision making.

1.6 Research questions

- What is the status of HIS within NGOs in reference to the identified components according to the WHO?
- What are the main factors affecting decision making in NGOs?
- To which extent HIS is utilized in decision making processes?
- What are the main strengths in the current HIS?
- What are the main weaknesses in the current HIS?

- Are there any variations among the different NGOs in the use of information?
- What are the main technical barriers to the use of HIS?
- What are the main organizational barriers to the use of HIS?
- What are the main behavioral barriers to the use of HIS?
- Which suggestions could be recommended in order to improve HIS in NGOs?

1.7 Study context

Health is an elusive concept that is hard to precisely define or even to measure (Boyd, 2000). It is also meaningless to discuss it away from its contextual factors and determinants including economic situation, poverty levels, education, peace & security, equity, women empowerment and safe and healthy environment (WHO, 1998). All these factors interact together and contribute to shaping the current health status in Palestine. Consequently, it is needless to say that the recent deterioration in all these aspects in recent years is responsible for the eroding of the health achievements noticed in the last decades (PNGO, 2009). The following paragraphs will provide a brief presentation of the demographic, political and socioeconomic contexts that might have affected the results of this study. In addition, the current health status and health care system context will be also discussed with particular focus on the use of HIS in health organizations in Palestine.

1.7.1 Demographic, political & socio-economic context:

Palestine refers to the land lying on the western edge of the Asian Continent bordered to the north by Lebanon and Syria, to the west by the Mediterranean Sea, to the south by Egypt and the Gulf of Aqaba, and to the east by Jordan. The majority of Palestinians were forcefully expelled from their land by the Israelis during the 1948 war, whereas from the 26,323 sq km land area of the historical Palestine only West Bank and Gaza Strip remained unoccupied (Passia, 2008). The suffering of Palestinians continued as these parts were occupied by the Israelis in 1967 and since that the term “occupied Palestinian territory” (oPt) is used by the United Nations (UN) for these parts of Palestine (Giacaman, et al, 2009). The Gaza Strip is a narrow band of land, located in the south of Palestine and lying on the coast of the Mediterranean Sea (Annex 1). It is one of the most densely populated

areas in the world with 1.6 million inhabitants living on a 365 sq km small area (Palestinian Central Bureau of Statistics-PCBS, 2009a & 2010a).

By the end of 2010 the total number of Palestinians worldwide was estimated by 11 millions and of them only 4.11 millions live in the oPt (PCBS, 2010a). About 1.36 millions (12.4%) still live behind the green line in the "1948 occupied land". The fact that over 50% of Palestinians are distributed over the whole globe is referred to the aforementioned forced migration. It is worth noting that 44% of Palestinians living in the West Bank & Gaza Strip are refugees with the higher proportion in the Gaza Strip of 67.4% (PCBS, 2010a). Almost a third of Palestinian refugees still live in camps with the traumatic memory of being dispossessed and expelled although three generations have gone since that experience (UNRWA, 2011). These feelings were continually fed by repeated Israeli confiscation of lands, military incursions, security closures and house demolitions.

After signing the Oslo Accords in 1993 the Palestinian National Authority (PNA) was established with partial autonomy and control over some, but not all, areas of the West Bank and Gaza Strip. While the PNA assumed control of all civilian administrations, including health, it did not have, and still does not have, sovereignty over borders, movement of goods and people, control over land, water and energy sources. In other words, Israel still holds the overall sovereignty over the oPt and its economy (PNGO, 2009). However, the political and socio-economic developments since establishing the PNA have not been very promising. On the one hand Israel continued and even accelerated settlements building and aggravated its security measures, on the other hand the PNA failed to achieve major achievements in the quality of life of population due to lack of sovereignty and other shortcomings (Giacaman, et al, 2009). The situation was further escalated by starting the second Palestinian uprising (intifada) in 2000 that ended with the election of Hamas government in 2006. International donor assistance was cut, closure periods, particularly for the Gaza Strip, were increased and the per capita Gross Domestic Product (GDP) has declined by half of its value in 1999 (World Food Program-WFP, 2008). The population of the Gaza Strip was more severely affected as the majority of labor force was dependant on jobs inside Israel and due to repeated closures the number of worker crossing to Israel was gradually decreasing till it reached the zero level (PNGO, 2009). The unemployment rate jumped to 33% in the Gaza Strip in 2007 compared with 19% in the West Bank for the same period (World Bank, 2007).

As if the Palestinians had not enough troubles with the Israeli policies, internal clashes began among the rival Palestinian parties after the election in 2006 ending in June 2007 with the "Hamas" takeover of the Gaza Strip. A tight siege was imposed on the Gaza Strip by the Israelis and signs of humanitarian crisis by the population were reported. The Israeli government stopped movement of goods and people in and out of Gaza (except the entry of food and some medicines). The premature economy collapsed due to lack of raw materials, fuel, and export opportunities. People in Gaza were practically imprisoned and impoverished (PNGO, 2009). Unemployment and poverty levels continued increasing. In 2009 unemployment rate in Gaza Strip was estimated by 37%, poverty by 76.9% and deep poverty by 69% (PCBS, 2009b). Consequently, food insecurity has continued to rise reaching 56% of the population in 2008 who became dependant on food aid and other emergency assistance received from UN and other international aid agencies (WFP/UNRWA/ Food and Agriculture Organization-FAO, 2008). The deterioration of the humanitarian situation in Gaza reached its peak in December 2008 during the Israeli war on Gaza that resulted in destruction of infrastructure, hundreds of killed and thousands of injured civilians, suspension or interruption of essential services such as educational and primary health care services (PNGO, 2009).

It can be concluded from all above that any attempts to improve the health status and solve the chronic health problems in this region will be less effective unless the root causes of these problems would be addressed by ending the occupation, lifting the siege and rehabilitation of the economy.

1.7.2 Health status context:

Recent PCBS data show that the population in Palestine is a young population whereas 43.5% of the population (47.9% in Gaza Strip) is under the age of 15 years (PCBS, 2009c). Population growth rate in Palestine is estimated by 2.9% and in the Gaza Strip by 3.3% which means that the population will be doubled in the next 15-20 years given that these increase rates will continue (PCBS, 2010a). This in turn requires careful planning from policy makers to better use this high percentage of young population to develop a strong economy rather than leaving them for unplanned and unclear future with possible aggravated unemployment and poverty levels. Thus the importance of the use of

information based decision making is here more important than elsewhere. However, signs of these practices are hardly observed whilst access to timely and accurate information became a hard job in the fragmented Palestinian health care system.

Although the reported figures of the major health status indicators such as Infant Mortality Rate (IMR), under-five mortality rate or maternal mortality ratio are misleading and significantly vary according to reporting sources there is consensus in the studied literature that the health status in Palestine is relatively good compared to other lower middle income countries.

As one of the most sensitive health indicators, IMR experienced gradual decrease over the years as it fell from 200 per 1000 live births in 1945 to only 24 in the year 2000 (Giacaman, et al, 2009; Abdul Rahim, et al, 2009). However, it was clear in both studies that these improvements have declined in the 1990s and since 2000 a slight increase was reported to 27.6 in 2006 (Abdul Rahim, et al, 2009). The discrepancy in figures was clear when the later was compared with that of the family health survey conducted by PCBS (2006a) which revealed a rate of 25.6 per 1000 live births. The MOH reports showed totally different figures for the same period as the health status report for 2005 showed a total IMR by only 17.0 per 1000 live births (MOH, 2006). This discrepancy is common in the Palestinian health context and highlights the need for comprehensive information system with agreed upon standards. However, all mentioned reports showed higher IMR rate in the Gaza Strip than in the West Bank. PCBS & MOH data showed that most infant mortalities are neonatal mortalities (first month after birth) and particularly in the early neonatal period namely the first week after birth (PCBS, 2006a; MOH, 2006). The main causes according to both reports are premature births, low birth weight and congenital abnormalities that substituted the traditional reasons of infectious and diarrhoeal diseases (PCBS, 2006a; MOH, 2006). Giacaman et al (2009) suggested that this slowdown of health achievements is an indication of health disparities or deteriorating conditions. Lack of access to health services, poor infrastructure conditions in maternity departments particularly in the Gaza Strip and recurrent emergency situations were also reported as possible reasons for this negative trend (United Nations Population Fund-UNFPA, 2009). The researcher claims that the used strategies in dealing with mother and child health did not respond to the different demographic, epidemiological and nutritional transitions in the Palestinian society and still mainly focus on the prevention of communicable diseases in

form of broad vaccination coverage. These strategies need to consider more other important aspects such as effective antenatal and postnatal care, nutritional health of mothers, women education and empowerment to affect age of marriage and age of first pregnancy.

Obtaining reliable figures is much more problematic by the issue of maternal mortality; the second major indicator of the health status in Palestine. Misclassification of cause of death and under-reporting contribute to increasing the mass of uncertainty in this regard. MOH data (2010) reported maternal mortality ratio of 45 in 2009. A previous MOH report showed a rate of 15.4 in Gaza Strip and 1.8 in the West Bank in 2005 (MOH, 2006). The MOH Medium Term Development Plan 2008 – 2010 avoided to mention any figures of this indicator due to contradiction of available estimates (MOH, 2008). WHO (2010a) estimates it by 38 per 100,000 live births. However, the fact that most pregnant women receive antenatal care and deliver in health facilities makes these avoidable mortalities completely unacceptable and raises some questions regarding the quality of provided services.

As mentioned before, epidemiological and nutritional transitions have been noticed in the Palestinian society in the last decades. Traditional communicable diseases were replaced with non communicable diseases such as heart diseases, cerebrovascular diseases, cancer and diabetes mellitus as main reasons of mortality and morbidity (MOH, 2006). Changes in last decades in the housing & hygiene conditions, improved basic health services such as universal vaccination coverage and improved educational and general health awareness levels have lead to declining mortalities due to communicable diseases to less than 10% of all mortalities (Husseini, et al, 2009). This also has led to increasing life expectancies to over 70 years that consequently contributed to increasing prevalence of chronic diseases. PCBS family health survey (2006a) showed that about 10% of all surveyed were suffering from at least one chronic disease with higher prevalence in the West Bank than in the Gaza Strip. As other societies in similar transition Palestinians face multiple burdens of diseases. Non-communicable diseases are increasing together or to some extent as a result of increasing obesity rates and coexist with poverty related diseases such as malnutrition, anemia and waterborne diseases. It is alarming that over 13% of children in Gaza are stunted and more than 40% are anemic (PCBS, 2006a; Near East Council of Churches-NECC, 2009). Stress related conditions are the third major disease burden that resulted

from deteriorating political and socioeconomic conditions described above and also contribute to increasing rates of chronic and nutritional diseases. Despite these facts there is still no clear vision by policy makers how to manage these problems properly as there are no effective surveillance systems for the most major chronic diseases nor clear strategies for their prevention. Most efforts are focused towards the high risk approach in form of introducing complicated surgical interventions that till now remained less effective and inefficient.

Actually, compared to their high expenditures for health (11% of GDP), Palestinians should receive extraordinary high quality health services (MOH, 2010). Indeed they have a well functioning child vaccination system with over 95% coverage, also more than 95% of pregnant women receive some kind of antenatal care and deliver in health facilities (Mataria, et al, 2009). But that was not reflected in better health status of the population than other neighboring countries with less expenditure for health, which makes inefficiency as one of the most important characteristics of the Palestinian health care system.

1.7.3 Health care system context:

After a long lasting occupation, the PNA practically inherited a fragmented and largely unorganized health system. Beside the governmental health services run by MOH there are other three major providers for health services including UNRWA, NGOs and the private for profit sector. Coordination among these different providers is perceived as inadequate. MOH is not only the main service provider providing about 70% of all health services but it is also according to the Palestinian Public Health Law responsible for regulating, supervising and coordinating the system (Public Health Law, 2004). Different reports revealed that MOH attached itself mainly to services provision with little concern to its regulatory role (Abed, 2007; PNGO, 2009). Big gaps are found in the areas that need coordination with different service providers or even inter-sectoral cooperation. For instance, accidents account as the first cause of death by children under 5 years and second cause for all age mortalities (Abed, 2007). Nevertheless, there is neither appropriate reporting system nor clear programs to address this problem jointly with other related ministries and institutions (Abed, 2007). The same could be seen by the problem of disability. Another report showed that NGOs do share their reports with the Ministry of

Interior and the donors rather than with MOH (Yaghi, 2009). Licensing and accreditation of services and facilities take place by inconsistent rules and regulation patterns varying from one region to another (Abed, 2007). Human resources are irrationally distributed. While in some MOH facilities general practitioners have average patient-doctor-time of less than two minutes, other NGO facilities are underused (Abed, 2007; Mataria, et al, 2009). The system lacks clear nurses' role leading to undermining their contribution to case management and increasing dependence on physicians (Mataria, et al, 2009). Both groups were gradually involved in roles inconsistent with their qualifications resulting in decreasing their productivity, satisfaction and quality of provided services.

However, some coordination takes place between the different service providers such as coordinating the vaccination of newborns between UNRWA & MOH and purchasing of particular services from other providers through specific referral systems. MOH, and partially UNRWA, purchase some secondary and tertiary services from the NGOs and the private sector including some specialized surgeries, rehabilitation services and providing some assistive devices (PNGO, 2009). However, this cooperation is rather a result of lack or overburdening of related services than a complementary approach among these providers. Lack of economic capacities and tools to analyze and best use of existing resources was reported as one of most possible barriers (Abed, 2007). Indeed, the highly centralized financial system of the governmental health services leaves little incentives for health managers to improve their skills regarding service costing, developing payment mechanisms or even budgeting in linkage with staffing policies (Mataria, et al, 2009). Such practices could improve appraisal of options; deciding who should provide the service and to which cost; and thus minimizing duplication of services and better utilization of resources.

Lack of effective coordination and poor licensing criteria of health facilities that weakly rely on equitable distribution and promoting access, has lead to duplication of provided services and finally to client-service-shopping. Although, this region lives in a permanent emergency since over 60 years, there is still no effective contingency plan that assures best utilization of available resources of all health care providers, which was clear in the last war on Gaza (Hamad, 2009). The system seems to be dominated by the reactive approach that is very risky due to the scarcity of available resources and the high level of uncertainty. Developing an appropriate comprehensive information system with effective

information sharing and agreed upon performance indicators and data collection tools is very necessary to provide essential baseline information for rational planning and policy formulation (PNGO, 2009). This information system could be an effective communication tool and will be crucial for consensus building towards developing national prevention, early detection and early intervention programs for major health problems.

As aforementioned the NGOs are the fourth major health care provider in Palestine. Their number increased significantly in the recent years due to the deterioration in the political & socio-economic situation (MAS, 2008). A survey of PCBS (2006b) showed that the NGO sector contributes to 13% of the total health service utilization and 22% of the total health expenditures in Palestine. This sector covers 28.3% of the total available primary health care centers and 31.6% of all hospital beds in Palestine (MOH, 2008) and more than 26% of all active health human resources are employed by NGOs (MOH, 2006).

The imposed boycott on the local Palestinian authority by most donors and their shift towards working with NGOs increased the responsibility on these organizations in representing the civil society. However, an interesting study conducted by Bisan centre & the World Bank (2006) showed some discrepancies in the activities of health NGOs in Gaza strip. NGOs seem to deliver specific services that are otherwise unavailable or inaccessible, and have thereby developed specific niches of specialization like rehabilitation, psycho-social counseling and activities, health education and nutritional services (Bisan centre & World Bank, 2006). The NGO sector also plays a vital role in complementing the work of the MOH in providing tertiary services that are usually not provided by the MOH (PNGO, 2009). Even most of NGOs focused their missions in helping the poor and marginalized communities; they have no clear mechanisms to identify their potential beneficiaries (MAS, 2008). Most of them rely to a high extent on the information provided by their employees (56%), and more than the half update these information only when necessary (MAS, 2008). Their need and demand to charge fees for their services moved the services of these organizations away from reaching these groups (Bisan centre & World Bank, 2006). The study revealed also that most NGOs seem to be more concerned with the vertical accountability to their boards of directors, the Palestinian authority or the donors rather than the horizontal accountability to the beneficiaries and the whole community. Although NGOs can demonstrate a well developed level of monitoring and reporting for funded projects their capacities to evaluate the final impacts of these

activities on their target communities are very limited (Bisan centre & World Bank, 2006). The study confirms that the work of NGOs is heavily constrained by the unpredictability and lack of sustainability in the provision of emergency focused short term funded projects. Their high dependence on external funding makes them vulnerable to variations in donor's agendas. Inefficiency seems also to be a general characteristic of health NGOs in Palestine which can be largely attributed to lack of effective coordination among these organizations. Failure to work together and absence of centralized lists of beneficiaries lead to both overlap and under-coverage (MAS, 2008). Duplicate services are provided to some individuals while others receive none.

All these factors show the importance of well developed information systems that can transform the work of NGOs from reactive into proactive approach, to reconnect the activities of these organizations to their community roots, and start managing these organizations strategically in a way that ensure their sustainability and increase their effectiveness.

1.7.4 Health management culture:

Decision making

Decision making in the Palestinian health care system is highly influenced by cultural related factors. Appointments, promotion or rewarding are to a great extent subjects to connections, political affiliation or personal favors (Hamad, 2009; Yaghi, 2009). Career development is completely unrelated to individual's performance; therefore, performance based competition is completely non-existent (Hamad, 2009). Healthcare organizations are generally managed in a traditional fashion. Decision-making is judgmental rather than information based (Hamad, 2001). Systems, management structures and decision-making criteria can significantly vary from one place to another even within MOH itself (Abed, 2007; Hamad, 2009). Most organizations within the health system lack clearly defined organizational structures, which regulate the relationships and information flow among people and departments (PNGO, 2009). Instead, most organizations follow strongly centralized command and control systems resulting in a predominant club culture with little workers involvement in the decision making process (Hamad, 2009). These practices exactly promote the development of the contradiction of an evidence based culture.

Feelings of lack of ownership, loss of motivation, lack of team work, loss of valuing professionalism and increased communication gaps between top management and the field could be the logical consequences.

Health information system

Different bodies are involved in generating of health statistics and other health related information on a national basis. Since its establishment the Palestinian Health Information Centre (PHIC) collects health related data that include vital statistics and clinic- based data, and publishes an annual report "Health Status in Palestine". PCBS collects and compiles demographic data and conducts health surveys. The UNRWA has an effective surveillance system for the main infectious diseases and issues a monthly epidemiological bulletin describing the main trends in this regard. Other UN agencies such as WHO or the UN Office for Coordination of Human Affairs (OCHA) provide important web-based information like digital maps or the 3Ws mapping system of health and other organizations.

Despite all efforts made by the different stakeholders there are still huge needs for improvement of the existing HIS especially in terms of comprehensiveness and integration of all players (MOH, 2008). Many providers, NGOs and International Agencies are collecting and analyzing data for monitoring purposes of their own programs and activities, resulting in a scattered and sometimes inconsistent and contradictory flow of information. For instance, differences in the denominator definitions between MOH and UNRWA results in significant variations in the estimates of major health status indicators such as infant mortality. Data collection, analysis and reporting capacities at central and district level remain insufficient (Mataria, et al, 2009). The data scarcely supports national planning efforts, policy development, research and evaluation (MOH, 2008). Obvious weaknesses are seen in the areas of surveillance of non-communicable diseases, human resources data, nutritional status, national health accounts, and prevalence of risk behaviors (Abed, 2007; MOH, 2008; Mataria, et al, 2009). The existing HIS is not capable to produce reliable periodic reports routinely and timely.

1.8 Operational definitions

Health Information System (HIS)

The integrated efforts to collect and process health data and transform them into information and knowledge for the use in decision making and policy implementation at all levels of health services in order to improve their effectiveness and efficiency (WHO, 2000).

Health Management Information System (HMIS)

HIS designed to assist the monitoring, management and planning of a specific health program (WHO 1993 as cited in WHO practical guide for developing countries, 2004a).

Decision making

It is the process of arranging and rearranging of information into a choice of action (Gelatt, 1989).

Evidence–based decision making

The term Evidence-based decision making refers to the systematic use and application of the best available information to evaluate all available options for clinical, managerial and policy setting decision making (Canadian Health Services Research Foundation, 2000).

NGOs

NGOs are the third major health provider in Palestine; consisting from Palestinian non-governmental organizations registered at the Ministry of Interior and authorized to provide non-profit based health services. NGOs in Gaza are primarily engaged in developmental and/or humanitarian actions, serving vulnerable population through community oriented approach.

Hospital

A hospital can be defined as an organized effort to provide a specific set of medical services, usually physically located in one or several buildings, and related to specialized cure (diagnosis and treatment) and care (as opposed to the primary care level) with the input of health professionals, technologies and facilities (WHO, 2003).

Primary Health Care Centers (PHC)

They are community based centers that share some common characteristics. They operate on an outpatient basis, often the first point of contact with the health care system, tend to be located near where their target population lives and, in general, they provide more low-tech than high-tech diagnostic and treatment services (WHO, 2004b).

Management

The process, through which efforts of individuals in the organization are coordinated, directed and guided towards the achievement of organizational goals (Mullins, 2005).

Perceptions

The dynamic and complex way, in which individuals receive information from the environment, interpret and translate it in a way that results in a specific pattern of behavior or thoughts (Mullins, 2005).

Chapter 2

Literature Review

In this chapter the researcher illustrates the study's conceptual framework with orientation to the reported domains about the investigated topic in the body of the literature. Then, a comprehensive review of the studied literature is presented regarding HIS concepts and values, its components, contextual determinants, assessment tools, improvement strategies, the current situation in the Gaza Strip as well as other developing countries.

2.1 Conceptual framework

Many efforts were done in the recent years to develop frameworks for HIS strengthening. One important framework was formulated by WHO (2006), which is divided in HIS components & standards; and the roadmap for implementation. The HIS components are HIS resources, indicators, data sources, data management, information products, and dissemination and use of information.

Lippeveld et al. (2000) emphasized that the development of HIS is exclusively associated with best management of their components including selecting appropriate indicators, data collection, transmission, processing and analysis, which all lead to information use. They assumed that if senior managers provide needed resources and develop appropriate rules and procedures the HIS will be functioning. However, increasing evidence showed that several HIS do not produce the intended results despite all managerial efforts and allocated resources (Aqil, et al., 2009). In response to this discrepancy, Lafond and Field (2003) developed a framework considering the effects of contextual factors on the system. They stated an operational definition for the performance of HIS, which will be also adopted in this study, as improved data quality and continuous use of information. It was proposed that HIS performance is influenced by three categories of contextual determinants: technical, behavioral and environmental/organizational. The framework was later called PRISM framework (Performance of Routine Information System Management).

The following framework which was adopted from all models mentioned above and modified by the researcher, describes the main aspects and components of the study. The adopted approach has considered the main determinants influencing the HIS performance; the technical; environmental/organizational; and behavioral factors. To acquire a comprehensive view of the situation the researcher tackled different perspectives of the topic. Organizational facts were considered (quality of facts) in addition to individuals' perspectives (quality of perceptions). This approach helped explore the different dimensions of this complex topic and thus strengthened the scientific rigor of the study and its findings. The main aspects of this framework will be following briefly described.

The main factors that affect the domains of the study include; demographic and work related characteristics. HIS components affected by these factors and addressed by the study include HIS resources, performance indicators, data sources, data management, information products & information dissemination and use. Contextual determinants including behavioral, organizational and technical determinants were incorporated within the aforementioned HIS components. Additionally, other decision making influencing factors were also addressed.

Behavioral determinants include: individual attitudes and skills regarding the use of data, awareness about the utilization of HIS in addition to the influence of demographic and work related factors like gender, type of work and managerial level on the use of information. Variations in reference to these factors are recognized for having effects on the use and utilization of HIS.

Organizational determinants cover: the existence of information culture, rules, the process of information flow among the organization and the extent of its utilization and the available allocated resources.

Technical determinants address: the use and quality of performance indicators, data quality, the use of information and communication technology and individual HIS related competencies.

HIS resources: include competencies of available human resources and their capacity building activities, infrastructure, information policies, information and communication technology and coordination mechanisms within the system.

Performance indicators: include the existence of a well defined set of performance indicators and the main domains of health information that are covered by those indicators. The study also addresses the quality of the used indicators regarding simplicity, affordability, representativeness, reliability, consistence with local & international standards, the frequency of their measurements and their evaluation criteria.

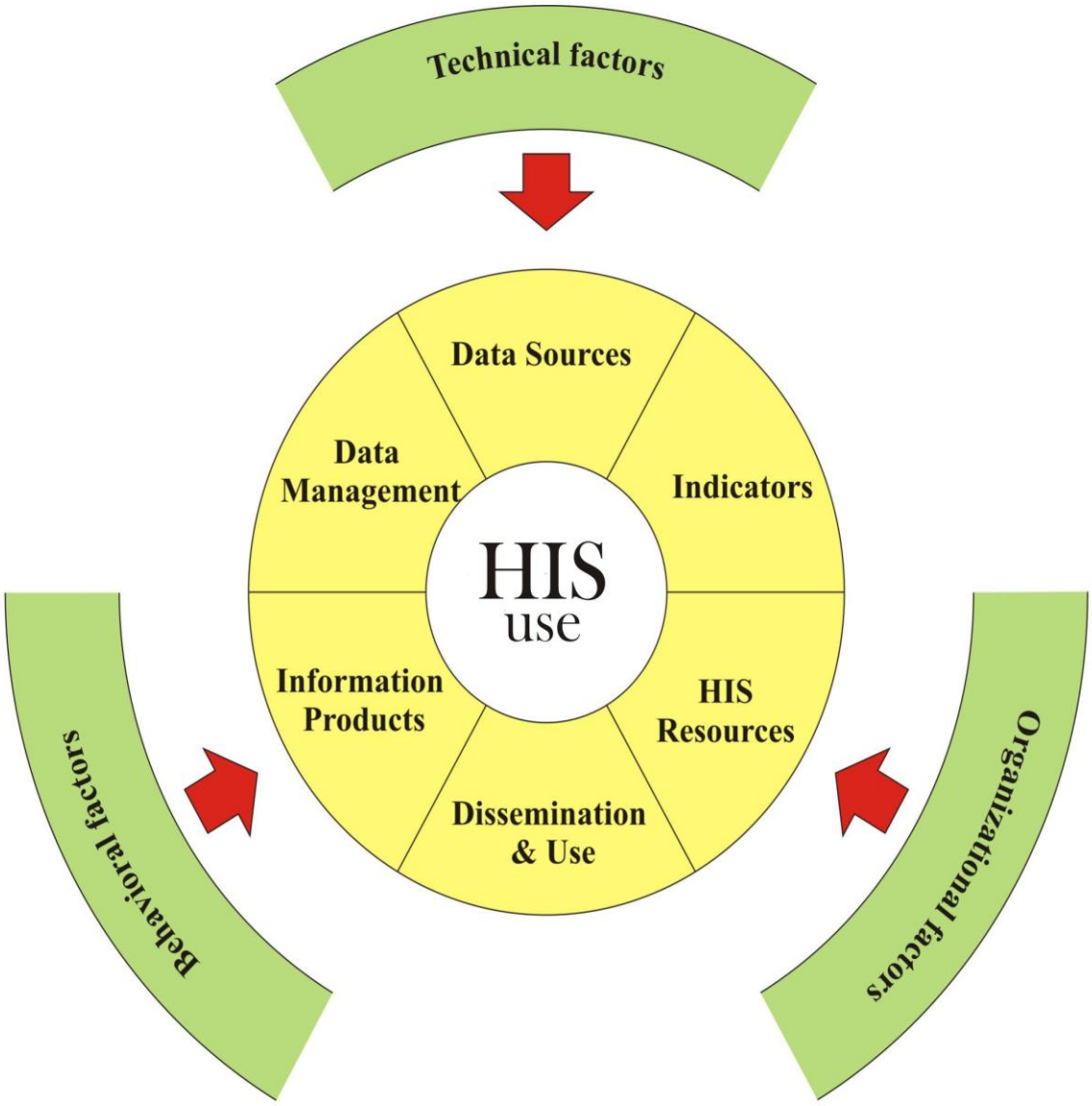
Data sources: include internal data sources in form of routine reporting practices in addition to external data sources including the use of community based needs assessments, published research studies and population projections.

Data management & data quality: include different aspects of data management from quality assurance, to analysis and speed of access. The quality of data was assessed regarding accuracy, timeliness, and periodicity, completeness of reports, disaggregation and consistence of data.

Information products: include the extent of information presentation in user friendly formats like graphs and maps; the quality of data storage; and level of information share and discussion among NGOs.

HIS dissemination & use in decision making: include the methods of internal and external information sharing of HIS products, the level of information use and main areas of use in addition to the common perceptions and organizational culture regarding the use of information in decision making.

Other factors affecting information based decision making: include the existence of a documented structure with clear authorities, the centralization level in decision making, the existence of evidence base supporting organizational culture, the transparency levels in decisions, barriers to the use of information in decision making and other factors affecting decision making at NGOs.



Conceptual framework

Figure 2.1: Conceptual framework

2.2. HIS concept and definitions

Health information is a broad concept which includes all types of data necessary for decision making, evaluation and planning at all levels of the health care system (WHO, 2000). The scope of this information includes epidemiological, financial and managerial, vital statistics as well as health services related data. The spectrum of information use ranges from setting priorities for strategic planning, to clinical diagnosis and management of illnesses, quality management of services, prevention and control of epidemics, human resource management, commodity management, and program evaluation and research (Stansfield et al. 2006). It is worth mentioning that health information needs vary according to their users' levels and the same could be said to their tools of collection (WHO, 2008a). For instance, health practitioners at peripheral levels need information about patient care, facility management or drug supply and use facility registers and log books to have access to these information. On the other hand, health managers need information about the overall performance of health facilities, budgeting and auditing, service quality and coverage and they use facilities summary reports to acquire these information. National policy makers need more aggregated summary indicators about disease burdens and available resources to develop policies and programs. They use national or regional summary reports to obtain this information.

HIS is considered as one of the fundamental six blocks of any health system (WHO, 2010b). Lippeveld (2001) described it even as the "glue" holding the health system together and the "oil" keeping the health system running. It has four key functions: data generation, compilation, analysis & synthesis, and communication & use. The word "system" implies a connected or organized process but this is rarely the case in real world (Abu Zahr & Boerma, 2005). Actually, it is the result of a complex interaction between demographic, socioeconomic, cultural, managerial and legal contexts. Besides, the word "health information" implies that information comes from the health sector only. In fact, the information needs go beyond the health system itself to other information needed and collected from different sectors including information about socioeconomic, environmental and behavioral determinants of health (Williams, 2005; Macfarlane, 2005).

A well functioning HIS collects data from the health sector and other relevant sectors, analyses the data and ensures their overall quality, relevance and timeliness, and converts

data into information for health-related decision-making (WHO, 2010b). Its ultimate goal is the production of information used for decisions and policies that finally have real impact on the health system or on the general health status. The performance of the HIS is measured against these outcomes rather than the quantity or quality of produced data (RHINO, 2003; WHO, 2006). HIS is sometimes equated with monitoring and evaluation. Actually, as much it is essential for monitoring and evaluation, HIS also serves broader scope of tasks including as an alert and early warning system, supporting patient and health facility management, enabling planning, supporting and stimulating research, permitting health situation and trends analysis, supporting global reporting, and facilitating communication of health challenges to diverse users (WHO, 2010b).

Some authors use the term information infrastructure in its broader sense, meaning the technological and human components, networks, systems, and processes that contribute to the functioning of HIS (Braa, et al, 2007). Different sources in the literature also equally use terms such as health management information system (HMIS), routine health information system (RHIS), management information systems (MIS) or occasionally Health Information System (HIS) referring to the institution–based health information (WHO, 2008a). In correspondence with the HMN Framework and in order to avoid confusion, the term "HIS" will be used by the researcher exclusively to describe the total information system, incorporating both population-based and institution-based data sources.

2.3 Value of HIS

The global advancement in medicine and the rapidly increase in the health service sophistication in the last decades have obviously increased the demand for adequate health information to support both clinical and managerial decision making. Health managers and policy makers increasingly demand information to measure the effectiveness of their implemented programs and track progress towards the goals that have been set. Donor agencies are placing more emphasis on performance-based release of funding and therefore require increasing amounts of quality information.

Thus, investing in HIS would be justified at different levels as it will help decision makers detect and control health problems; monitor progress and promote equity. It would

empower individuals and communities with timely understanding of health related issues, as well as strengthening evidence based health policies, improving their evaluation and ensuring accountability (WHO, 2009).

2.4 HIS components

2.4.1 HIS resources:

The scope of HIS resources is wide ranging from information policies and regulations, financial & human resources, infrastructure, logistic support, information and communication technology and coordination mechanisms within the system (WHO, 2006). It is needless to say that all these kinds of resources are essential for improved HIS functioning. For instance, well developed regulatory and legal framework will enable the establishment of mechanisms to ensure data availability, quality and sharing. Additionally, any HIS improvements cannot be achieved without well qualified and trained human resources at all levels of data use. Furthermore, information and communication technologies could significantly improve the availability and dissemination of health information, quality of data collected, timeliness, analysis and use of information. Some authors described information technology as the engine for HIS development (Aqil, et al, 2009).

2.4.2 Performance indicators:

The term "healthcare performance indicators" refers to quantitative or qualitative information which reflect directly or indirectly the performance of the healthcare system (Boyce, 2002). They have four basic functions; facilitating accountability; monitoring health care systems and services; modifying the behavior of professionals and organizations at both population & individual levels; and forming policy initiatives (Bankauskaite and Dargent, 2007). Both, indicators' definitions as well as the main domains of health information covered by them, vary according to different stakeholders and their different information needs and demands (Abu Zahr & Boerma, 2005; WHO, 2008a). However, main used health indicators include; health determinants indicators like socio-economic, environmental, behavioral and genetic factors; inputs indicators including available infrastructure, facilities and equipment, costs, human and financial resources.

Additional domains are performance or outputs indicators such as availability, accessibility, coverage of services, quality and use of services, responsiveness of the system to user needs, and financial risk protection; health outcomes indicators like mortality, morbidity, disease outbreaks, disability, wellbeing; and health inequities indicators (Abu Zahr & Boerma, 2005; WHO, 2008a). As the scope of indicators users ranges from healthcare funders to providers and consumers with different perspectives and expectations, the indicators development must take these differences into account (Ibrahim, 2001). Their reporting frequency and evaluation criteria should be adapted to those differences. However, the indicators definitions must meet international technical standards and they should be valid, reliable, specific, sensitive and affordable to measure. For some important indicators, there may be no suitable data source, in which case a proxy indicator may be used (WHO, 2006).

2.4.3 HIS data sources:

The different data requirements necessitate the use of different sources for data collection. It is important to match data sources and collection with the performance indicators that need to be measured and they have to be included in the indicators' operational definitions. The literature describes two major kinds of data sources; the population-based sources including census, vital statistics and population surveys and secondly the health service-based sources including individual health and disease records, service records and administrative & resources records (WHO, 2006). The second edition of the HMN framework mentioned additional data sources that could be used like health surveys, research, and information produced by community based organizations (WHO, 2008a). Modeling, estimates & projections, national health accounts or behavioral surveillance were also mentioned as considerable data sources (Abu Zahr & Boerma, 2005). Some authors argued that household and facility surveys yield better quality information than the routinely reported institution based information because of more objectivity and less bias (Aqil, et al, 2009).

Facility-based sources provide information about morbidity, mortality, quality of services provided, commodity & financial management and human resources. Such information is generally routinely generated during recording and reporting of services delivered so that these data sources are most suitable for measuring inputs, process, outputs and to some

extent outcome health indicators. On the other hand, population-based sources provide important information on determinants of health, the general health status and to some extent the health outcomes (WHO, 2008a). It is worth noting that no single data source can provide all information required for planning and management of health services so that triangulation of data sources is always recommended (Lippeveld, 2001).

2.4.4 HIS data management & data quality:

Data management is a complex process and covers different activities related to data collection, storage, quality assurance, processing, compilation and analysis. This process has the function to collect needed data and transform them into useful information. Standards of data quality include timeliness, periodicity, consistency, transparency, representativeness, disaggregation, confidentiality and controlled access (WHO, 2008a). Procedures to ensure data quality include; reducing the amount of collected data to the minimum necessary; regular data quality control; clear definitions of data elements; up-to-date training of data users; and frequent feedback to those collecting or producing data (WHO, 2006). The HMN framework provides an ideal picture of successful data management, by which data from different sources is incorporated in a central data ware house, where thorough analysis takes place and actions are taken based on the results of that analysis.

2.4.5 HIS information products:

Raw data have little value until transformed into useful information and knowledge. The component of information products refers to transforming data into information presented in user friendly formats for decision making. The HMN framework depicts the relation between data and decision making in the form of a cycle beginning with raw data that after cleaning, organizing and analyses will be transformed into information. After its evaluation and integration with other information it becomes evidence. When communicated and disseminated to decision makers in a form that changes their understanding it will become knowledge. This knowledge can then be applied and implemented in form of actions that finally have impact on the monitored indicators resulting in new data (WHO, 2008a). Actually, it is not always needed to undergo this cycle at all levels. Preliminary analysis of data could be sufficient to provide useful information for use at the operational level such

as for monitoring purposes (WHO, 2006). At the same time, this low-level analysis of raw data requires appropriate basic analytical skills and tool-kits. Higher level analysis, where data from different sources are compared and compiled into useable statistics, are usually used for policy setting and strategic planning. Therefore, comprehensive analysis, interpretation and advocacy actions are needed that require appropriate formatting, communicating and dissemination of processed data for decision makers (WHO, 2008a).

2.4.6 HIS dissemination & use in decision making:

As the scope of HIS use in decision making is wide, the dissemination of HIS products should vary according to the characteristics of HIS users. Careful selection of the appropriate information format, channel of communication and timing of information dissemination is needed to ensure effective use of information (WHO, 2008a). Additionally, encouraging the development of information culture with increased information demand will promote the use of information in decision making (Aqil, et al, 2009). This requires increased access of decision makers to timely and relevant information, removing behavioral and organizational constraints for their use, providing incentives for the use of available evidence in decision making and linking information to actual resource allocation (WHO, 2006). The information use in decision making can be also institutionalized by indicator driven planning and increased performance-based accountability.

2. 5 Factors affecting information based decision making

Decision making process in real world organization is not influenced by the information available alone. Other factors like budgets, ideologies, community - & other interests, political instabilities, donor agendas or media pressure may link the decisions away from responding to the available information (WHO, 2000). Thus the evaluation of the use of information based decision making should refer to the degree of information recognition and consideration in decision making process (Canadian Health Services Research Foundation, 2000). The purpose of use of evidence in decision making is not to minimize options; rather it is to assist decision makers in choosing the option that most likely would have the most improved health outcomes by the least effort, cost or risk (Clancy & Cronin, 2005).

Lack of access to information remains a major barrier to knowledge based practice in developing countries (Godlee, et al, 2004). Poor HIS management and under resourcing are responsible for its poor performance. Less than 10% of health research funding is targeted to the health problems that account for 90% of the global disease burden (Godlee, et al, 2004). This (10/90) gap is primarily responsible for the lack of access to relevant health information. Lack of leadership, time to gather, analyze or evaluate the information and lack of appropriate, up to date information are also important barriers for the use of information in decision making (Brownson, et al, 1999). Additional barriers are lack of awareness of what is available, lack of time and incentives to use information, lack of interpretation skills and low motivation to demand information due to poor working conditions, long term professional isolation and lack of reading culture (Godlee, et al, 2004). Mataria et al (2009) additionally suggested resistance to change, feeling of lack of ownership, lack of effective partnership with those who are supposed to use the information and the almost absence of effective dissemination of results as the major barriers to promote a culture of information in the Palestinian health system. In order to improve HIS performance Godlee, et al (2004) suggested three recommendations: improved access to essential information for health professionals, improved connectivity, which is vital for efficient information flow and finally addressing significant problems. This might include inadequate power supply, lack of computer equipment and information technology support, lack of computer skills and the resistance to use technology among health professionals.

An interesting hypothesis was made by Chambers, et al (2002), which referred the limited use of information based decision making in health organization to the poor knowledge & competencies of public health managers in the core concepts of epidemiology. They stressed that epidemiological concepts became essential for the decision making in different health related areas including monitoring trends; developing policies and programs to manage health risks; improve the understanding of health determinants, evaluation of health policies & programs and demonstrating accountability; and facilitating research. According to the authors improving the core epidemiological competencies among public health practitioners will enormously enhance their abilities to make information based decisions.

2.6 HIS contextual determinants

Lafond and Field (2003) argued that understanding the function of HIS cannot be achieved without considering the context in which it operates. They developed their PRISM framework based on the three contextual determinants of HIS namely; technical, behavioral and environmental/organizational determinants. Their main idea is that an efficient HIS should have different components that work together in harmony. To achieve high quality data it is essential to have highly motivated and confident staff who routinely conduct data quality checks, a supportive information valuing culture and organizational leadership, policies and resources that promote the use of information. If there is a gap in any of these components the HIS would not achieve the desired performance.

2.6.1 HIS behavioral & socio-demographic determinants:

HIS users' confidence, motivation, competence to perform HIS tasks and their awareness about the utility or outcomes of these tasks will significantly enhance the quality of produced data and the culture of information use. People need to see the task as challenging rather than overburdening and with some problem solving skills they will perform the task accordingly (Aqil, et al., 2009). However, motivating HIS users remains a challenge despite all training and other capacity building efforts (Rhino, 2003). Cultural, demographic and work related factors proved to affect the individual perceptions towards the use of HIS. Although it was found that gender had little to no influence on the perceptions of HIS users, age and educational level seemed to have significant influence whereas elder higher educated revealed more positive attitudes towards the importance of the use of modern HIS but with less readiness to accept change (Shorafa, 2004). It was also found that people with purely administrative jobs had more positive attitudes towards the use of HIS than the "technical" people (Shorafa, 2004).

2.6.2 HIS technical determinants:

HIS overall performance is influenced by all factors related to the specialized knowledge and technology to develop, manage and improve HIS processes and performance (Aqil, et al, 2009). They include development of indicators, designing data collection forms, preparing procedural manuals, use of information technology and software for data

processing and analysis. If indicators are irrelevant, data collection forms are complex and if computer software is not user friendly it will negatively affect the confidence and motivation of HIS users. If software does not process data properly and in a timely manner it will also hinder the effective use of information. Due to the recently increased use of computerized information & communication technologies the researcher will discuss this issue following in more details.

Indeed, there is a tendency among health managers to use modern information & communication technologies to improve the organizational performance despite of its high price burden. Blaskovich and McAllister (2007) had explained that managers implement these technologies in their organizations for four reasons. Improved decision making process with more consistency in the decisions and improved judgment capabilities was mentioned as a first reason followed by improved financial outcomes and efficiency by reducing the decision making time, level of required staffing, and operational costs. Additionally, they mentioned improved communications by timely dissemination of information and providing a standardized language for all users of the system and improved learning and training opportunities and share of knowledge and expertise among the organization.

The last point supported the findings of Jessup & Valacich (1996) about the use of information technologies to enhance the organizational learning and the resulted continuous quality improvement and competitive advantage for the organization. Another benefit of the introduction of modern information technology is to minimize the total spending on health. The higher U.S. spending on health than the other countries of the Organization for Economic Cooperation & Development-OECD (15% of GDP in USA vs. 8% of the median GDP in other OECD countries) was partially referred to the U.S reluctance and delay in introduction of such systems (Anderson, et al, 2006).

On the other hand, findings of other studies showed that the introduction of such technologies is not always the best and exclusive solution to HIS strengthening. Without consideration of other determinants, technology alone would not give the expected performance (WHO, 2009). An interesting study of Weir, et al (2006) depicted the role of organizational barriers such as rigid structures or high degree of centralization to impede the role of technologies in HIS strengthening. Lippeveld (2001) suggested that lack of

appropriately trained staff and problems at the hard- & software could result in the obsolescence of expensive computer equipments, without any gains in decision making. He added also that culture related personal attitudes like feeling threatened by the use of automated systems could inhibit the supportive role of Information Technology (IT) in strengthening HIS systems. That was supported by the findings of Alvarez (2004) who investigated the impact of introduced modern IT systems in the public health facilities in Ecuador and found that these systems hindered the decentralization process at the district level and created a lot of destructive conflicts. He suggested that the implementation of such systems should strongly consider the motivation and interests of intervening stakeholders, particularly the end users at local levels, and embrace the participatory approach and the orientation towards developing people rather than technology.

2.6.3 HIS environmental & organizational determinants:

These include management support, level of supervision, allocated human and financial resources, rules & procedures, organizational structure & culture and leadership. Collective values and shared culture will shape the performance of the system. Therefore it is crucial to develop a "culture of information" to improve the HIS performance. Such a culture is indicated by valuing information and information quality as critical components for decision-making, continuous demand for additional information to fill in gaps and regular use of information in strategic and operational management (RHINO, 2002). Even well designed information systems fail to change information management practices where the culture within the health system does not support evidence-based decision-making. Environmental factors are related to the external environment under which every HIS works and has little control over and therefore considered to be constraints that the HIS has to overcome (Aqil, et al., 2009).

2.7 Impediments of the progress of HIS

In practice HIS rarely function systematically. Usually they are complex, fragmented and unresponsive to needs (Abou Zahr & Boerma, 2005). Most reviews and assessments of HIS worldwide showed that there is a gap in the links between producers, consumers, and users of different types of health information with duplicated and overlapped information at the one side and gaps in important health information at the other side (WHO, 2009).

Financial investments are unlikely able to achieve the desired results alone unless accompanied by strong political support, developing a culture that values the use of information, broad inter-sectoral involvement and improving the basic system fundaments such as coding, reporting and routine record keeping (DFID Health Resource Centre, N.D). Indeed, experience in many countries shows that HIS funded by donors yielded to fragmentation the system in separate vertical information systems focusing on particular disease or programs (Abou zahr & Boerma, 2005; WHO, 2008b). Currently, vast amounts of data are collected but a small proportion is synthesized, analyzed and used yielding to imbalances between demand and supply of health information. Lack of shared standards for data collection means that the same data are often collected and reported many times through different structures, while at the same time important data do not get reported (Braa, et al, 2007). The larger are the gaps between system design and contextual realities, the greater the risk of system's failure. When behavioral aspects of users, cultural differences between countries or differences between private and public sectors poorly considered then the system is more likely to fail in some way (Heeks, et al, 1999). The alliance for health policy and systems research (2008) highlighted that HIS is a neglected area of health system research, which partially reflects the general under-investment in this field.

Other problems related to the use of computerized information systems in developing countries were also mentioned in the studied literature. These included the lack of adequate electricity supply, lack of computer infrastructure, lack of or unsustainable funding, and inadequate training of the primary users of the systems (Malik & Khan, 2009). Idowu & Cornford (2008) identified the government's lack of appreciation of the value of IT in healthcare, high cost, poor internet connectivity, and lack of maintenance culture as further obstacles.

2.8 HIS in developing countries

HIS in many low- and middle-income countries tend to be "data-rich" but "information-poor" (Alliance for health policy and systems research, 2008). Williams (2005) described the dilemma of developing countries as he highlighted that solid statistics are most needed at those countries with weakest information systems. In countries like India or Ethiopia the systems lack of capacities to gather, integrate and analyze data particularly among health

care personnel at lower levels. The systems are predominantly paper-based with parallel reporting channels causing increased workload, wasting of time and low quality of produced information (Vital Wave Consulting, 2009). Too often, lower level managers are required to report vast quantities of data to higher levels but rarely receive any feedback. At the same time, the information overload at higher levels implies that the data are in practice rarely used effectively (Abu Zahr & Boerma, 2005). On the other hand, little attention is given to information needed to improve service on the operational level which is largely associated with culture related assumptions that individuals at these levels do not need such information. The irrelevancy and poor quality of data were referred according to Lippeveld (2001) to lack of consensus between producers and users of data at each level of the health system. Care providers receive little training in data collection methods, and they have rarely standardized instructions on how to collect these data. Additionally, highly centralized data processing and analysis, mainly the responsibility of centrally located offices, yield that by the time feedbacks are received at peripheral level the information is mostly obsolete for decision making. The result is that information use is weakest at the level, where the main health interventions take place (Lippeveld, 2001). Poor and inadequately used HIS infrastructure and fragmentation of the systems are also considered as main reasons of the poor performance of HIS in developing countries (Lippeveld, 2001).

However, an analysis of the health information landscape in different developing countries suggested that some countries like China and Brazil are shifting from the conventional paper-based model to systems, where health data is used not only to inform policy but also to improve care at the point of service (Vital Wave Consulting, 2009). Web-based disease surveillance systems and Geographic Information System (GIS) mapping were increasingly introduced providing real-time reports for early detection and intervention activities that significantly enhanced the effectiveness of the systems. Decentralized HIS systems provide timely information on the utilization of services and the evaluation of implemented programs for different types of users including medical & administrative staff, health officials and planners (Vital Wave Consulting, 2009). According to the same source this progress is not just a result of improved technology but also implies improved commitment to the use of health information in decision making.

Recent assessments of HIS in some Arab countries showed that these systems have obvious strengths in the use of indicators and in the information products. On the other hand, core indicators are not necessarily defined in collaboration with all key stakeholders and experts (Yemen MOH, 2009). Also, these systems suffer from severe problems in the areas of data quality & management and in the poor use of HIS in decision making (Syrian MOH, 2009; Yemen MOH, 2009; Sudan MOH, 2007). Big shortages in the area of developing HIS policies and regulations and lack of trained personnel, particularly in statistical and analytical tasks, were also reported (Sudan, 2007). It is worth mentioning that the use of HIS in decision making was weakest by the implementation & monitoring of health programs. Highly centralized management systems, numerous vertical information systems focusing on particular diseases or programs and the dominance of facility based information contribute to the low quality of produced information.

To sum up the main HIS challenges in developing countries include; inconsistencies between sectors in their data sources, operational definitions of indicators and reporting intervals; tensions between local data needs and central demands resulted from highly centralized systems. Furthermore, lack of harmonized data exchange between different institutions; shortages of trained staff, particularly at peripheral levels; and difficulties to create incentives for information use are additional barriers for proper HIS performance.

It can be concluded that ways to improve HIS in developing countries include: standardization the data collection and analysis process; building consensus about minimal needed set of collected data, automation data processing; decentralization of HIS management, validating data by triangulation of sources and introducing modern analytical tools in addition to enhancing the building of information culture by both producers and users of data. To bridge the transition phase from paper-based systems to computer-based infrastructure Braa, et al. (2007) suggested the development of flexible and adaptive standards that would work at two levels, at the technical level of software and at the service delivery level for data collection with paper-based systems. This type of standards will be increasingly needed in developing countries, where increasing rates of uncertainties are found.

2.9 Recent studies on the use of information in the health sector in Gaza Strip

Little was known about the extent of the use of evidence based decision making in health organizations in Gaza Strip, particularly NGOs. After reviewing the available literature the researcher found that till November 2010 no comprehensive assessments were made to explore this area until WHO took the initiative and organized an assessment of the entire HIS in the Gaza Strip as a part of the assessment of the national HIS in oPt (WHO, 2010c). Until writing this report the final results of this assessment were not available and thus it's detailed analysis. However, based on its preliminary results the assessment showed big gaps in the areas of data management, available resources and information dissemination & use in decision making (WHO, 2010c). The performance of indicators, data sources and information products was slightly over the satisfaction level.

In reference to other previous studies, the researcher attempted to provide clarifications for some aspects of the topic. For instance, Shorafa (2004) showed strong positive attitudes in MOH towards the necessity of introduction of computerized data base systems and broad confidence towards tackling information related tasks with these systems. In addition there is a broad consensus to the necessity to standardize data collection & entry, indicator definitions and reporting. Although this broad support is encouraging to initiate needed changes barriers like inadequately available resources, particularly the IT equipments and the available technical support, delayed computerization of the systems till now (Shorafa, 2004).

Although a culture of information and the learning organization are internationally recognized concepts for stimulation of organizational lifelong development, a recent study revealed that MOH is far away from implementing the learning organization dimensions (Shalaby, 2009). According to the same source the most dominant learning style among MOH managers is habits that could be characterized as "Blind Automation Syndrome", which is an indication that the use of information, as an essential tool in the organizational learning and team learning process, is very poor. On the other hand, Yaghi (2009) showed that there is a commitment among most NGOs in Gaza strip towards the use of information based planning as the majority of studied NGOs follow conducting need assessments and community involvement in setting their strategies. However, the use of performance indicators is still in general not well developed which minimizes the ability to monitor

performance or hold managers accountable for their efficiency or quality of care (Hamad, 2009).

An interesting study conducted by Al Ghareeb (2009) showed that the majority of managers in governmental hospitals did not receive any management related training. The only few who claimed to have some training in this regard perceived it as inadequate. Consequently, this yielded low general knowledge and awareness towards their responsibilities and tasks that need to be accomplished and the best methods to do this. Training in information management was strongly recommended as one of the top training priorities (Al Ghareeb, 2009). Besides, lack of policies, rules and regulations and lack of clear job descriptions that remained most important management problems were additional barriers to appropriate functioning of HIS. Yaghi (2009) revealed also that communication and information sharing within NGOs still follow traditional patterns in form of written reports and individual meetings with little utilization of modern communication tools such as the use of e-mail.

2.10 HIS assessment tools

After review of the available literature the researcher found a universal consensus that HIS assessment tools were designed to evaluate national HIS performance. Country information system performance can be assessed either through independent expert evaluation or using a self-administered tool (WHO, 2010b). The disadvantage of individual assessments is that countries may not agree with their findings and therefore may not use the results for developing an improvement strategy. On the other hand, the self assessment approach has the major advantage of the generation of country ownership that enables the assessment to serve as the basis for developmental plans. However, self assessment approaches are generally time consuming and complex to implement and are less likely to generate results that can be compared over time or between countries, and are more likely to be biased.

The process of the self assessment engages both data producers and data users and seeks to initiate effective communication both among national health information bodies (the "information providers"), and with the user community (the "care providers"). Based on the result of the assessment, countries develop comprehensive improvement plans for their

HIS and those results serve as baseline data against which the performance of HIS improvement plans is later measured (WHO, 2010b).

The HMN assessment tool is one of the most used self assessment tools. More than 50 countries completed their HIS assessment by the end of 2009 using this tool (WHO, 2010b). The assessment is aligned with the HIS standards described in the HMN framework. It should cover all subsystems of a national HIS including different sources of health-related data. It addresses the resources available (inputs), its processes and outputs including data sources & data collection methods, used indicators, data management methods and produced information products in addition to HIS outcomes in terms of data availability, quality and use (WHO, 2008b). Broad inter-sectoral stakeholders' participation is required in assessing the national HIS and planning for its strengthening. Stakeholders include health departments' managers; health financial managers; clinicians; representatives of statistical offices; civil society; donors; officials in government ministries and agencies; NGOs; academic institutions; professional associations; other users of health-related information such as parliamentarians; and the media (WHO, 2008b). The broad stakeholders' engagement helps develop a shared vision of a more coherent, integrated, efficient and useful system. The tool could enhance collaboration among various stakeholders in health information in addition to improve the general understanding of the HMN framework. However, due to the high degree of stakeholder involvement required this approach seems to be time consuming and complex to administer.

Similarly, the PRISM framework has resulted in developing four tools to measure routine HIS performance including; RHIS performance diagnostic tool; RHIS overview tool; RHIS management assessment tool; and the organizational and behavioral assessment tool (Aqil, et al, 2009). The RHIS performance diagnostic tool specifically measures HIS process, the promotion of a culture of information, supervision quality and technical determinants. The RHIS overview tool considers information from different levels and examines their interactions and overlaps. It also identifies redundancies, workload, fragmentation and level of integration. Additionally it provides information on the complexity and user-friendliness of HIS products. The RHIS management assessment tool is designed to assess different HIS management functions such as governance, planning, training, use of performance improvement tools and finance. In other words, it measures the organizational

determinants within the PRISM framework. Finally, the organizational and behavioral assessment tool addresses behavioral factors such as motivation, confidence levels, task competence, data demand and problem solving skills. Additionally, it measures some organizational variables like the promotion of a culture of information.

Different data collection methods are used to conduct the aforementioned assessments including interviews, observations and self-administered questionnaires (Aqil, et al, 2009). Although this approach proved to produce reliable results in many countries, it shows, similar to the HMN- assessment tool, a high level of subjectivity. To bridge these "perception" gaps both approaches use nowadays validating processes to minimize bias.

2.11 HIS implementation & improvement strategies

International initiatives such as "health for all by 2000" or the Millennium development Goals (MDGs) raised the needs for comprehensive HIS that could provide reliable indicators to track the progress towards the goals of such initiatives. Although HIS improvement is a priority for every country, particularly for low-income countries, it is clear that it is not the only priority. HIS developing strategies need to be set within the context of national development plans of other statistical systems (Williams, 2005). Because in a low-income country, such as Palestine, resources are scarce and health problems are complex and because nowadays developing countries need better information to receive external aids, it is crucial to develop strategies to HIS improvement in the Palestinian context. It is known that HIS improvement need resources, but it is also known that Palestinians cannot afford the current costly duplication, inefficiencies and inconsistencies between institutions in the collection, analysis, reporting, storage and analysis of data. However, investing in HIS development seems to be cost effective given that the costs for a comprehensive HIS have been estimated to be in the range of US$ 0.50 (for low-income countries) to US$ 3.00 (in middle-income countries) annually per capita (Rommelmann, et al, 2005). The cost-effectiveness of such HIS improvement could be very high for the Palestinian context taking in consideration that the per capita expenditures for health are over US$ 100.00 annually (MOH, 2010). These figures could be encouraging for health policy makers to think not about the necessity of HIS improvement but about the best strategy for improvement and methods of its

implementation. However, the next paragraphs will discuss such possible strategy in more details.

To improve HIS in terms of data availability, quality and use some interventions are needed that capable to address the "determinants of performance" described by Lafond & Field (2003) namely the technical; behavioral; and organizational/environmental determinants as aforementioned. The power of motivation of people, their attitudes and perceptions on the HIS performance was intensively discussed in the studied literature. Particularly the support of senior managers was suggested to be essential for developing a culture of information use, transparency and accountability (WHO, 2008a).

The HMN framework (2008a) described some guiding principles to undertake an improvement strategy of national HIS. For instance, promoting people's empowerment, leadership and ownership are necessary to sustain gains. Raising awareness among different stakeholders that routine use of HIS in decision making is associated with better health outcomes, and focusing on the local needs would enormously enhance building a broad-based consensus which is essential because addressing some health issues requires multi-sectoral involvement. Inter-sectoral linkages between health, social, environmental and economic sectors are essential for sustainable development (Macfarlane, 2005). Usually, there are always some existing positive HIS functions or initiatives, and therefore it is recommended to build on these positive points by supporting strengths and correcting malfunctions rather than beginning from zero. Finally it should be known that HIS strengthening is a long term process, so that long term planning is required but with focusing on producing some tangible results and building on the momentum for longer term strategic issues. This incremental approach is essential to encourage people and increase their overall commitment.

Based on these principles the framework developed a five – phases approach to develop and strengthen national HIS including assessment of the current system; coordination & leadership; planning & priority setting; HIS implementation; and monitoring & evaluation (WHO, 2006). However, the assessment and coordination & leadership phases seem to interact together and take place simultaneously. Accordingly, the new version of HMN framework has shortened the approach into three phases; leadership, coordination and assessment; priority setting and planning; and implementation of HIS strengthening

activities (WHO, 2008a). However, both versions recommend the same actions in the same sequence for the implementation of the process.

In the assessment and coordination & leadership phase a consultation & coordination mechanism should be established that brings together all key stakeholders including different ministries, research institutions, NGOs, donors and other support groups. Following, a steering committee has to be formed to provide oversight and coordination of HIS strengthening activities. Identifying of team leadership is needed to lead the process and to gain political commitment. Undertaking a comprehensive assessment of the current situation with broad stakeholder involvement is then required. It should cover all HIS components and consider its different performance determinants. Once conducted, it should serve as a baseline against which the future progress should be evaluated (WHO, 2008a).

The planning & priority setting phase requires building consensus on a shared vision and goals of HIS. At this stage operational definitions for minimum standards of data availability, timeliness and quality have to be set including identifying key indicators and their best data collection methods to minimize later conflicts and misinterpretations. Next step will be agreeing on the strategic actions needed to achieve the shared vision. This requires prior prioritization of needs to identify which actions should be undertaken in the short, medium and long term. As mentioned before the implementation of the strategic plan should be incremental with gradual scaling up as resources and capacities permit (WHO, 2006). A detailed action plan with a clear budget, time frame and allocation of responsibilities has to be developed. The plan should be endorsed at the highest level.

In the implementation phase broad participation of key stakeholders should be promoted under the overall guidance of the steering committee. Incentives for improved HIS activities could be provided. Areas of data collections requiring urgent strengthening should be promptly identified and addressed. Simultaneously, monitoring activities should be conducted where the steering committee should develop monitoring and evaluation mechanisms including specific indicators and reporting system. A full evaluation of the implementation plan should take place at intervals appropriate to the time frame of the plan. Monitoring & evaluation results should be disseminated and shared with major stakeholders to keep them informed and involved (WHO, 2008a).

The last phase should feed a new strengthening cycle in order to gradually build on the achieved improvements towards the overall goal (WHO, 2006). Abu Zahr & Boerma (2005) argued that the sequence of actions in establishing or strengthening HIS will depend on existing capacity and resources but they agreed that an incremental approach with a long term view is essential. However, they stressed that the process could not be implemented without appropriately trained human resources with basic analytical, numerical and statistical skills.

Chapter 3

Methodology

This chapter presents the study methodology. It describes the study design, target population, sampling method and the ethical and administrative procedures that were implemented. Further, the data collection methods and instruments are illustrated in addition to measures followed to increase scientific rigor, data processing and analysis and finally the limitations of the study.

3.1 Study Design

The study is a descriptive, analytical cross sectional one with a quantitative design. The researcher used two data collection tools to cover the research topic from different perspectives which enriched the study and strengthened the scientific rigor of the findings. The cross sectional design has the advantage that it captures the realities in a credible way and it can also save time & costs (Burns & Grove, 2005). Census survey was used that has been proved in many research studies to be a highly accepted and recommended data collection model.

3.2 Study Population

The population of the study consisted of all staff with managerial positions of registered and licensed NGOs by the Palestinian MOH at the period of the study that at least operates one PHC and/or one hospital. According to the data obtained from the NGOs Coordinating and Registration Department at the MOH there were 24 NGOs operating 36 PHC and 11 hospitals which meet these criteria at the period of the study. The total of 21 NGOs participated in the study with positive responses from 115 managers acting at these organizations (Annex 9). Their managerial positions ranged from executive director, directors of departments to heads of units and supervisors. The researcher used the census method so that all eligible NGOs and all acting managers of positively responded NGOs were targeted by the study.

3.3 Response rates

Of the 24 eligible organizations that were formally invited to participate in the study, the total of 21 organizations had positively responded resulting in a response rate of 87.5% who completed the organizational questionnaire. The 21 participating NGOs employed a total of 138 employees with managerial positions-according to their records. All those managers who were working in the 21 positively responded organizations, were requested to participate in the study and among them 115 positively responded with a response rate of 83.3% (for the individual questionnaire).

3.4 Period of the Study

The study had started immediately after having the university approval and obtaining the ethical approval from the Helsinki committee in June 2010. Data collection tools were prepared in July 2010 while in the same period different NGOs were formally contacted to obtain their administrative approvals to start the study. Pilot study was conducted in the first week of August 2010 and immediately after that data collection activities started till the end of September 2010. Data entry and data cleaning were conducted in October 2010 and finally data analysis and writing the final research report were performed in the next period till the end of March 2011.

3.5 Study Setting

The study was carried out at all facilities of eligible and responding NGOs. The total of 10 hospitals, 34 primary health care centers and 4 NGO main offices at all five governorates were visited.

3.6 Eligibility Criteria

3.6.1 Inclusion criteria:

All managers of registered and licensed NGOs by the Palestinian MOH at the period of the study including those NGOs whose re-licensing is in process were eligible for the study. In other words, all employees with managerial positions regardless their managerial levels

were included. It is worthy to mention that the eligible NGOs had to strictly meet the definition criteria of non-governmental status mentioned above so that the Palestinian Red Crescent Society had to be excluded as it is a semi-governmental organization and is considered as a sub institution of the Palestinian Liberation Organization.

3.6.2 Exclusion criteria:

Staff of unregistered NGOs by MOH or those registered NGOs but did not apply for re-licensing and managers of registered and licensed NGOs who are not working at the period of the study for any reason (retirement, sickness, traveling abroad, ..). In addition, all employees of eligible NGOs but without managerial positions were excluded.

3.7 Ethical and administrative considerations & procedures

After receiving the study approval from Al Quds University an official letter of approval from the Helsinki committee in Gaza was obtained (Annex 2). Additionally, all NGOs eligible for the study were formally contacted to obtain their approvals to start the study. Formal letters were sent through the university to all eligible NGOs mentioning the title of the research study and name of researcher (Annex 3). Sample questionnaires were sent upon request to targeted NGOs and meetings were held with some NGO top managers to explain the objectives and planned methodology to convince them to participate in the study.

All questionnaires (both organizational and individual) were attached with explanatory letters including the title of the study, objectives and other related information (Annexes 4 & 5). The explanatory letters highlighted that participation in the study remained completely voluntary. Confidentiality and anonymity of collected data were completely maintained. Every participant was made aware about the contents of the explanatory letters before starting the interviewed questionnaire and verbal consent was obtained from each participant.

3.8 Research Instruments

The researcher used the interviewed questionnaire as research instrument with two versions/forms; the first one was for the entire organization and was conducted by the top management and the second was for the field based on individual information and was conducted by all individuals with managerial positions.

The construction of the questionnaires was partially based and adopted from the WHO – HIS assessment tool (WHO, 2008b). As the original tool was developed to assess national information systems it had to be modified to be used on a lower level, the organizational one. Increased concern was given for the practical issues that take place in the field. In addition, special focus was given for the attitudes and perceptions of people, which was not included in the original tool. As the researcher adopted and used the interviewed questionnaire model, it was not needed to develop translated forms of the questionnaires into Arabic, but the researcher prepared a self-translated form to be used by himself to ensure standardized questioning of participants and to avoid any variations in the simultaneous translation that might negatively affect the quality of responses.

The organizational questionnaire (Annex 6) was divided in the following parts:

- Organizational characteristics information including address, duration of health activities, existence of an own e mail address, number of operated hospitals & PHC and number of their full time employees. These characteristics were later used to test and clarify the variations among NGOs in the functioning of their HIS.
- The components of the used HIS including available resources & technologies and HIS policies & regulations, performance indicators, data sources, data processing & management, information products and the information dissemination & use covering the organizational and technical factors affecting the performance of the system. The questions were mainly formulated according to a scale following the system of HMN assessment tool. The scale ranged from highly adequate receiving the score of 3 to adequate with score 2, existing but not adequate with score 1 and finally not existing with score of 0 (WHO, 2008b). The questionnaire was later evaluated according to the mentioned scores and resulted in average score for each component of the HIS.

- The last part tackled other factors influencing the decision making process including the availability of a documented structure with clear authorities, centralization level and the common culture and its relation to the use of information.

The individual questionnaire (Annex 7) had similar structure with the difference that it focused on what is actually practiced on the individual basis and on the perceptions and attitudes of the staff. However, this questionnaire was more detailed as the previous one and aimed to dig more behind the individual practices and perceptions. The composition of this questionnaire was as following:

- Demographic and work related data including gender, age, educational level, managerial level, previous practical experience and type of work. This information aimed also to test the variation in the use of HIS in reference to these variables.
- The components of HIS were included in the same sequence as previously mentioned in the organizational questionnaire with additional sub component of the general perceptions towards HIS and working with data. The questions followed mainly the same scaling and scoring system mentioned before.
- The component tackling the description of the current decision making process was more detailed than in the organizational questionnaire. Areas like transparency levels, main factors affecting decision making and main barriers to the use of information in decision making were covered. The questions of this components could be considered as an addition to the HIS assessment tool. They were developed after comprehensive literature review and consultation of experts.

3.9 Pilot Study

Pilot questionnaires were conducted in order to test & standardize the research instruments and to increase the response rate**.** The piloting aimed also to test the feasibility and suitability of study instrument and to improve its validity and reliability. The pilot results were used to finalize the tools for the general study phase. A sample of three NGOs was selected to pilot the organizational questionnaire and 11 individuals from the same NGOs were selected to test the individual questionnaire. According to the results of the pilot tests only minor changes in the wording of some questions were needed and therefore there was

no need to exclude the results of the pilot questionnaires from the total results of the study. This has been agreed upon with the academic supervisor.

3.10 Data collection

The researcher conducted the data collection by himself using the interviewed questionnaire method**.** This model had the advantage that it provided the researcher with real picture of the situation on the field and enabled to fully probe perceptions & responses of participants to the different domains and questions. It enabled also to clarify some points and to validate the participants' responses with some observations. After coordination with NGOs top managements, meetings with study participants were arranged to avoid disturbing daily work of participants and to assure suitable environment that enables realistic responses of participants. At the beginning of each questionnaire the explanatory letter was read to clarify the aim of the study and to obtain verbal consent from participants. The researcher used his own translated form of the questionnaires to ask the questions in Arabic. Participants were given enough time to select the appropriate options from their point of view and they were provided with clarifications of questions when needed. Meetings took place in the real work environment of participants to enable the researcher compare between participants' responses and the reality on the ground. Responses of participants were filled in the questionnaire forms by the researcher. In average, each questionnaire took around 25 minutes to be completed.

3.11 Reliability and Validity

3.11.1 Reliability of the instruments:

An instrument is considered as reliable when it yields consistent results by repeated measuring the concept of interest (Burns & Grove, 2005). In other words it means the stability/reproducibility of the results of a scientific observation (Lafaille & Wildeboer, 1995).

The reliability was improved in this study by standardization of the instrument that was adopted from internationally renowned and tested tool, in addition to standardization of its implementation, piloting and data cleaning and reentry.

The reliability of scale questions were tested using the reliability coefficient "Cronbach" Alpha test. The overall value of the reliability coefficient at the individual questionnaire was 0.904 which is highly over the accepted level of 0.7 (Santos, 1999). Also the coefficient values by the different categories were high ranging from 0.672 to 0.971 which is much higher than the tolerated value of 0.5 for each category. The results of the organizational tool were even clearer with a total reliability coefficient of 0.954 and values for different categories ranging from 0.646 to 0.977 which reflect a very high reliability.

Table 3.1: Reliability of the used data collection tools

No.	Domain	α
1	**Individual questionnaire**	
1.1	HIS resources	0.717
1.2	HIS indicators	0.971
1.3	HIS data sources	0.743
1.4	HIS data management	0.809
1.5	HIS information products	0.704
1.6	HIS dissemination & use	0.759
1.7	Level of transparency in decision making	0.719
1.8	Factors influencing decision making	0.672
	Overall	**0.904**
2	**Organizational questionnaire**	
2.1	HIS resources	0.707
2.2	HIS indicators	0.977
2.3	HIS data sources	0.713
2.4	HIS data management	0.859
2.5	HIS information products	0.646
2.6	HIS dissemination & use	0.86
	Overall	**0.954**

3.11.2 Validity of the instruments:

The scientific literature describes a test as valid when it actually measures what it is supposed to measure (Burns & Grove, 2005). Different types of validity were discussed in the literature including face validity, content and internal validity.

- Face validity refers to which extent a measure appears appealing. In other words it is related to the design of the instrument which was reached in this study by organizing the questionnaires in categories with logical sequence.
- Content validity examines to which extent the instrument includes all major elements relevant to the construct being measured (Burns & Grove, 2005). This type of validity was assured as data collection tools were reviewed by seven different experts with different background (Annex 8), where all questions that reached less than 80 % consensus were removed.
- Internal validity refers to the question if real relationship between the research variables exists or if alternative explanations of findings are eliminated (Lafaille & Wildeboer, 1995). This kind of validity was increased by minimizing the potential threats to this validity through piloting & standardization of the instruments, field checking and observations, conducting the data collection within limited time frame to avoid attrition of study participants and maturation. Additionally, the data collection tools were adopted from the well tested WHO-instrument.

3.12 Data management & statistical analysis

After completion of the collecting of data the researcher used the Statistical Package for Social Sciences (SPSS) program version 17 to code the questions and the responses of both questionnaires. Data entry following the developed coding system was made by the researcher himself. After that the researcher conducted cleaning of entered data by reentering of random sample of questionnaires and by making descriptive statistical frequencies and reviewing of results. Means and standard deviations (SD) of continuous numeric variables were computed and then recoded in appropriate categories. Descriptive statistical analysis was made by comparing frequencies and percentages of different variables. Total scores of questionnaires' domains were computed. Reliability of the used instruments was tested by computing the reliability coefficient to ensure the consistency of findings. To examine the relationships between independent (categories) and dependent

variables (numeric scores) inferential statistical tests were made including independent t-test and one way ANOVA test. The independent t-test was used to compare two means and the one way ANOVA to compare more than two means. P – Value of equal or less than 0.05 has been considered as statistically significant.

3.13 Limitations of the study

- The cross sectional design of the study has some weaknesses as it is liable to contextual changes and does not allow giving answers of possible causalities.
- The study did not tackle the technical aspects in form of evidence based medicine and types of used database and soft ware as these aspects fall beyond the scope of this study and its stated objectives.
- The study was limited to NGOs that operate at least one hospital or one PHC and excluded other NGOs operating exclusively in mental health & psychosocial support or in rehabilitation services, as these areas have more technical nature and they need conducting other studies with possibly complete different designs.
- The results of the study are based on the perceptions of participants rather than on the in-depth evaluation. There was a reluctance of participating NGOs to provide their own documents.
- Lack of a unifying overall supervisory body leads to dealing with numerous and to some extent contradicted information systems which made it difficult to develop standardized data collection tools

Chapter 4

Results & discussion

In this chapter the researcher illustrates the main findings of the study and compares that with the results of previous similar studies. The findings of the organizational questionnaire will be first presented followed by the results of the individual one. At the end of the chapter findings of both questionnaires will be consolidated to extract the final conclusions of the study.

4.1 Findings from organizational questionnaire

4.1.1 Characteristics variables:

Table 4.1: Distribution of NGOs by organizational characteristics variables

#	Factor	Frequency	%
1	**Location of NGO's health care facilities**		
	2 or more governorates	9	42.9
	North	2	9.5
	Gaza	6	28.6
	Mid zone	2	9.5
	Rafah	2	9.5
2	**Number of employees working at the NGO**		
	up to 25	6	28.6
	26 to 75	8	38.0
	76 and above	7	33.3
	Mean = 90	**Median = 56**	**SD = 98.971**
3	**Number of PHC**		
	1 PHC	10	47.6
	2 to 3 PHC	4	19.0
	More than 3 PHC	3	14.3
	Mean = 1.67	**Median = 1**	**SD = 1.56**
4	**Number of hospitals**		
	None	13	61.9
	1 Hospital	6	28.6
	2 Hospitals	2	9.5
	Mean = 0.48	**Median = 0**	**SD = 0.68**
5	**Years since starting health activities**		
	1 to 10 years	6	28.6
	11 to 20 years	7	33.3
	More than 20 years	8	38.1
	Mean = 23.1	**Median = 15**	**SD = 26.351**

As mentioned earlier, out of 24 eligible NGOs a total number of 21 organizations positively responded and participated in the study. The highest percentage (42.9%; 9 organizations) of organizations were operating their activities in two or more governorates followed by organizations working in Gaza governorate (28.6%; 6 organizations). NGOs working in the North, Mid zone and Rafah governorates were two organizations each. The relative dense concentration of NGOs in Gaza governorate supports the findings of Yaghi (2009) who referred that to the tendency of NGOs to be closer to the main decision & policy making circle such as ministries & donor offices.

The duration of working in health services ranged between 3 to 128 years with the mean of 23.1 years (median 15 years). It was found that 6 NGOs have been involved in health service only in the last 10 years and other 7 NGOs since 11 to 20 years. Only 8 NGOs could reveal health service activities for over 20 years. These findings could be explained by the fact that many new NGOs were emerged in the last two decades after the establishment of PNA which reduced the restriction on NGO after the partial end of the Israeli occupation. This could also imply that these young organizations could be a fertile landscape for development and innovation. On the other hand it is unlikely that the limited accumulated experience at the organizational level was sufficient to develop effective organizational structures and culture that need long time to evolve. Strengthening the cooperation and information sharing among these organizations could enhance their organizational learning and accelerate this evolution process.

PHC centers were found in 17 organizations (80.9%) that operate the total of 34 centers. The majority of them (10 organizations; 47.6%) have only one centre whereas other 4 NGOs (19%) have 2 to 3 PHC centers and only 3 NGOs (14.3%) operate more than 3 centers. This is congruent with the relative young character of most investigated NGOs. The proportion of NGOs operating PHC centers in this study (80.9%) is higher than the finding of Yaghi (2009) with a 61.9% of the investigated NGOs. This could be also explained by the fact that this study did not consider NGOs that exclusively provide rehabilitative services.

Another important point was found where 8 organizations (38.1%) provide secondary or tertiary services through 10 hospitals. Only two NGOs (9.5%) operate two hospitals each and 6 NGOs (28.6%) have only one hospital per each. The complexity of operating

hospitals and the associated high running costs could be the rational reason for these young organizations to avoid providing secondary or tertiary health services. The increasing number of NGO hospitals in comparison to the study of Yaghi (only 7 hospitals) could be explained as new hospitals were established and licensed by the MOH after the last war on Gaza (December 2008 – January 2009).

The total number of employees working in NGOs ranged from 5 to 372 employees with the mean of 90 (median 56 employees). Although the man power of 7 NGOs (33.3%) is over 75 employees, a considerable portion of NGOs (38%) have 26 to 75 employees and also 28.6% of NGOs have only 25 or less employees. It is worth mentioning that only full time employees were considered in this study as part time employees do not reflect the real human potential of these organizations and its consideration could confuse the results especially as some part time employees are working in more than one NGO (Yaghi, 2009). A large portion of these "part timers" is engaged with the MOH or other service providers as also mentioned in the study of Yaghi (2009).

4.1.2 HIS resources

To quantitatively calculate the provided responses, the answers with Yes/No options were scaled as 0 for "No", 1 for "Yes" and 2 for "Yes, seen". The component was divided into two main sub-categories; available infrastructure and policies & regulations. The results were as following:

a) Available HIS infrastructure

Table 4.2: Distribution of NGOs by availability of HIS infrastructure (N=21)

No.	Domain	Yes		No	
		#	%	#	%
1	Availability of E mail address	15	71.4	6	28.6
2	Availability of computerized database	18	85.7	3	14.3
3	**Components of the available database**				
	Patient admission/discharge	13	61.9	8	38.1
	Patient billing	12	57.1	9	42.9
	Payroll	16	76.2	5	23.8
	Taxonomy of workforce	15	71.4	6	28.6
	Budgeting	16	76.2	5	23.8
	Supply chain management	14	66.7	7	33.3
	Patient records	12	57.1	9	42.9
	Laboratory records	10	47.6	11	52.4
	Pharmacy records	13	61.9	8	38.1
	Patient referral system	4	19	17	81
	Occupational health registry	4	19	17	81
	Total score of the available data base	Mean = 6.14 /11	Median = 7	SD = 3.568	% = 55.82
	Overall	**Mean = 7.71 /13**	**Median = 9**	**SD = 4.101**	**% = 59.31**

Only 15 organizations (71.4%) own E mail address and 18 organizations (85.7%) had computerized database to some extent. Financial & administrative components were more present than the technical components (Budget and payroll components elicited the highest score followed by taxonomy of workforce). The total score of the database components reached the mean of 6.14 out of 11 accounting for a percentage of 55.82% which is slightly over the satisfactory level according to HMN assessment tool (WHO, 2008b). The overall score of this component reached 59.31% (mean 7.71/13) which is congruent with the findings of the WHO assessment of HIS in Gaza Strip that had been conducted in November 2010 and revealed a score for infrastructure of 61% (WHO, 2010c). Compared with other neighboring countries, these results show middle position between the developed infrastructure found in Syria with a score of 75% (Syrian MOH, 2009) and the weak one in Yemen with a score of 40% (Yemen MOH, 2009). Sudan (2007) showed a similar position to the situation in Gaza Strip with the score of 61% for HIS infrastructure.

Nevertheless, policy makers need to critically consider these findings and invest more in supporting HIS infrastructure.

b) Policies & regulations

Table 4.3: Distribution of NGOs by the availability of HIS policies & regulations (N=21)

No.	Variable	Frequency	%
1	**Existence of policies for reporting & information flow**		
	Yes, seen	6	28.6
	Yes	13	61.9
	No	2	9.5
2	**Existence of feedback mechanisms within the information policies**		
	Yes, seen	3	14.3
	Yes	9	42.9
	No	9	42.9
3	**Existence of a specific HIS budget**		
	Yes	6	28.6
	No	15	71.4
	Overall	**Mean =2.19 /6** **Median = 2** **SD = 1.436**	**% = 36.5**

Although 90.5% (19 organizations) of the studied organizations claimed to have policies for reporting and information flow, this could be really provided (seen) by 28.6% (6 organizations) only. The situation regarding the existence of feedback mechanisms within these policies was even worse as this did not exist in 9 NGOs (42.9%) and only 3 NGOs (14.3%) of the other group could really show these mechanisms. Only 6 NGOs claimed to have a specific budget for the functioning of HIS and only 2 out of them provided an estimate of the percentage of this budget to the total one.

Although the elicited total score of the policy sub-component (36.5%) seems to be weak it is still widely over the revealed results of the WHO assessment (2010c) for Gaza Strip with a score of only 21% and also over the registered scores at the neighboring countries; 28% in Syria (2009), 25% in Sudan (2007) and only 10% in Yemen (2009). However, the findings highlight the chronic problem regarding the need for strengthening documentation practices and developing appropriate policies not only in the Palestinian health system but also in the whole Arab region. The total score of HIS resources was on the borderline of

satisfaction level with 52.11% that could be referred to the obvious weaknesses in the policies & regulations sub-component.

4.1.3 HIS indicators:

Table 4.4: Distribution of the NGOs by the availability of HIS indicator-related variables (N=21)

#	Domain	Yes seen		Yes		No			
		#	%	#	%	#	%		
	HIS indicators								
1	Existence of indicators (any)	4	19.0	10	47.6	7	33.3		
		Highly adequate		**Adequate**		**Existing but not adequate**		**Not existing**	
		#	%	#	%	#	%	#	%
2	Human resources indicators	0	0	7	33.3	5	23.8	9	42.9
3	Financial management indicators	4	19.0	7	33.3	3	14.3	7	33.3
4	Commodity management indicators	3	14.3	10	47.6	0	0	8	38.1
5	Indicators about services availability	2	9.5	10	47.6	0	0	9	42.9
6	Indicators about services coverage	1	4.8	9	42.9	3	14.3	8	38.1
7	Indicators about access to services	3	14.3	7	33.3	3	14.3	8	38.1
8	Indicators about success rate of services	1	4.8	11	52.4	1	4.8	8	38.1
9	Final impact indicators	1	4.8	10	47.6	2	9.5	8	38.1
10	Level of consistency with standards	2	9.5	10	47.6	0	0	9	42.9
11	Combination with targets/benchmarks	1	4.8	10	47.6	1	4.8	9	42.9
	Overall Mean = 12.95 /32	**Median = 16**			**SD = 10.433**			**% = 40.47**	

As reported earlier, to quantitatively calculate the scores pertaining to this component, responses were assigned to numbers with 3 scores were given to highly adequate, 2 to adequate, 1 existing but not adequate and 0 to not existing. The total maximum score of the indicators component was according to these scales 32 points.

The results of the organizational questionnaire revealed low performance at indicators front as 33.3% of NGO top managers mentioned that they have no sets of well defined indicators. Although the rest (66.6 %; 14 managers) claimed to have some indicators, only 4 (19%) had showed these indicators. However, it was interesting to see that financial indicators (financial management & commodity management) achieved the highest results with a score of 46%, which implies that organizational top managers are more interested to measure financial figures than other health services components. However, financial rules and regulations stress on the importance of having financial indicators which might explain the higher results of these components.

The overall evaluation of the HIS indicators was under the satisfactory level as the total score was only 40.47% with the mean of 12.95 out of 32. This result is largely below the findings of the last assessment for the HIS in Gaza Strip conducted by WHO (2010c) with the total score of 55% for the indicators component and also below the findings of Syria (2009), Yemen (2009) and Sudan (2007) with 87%, 67% and 69% respectively. These differences could be attributed to the nature of the assessed indicators nationwide as these are generally well-known national indicators like mortality & morbidity rates or life standards indicators that could not be tracked on community base level. Weaknesses at the national findings of this component in comparison to neighboring countries could be referred to the fragmented character of the health system in Palestine and lack of coordination and effective information flow between different service providers. This increases the need for a common understanding of which information should be shared, at which interval, which indicators will be monitored and how they are defined. Developing information policies by MOH, the regulatory and supervisory body of the health care system, will strongly enhance the validity and reliability of indicators and the effectiveness of their use.

4.1.4 Data sources:

The component of HIS data sources comprised five scale questions scored as mentioned above with a maximum score of 13 points. The questions aimed to evaluate the use of external data sources like population projections or other published studies and community based need assessments. In addition, facility based data sources in form of internal reports and feedbacks were considered.

Table 4.5: Distribution of NGOs by HIS data sources-related variables (N=21)

No.	Domain	Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
	HIS data sources								
1	Use of population projections	4	19.0	8	38.1	1	4.8	8	38.1
2	Internal regular reporting	7	33.3	11	52.4	2	9.5	1	4.8
3	Internal regular feedbacks	3	14.3	14	66.7	1	4.8	3	14.3
		Yes seen		**Yes**		**No**			
4	Conducting need assessments	6	28.6	10	47.6	5	23.8		
5	Use of published studies	5	23.8	2	9.5	14	66.7		
	Overall	**Mean = 6.95 /13**		**Median = 7**		**SD = 3.106**		**% = 53.46**	

Published studies are in general poorly considered in the design of NGOs programs as 14 NGOs (66.7%) revealed that they do not use such studies and also 23.8% (5 NGOs) does not even conduct own need assessments in order to select their provided services. This contradicts the findings of Yaghi (2009) who found that the majority of NGOs conduct need assessments in developing their strategic plans. The researcher suggests that these organizations rely to some extent on the assistance of external experts in developing their strategic plans and conducting need assessments. This suggestion is supported by the finding that NGOs claiming to conduct need assessments and published studies for selecting their services conducted in average only 1.05 need assessments last year and only designed 0.57 of their programs based on the results of published studies. The use of other community based data sources like population projections is still inadequate as it does not exist by 8 NGOs (38.1%). This poor performance is an implication of weaknesses of the

organizational capacities in the data collection from external data sources. The facility based information flow (through reporting and feedbacks) seems to be adequate with a mean of 2.14 (71.33%) for regular reporting and 1.81 (60.33%) for feedbacks. The later is congruent with the results of Maram survey (2003) that was conducted to assess Women and Child health & health services in the oPt and revealed that 75.4% of respondents reported that feedback is provided about health reports. Although it is difficult to compare both studies as the Maram survey used different methodologies and covered health facilities from different health care providers, it is clear from both studies that internal reporting and feedbacks could be considered as one the strengths of the national HIS.

However, improvements in this area are still possible and strongly needed to enhance the commitment among people who collect the data and prepare the reports to maintain and improve the quality of collected data. The researcher suggests that internal reporting practices could be meaningless routine activities if not linked to continuous quality improvement and accompanied with reflective decision making process. Also the focus on internal data alone is very dangerous as this data source is a subject to reporting bias and it is less representing the population than the population based data sources (WHO, 2008a).
In general the HIS data sources reached a total score of **53.46 %**. This result is congruent with the findings of the last WHO assessment for Gaza Strip (2010c) with the resulted score of 55% and also finds a middle position between Syria (2009) and Yemen (2009) with scores of 62% and 44% respectively.

4.1.5 Data management & data quality

Table 4.6: Distribution of NGOs by HIS data management-related variables (N=21)

#	Domain	Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
	Data management & data quality								
1	Consistency of data	2	9.5	16	76.2	0	0	3	14.3
2	Completeness of reports	1	4.8	16	76.2	3	14.3	1	4.8
3	Timeliness of reports	5	23.8	11	52.4	3	14.3	2	9.5
4	Disaggregating of data	4	19.0	14	66.7	1	4.8	2	9.5
5	Accuracy of reports	5	23.8	12	57.1	0	0	4	19.0
						Yes		**No**	
6	Evaluation of data against other sources					9	42.9	12	57.1
	Overall	**Mean = 9.76 /16**		**Median= 10**		**SD = 3.208**		**% = 61.0**	

To assess data management practices, the respondents were asked about consistency of data, completeness of reports, timeliness, accuracy of reports, disaggregating of data and the evaluation of internal data against other sources with one question each. The revealed average score of this component was 9.76 (median 10) which equates a percentage of **61.0%**. The perceived quality of internal data was relatively high but wide gaps were found in the use of external data sources to verify the internal reports as 12 NGOs (57.1%) revealed that they do not practice that.

The findings significantly differ from that of the last WHO assessment of the HIS in the Gaza Strip (2010c) that showed a result of only 18% of this component. It differs also from the findings in Syria (2009), Yemen (2009) & Sudan (2007) with 33%, 13% and 17% respectively. A potential explanation for this could be the hierarchical nature of the health systems with numerous managerial levels whereas disaggregation, analysis & interpretation of data take place only at the top level. The role of lower managerial levels is limited to collection and transport of data with no or minimal data processing. The less bureaucratic nature of NGOs and the limited number of managerial layers contribute to increasing the total score of this component.

4.1.6 Information products

Table 4.7: Distribution of NGOs by HIS information products-related variables (N=21)

No.	Domain	Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
	HIS information products								
1	Quality of information presentation	2	9.5	16	76.2	1	4.8	2	9.5
2	Level of information discussion throughout the organization	1	4.8	16	76.2	4	19.0	0	0
3	Quality of information storage	6	28.6	10	47.6	5	23.8	0	0
	Overall	**Mean = 5.76**		**Median= 6**		**SD = 1.513**		**% = 64.0**	

The total elicited score of this component reached the mean of 5.76 (median 6) accounting for a total score of **64.0%.** This could imply good competencies, at least by the top managerial levels, in using information effectively and in user friendly formats. The concluded result in this study is consistent with the findings of the last assessment for the Gaza Strip with the score of 57% (WHO, 2010c) and the findings in Syria (2009), Yemen (2009) and Sudan (2007) with 71%, 64% and 62% respectively.

4.1.7 HIS Dissemination & use in decision making

The component of HIS dissemination & use in decision making was divided into two sub components; information dissemination and the use of HIS in decision making.

a. Information dissemination

Table 4.8: Distribution of NGOs by the availability of HIS information dissemination-related variables (N=21)

No.	Domain	Yes		No	
		#	%	#	%
	Information dissemination				
1	Existence of a system for internal communication	21	100	0	0
2	**Internal information dissemination tools (more than one option is possible)**				
	E mail	12	57.1	9	42.9
	Written reports	19	90.5	2	9.5
	Regular staff meetings	21	100.0	0	0
	Telephone	19	90.5	2	9.5
	Others	6	28.6	15	71.4
3	**Information sharing with stakeholders**				
	MOH	19	90.5	2	9.5
	Donors	20	95.2	1	4.8
	Other NGOs	14	66.7	7	33.3
	Beneficiaries	14	66.7	7	33.3
	Universities	8	38.1	13	61.9
4	**External information dissemination tools**				
	Website	12	57.1	9	42.9
	E mail	18	85.7	3	14.3
	Printed reports	20	95.2	1	4.8
	Press release	13	61.9	8	38.1
	Workshops	13	61.9	8	38.1
	Community meetings	15	71.4	6	28.6
	Others	3	14.3	18	85.7
	Overall	**Mean = 13.71 /19**	**Median = 15**	**SD = 3.2116**	**% = 72.16**

The revealed total score of the information dissemination sub component was 72.16% (mean 13.71; median 15). The internal communication systems seems to be done through regular staff meetings as the most used information sharing tool (100%) followed by written reports and telephone calls with 90.5% each which is consistent with the findings of Yaghi (2009). It is interesting that two of these communication tools are verbal and the most used contains eye contact which is common and preferred in the Palestinian culture.

People prefer social interaction and seek for harmony and internal peace. These findings are congruent with the findings of Turban (2007) who investigated the status of supervision in primary health care centers at MOH and found that about 86% of supervisors prefer providing verbal support to their subordinates. Need for improvement has been found by the use of e mail in internal communications as only 57.1% of NGOs use this tool which could be referred to the still inadequate coverage of internet access. However, the reluctance to use e mail as a communication tool is a general characteristic in the Palestinian society. A recent PCBS survey showed that only 16% of individuals use e mail for work related communications (PCBS, 2010b).

It is remarkable that the highest percentage in the information sharing with external stakeholders was reached by donors (95.2%) followed by MOH (90.5%) and the lowest was by universities with only 38.1%. These results should be cautiously considered as they could not be verified by these stakeholders. Also they seem overestimated by comparing them with the results of Yaghi (2009) who found that donors & Ministry of Interior were the most targeted external partner regarding submitting reports with 69% each followed by MOH with only 33.3%. These differences might be explained that Yaghi focused only on the annual reports but this study tackled all forms of information dissemination which increased the found percentages.

The most used information sharing tool with external partners is still printed reports (95.2%). Interestingly, the increased use of e mail here in comparison to internal communications implies that the external communications are generally conducted by the top managers who have access to the internet. However the use of websites in information sharing is still weak with only 57.1% which needs to be strengthened in the future.

The researcher finds that information sharing with the community and other NGOs is still inadequate as 33.3% of investigated NGOs have no interactions with these highly important stakeholders. This lack of communication could be responsible for duplication of provided services, detachment from the real needs and expectations of the community and leading finally to inefficiencies and waste of resources. Possible explanations of these weaknesses could be the use of ineffective communication tools as the most used tool in communication with the surrounding community is the traditional, partially formal, community meeting in presence of some community leaders, that seems to be unattractive

for broad components of the community. Also, the little messages sent by local media mainly focus on advertising for services provided by the centers. Targeting women & children, the largest population groups and most beneficiaries of NGOs, with new innovative tools such as DVD films, cartoons and theater performances or issuing weekly or monthly magazines in attractive formats that provide simple information about child growth & nutrition, chronic disease management or women issues could bridge the gap between these organizations and the community. Even in times of financial crisis and lack of resources these innovative tools will attract donors to provide needed funds and will enhance the overall image of the organization by the community and by the donors as well.

b. Use in decision making

Table 4.9 Distribution of NGOs by the use of HIS in decision making (N=21)

#	Domain	Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
	Use of HIS in decision making								
1	Changing policies	2	9.5	14	66.7	5	23.8	0	0
2	Selecting services	2	9.5	14	66.7	4	19.0	1	4.8
3	Advocacy	3	14.3	11	52.4	3	14.3	4	19.0
4	Performance evaluation of staff	2	9.5	11	52.4	4	19.0	4	19.0
5	Performance based accountability of managers	2	9.5	12	57.1	3	14.3	4	19.0
6	Costs/budget analysis	10	47.6	8	38.1	3	14.3	0	0
7	Labor-costs analysis	10	47.6	9	42.9	2	9.5	0	0
8	Revenue analysis	13	61.9	6	28.6	2	9.5	0	0
9	Service-quality analysis	9	42.9	8	38.1	3	14.3	1	4.8
10	Expenditure forecasts	9	42.9	8	38.1	3	14.3	1	4.8
11	Beneficiaries forecasts	8	38.1	10	47.6	3	14.3	0	0
	Overall	**Mean = 22.24 /33**		**Median = 23**		**SD = 5.629**		**% = 67.39**	

The sub component of the use of HIS in decision making revealed a total score 22.24 out of 33 (median 23) accounting for a percentage of 67.39%. The total score of the two sub components had a mean of 35.95 out of a maximum score of 52 points accounting for a total percentage of **69.13%**. The high reached scores of this component could imply high

commitment among top managers to the dissemination and use of information in decision making. Again, it was here clear that top managers were most concerned with evidence based decisions in the financial issues as the use of HIS in decision making was highest by revenue analysis followed by labor-costs analysis and cost-budget analysis with scores for these items of 84.1%, 79.4% and 77.8% respectively.

This result completely differs from the results of the last WHO Assessment of national HIS in Gaza Strip (2010c) with the score of 36% and from the findings in Syria (2009), Yemen (2009) and Sudan (2007) with 27%, 20% and 40% respectively. Again the limited managerial levels in addition to the effective internal communication systems at NGOs could be responsible for the improved use of HIS in decision making.

4.1.8 Other decision making influencing factors:

Table 4.10: Distribution of NGOs by other decision making– related variables

No.	Variable	Yes		No	
		#	%	#	%
1	Existence of documented organizational structure	17	81	4	19
2	Decentralization level in the organizational structure	10	47.6	11	52.4
3	Recognition of delegation & accountability of responsibilities	17	85	3	15
4	Recognition of the use of evidence based decision making	21	100	0	0

It is well known that the ways people make decisions and the quality of their final choices are largely influenced by their perceptions and values which in turn affected by the common culture of the organization (Mullins, 2005). Also concepts like centralization and formalization levels that are related to the applied organizational structure are important factors in shaping the process of decision making (Mullins, 2005). Therefore it was important to assess these factors to explore the organizational and behavioral determinants that could affect the use of information in decision making in NGOs.

The table above showed that the majority of NGOs top managers claimed to have formally documented organizational structures (81%) and recognized delegation and accountability of responsibilities (85%) and there was a consensus among all top managers regarding the recognition of the use of evidence based decision making. Some differences were found regarding evaluation of the decentralization levels in NGOs as 47.6% of top managers considered their organizational structure as decentralized. However, it is well known that accountability should be based on measurable performance results and outcomes that need clear indicators as measurement criteria. The poor performance of the indicators component in this questionnaire (only 40.47%) could not provide supportive evidence of the existence of rational accountability in these organizations. On the other hand, developing a culture of accountability and transparency is essential to convince people and enhance their commitment towards using performance indicators. Additionally, the clear organizational structures and the related communication and information flow processes explain the good performance of the internal reporting in NGOs.

4.2 Findings derived from the individual questionnaire

4.2.1 Individual characteristics variables:

Table 4.11: Distribution of participants by characteristics variables

No.	Variable	Frequency	Percentage
1	**Gender (N=115)**		
	Female	33	28.7
	Male	82	71.3
2	**Age (N=108)**		
	up to 35 years	23	21.3
	36- 45 years	48	44.4
	More than 45 years	37	34.3
	Mean = 43.83	**Median = 43.0**	**SD = 10.527**
3	**Educational level (N=115)**		
	Post graduation	36	31.3
	Bachelor	62	53.9
	Diploma or less	17	14.8
4	**Total experience (N=115)**		
	Up to 10 years	27	23.5
	11-20 years	23	20.0
	More than 20 years	65	56.5
	Mean = 18.43	**Median = 17.0**	**SD = 9.405**
5	**Managerial level (N= 115)**		
	Top manager	15	13.0
	Midlevel manager	32	27.8
	First level manager	68	59.1
6	**Place of work (N=115)**		
	North	23	20.0
	Gaza	69	60.0
	Mid zone	10	8.7
	Khan Younis	7	6.1
	Rafah	6	5.2
7	**Type of work (N=115)**		
	Hospital	51	44.3
	PHC	43	37.4
	Org. head quarter	21	18.3

The total number of the study population was 138 and the number of study participants was 115 with a response rate of 83.3%. The majority of study participants (71.3%) were male. This percentage slightly differs from that of Yaghi (2009) that showed 83.3% of managers are male taking in consideration that only top managers were considered in the study of Yaghi. Considering the findings of Shalabi (2009) who investigated the applicability of the learning organization concept at the managers of MOH it can be inferred that NGOs are at the same level as MOH in respect to gender issues by hiring managers. On the other hand, another PCBS study (2010c) showed that females contribute to 40% of the entire workforce in services activities in the private & nongovernmental sectors. The variations in figures between total contribution of women in the workforce and their percentage in managerial positions could be referred to cultural reasons as most females avoid occupying managerial positions that are accompanied with increased responsibilities and could be on the cost of their traditional responsibilities towards family and children.

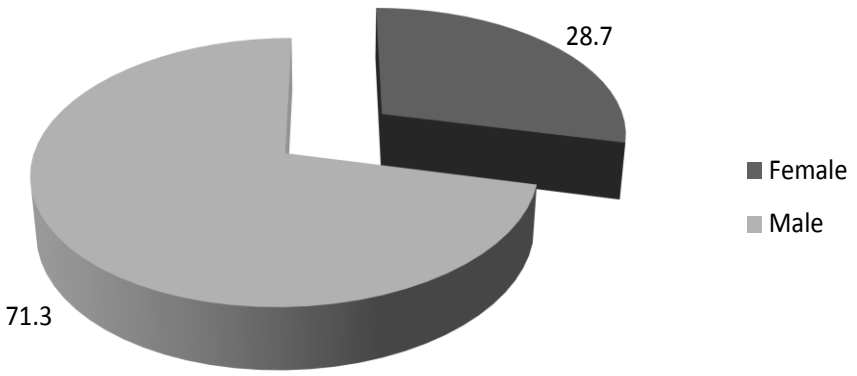


Figure 4.1: Distribution of participants by gender

Regarding age the average age of participants was 43.83 years with a considerable portion aged between 36 to 45 years (44.4%) whereas 21.3% of participants comprise the younger group and 34.3% the older one. The high percentage of young managers (65.7% up to 45 years) is consistent with the findings of Shalaby (2009) and could be seen as potential resource for NGOs and an opportunity for investment and development. On the other hand the older group of managers could provide the young generation with the needed

experience as this group contributed to the found high work experience with an average of 18.43 years (median 17 years). The majority of participants (56.5%) had work experience of more than 20 years while 23.5 % of them have a total work experience of only 10 years or less and other 20% have a total experience of 11 to 20 years. This distribution differs from the findings of Shalaby (2009) where the three groups were close together. This could be referred to the fact that there is no age limit for human resources at NGOs particularly for managers and a lot of them are resigned ex-managers from UNRWA, MOH or other governmental bodies with long work experiences. This explanation could be supported by Yaghi (2009) who found that 14.3% of NGO top managers are aged over 60 years.

The educational level of study participants ranged from diploma (14.8%) to post graduate degrees (31.3%) with the majority of BA holders (53.9%). This is consistent with the findings of Shalaby (2009) and shows no significant differences between MOH & NGOs in the academic qualification of managers.

The managerial levels ranged from first level (59.1%) and midlevel (27.8%) to top level (13%). The majority of them are working in Gaza Governorate (69 participants; 60%) followed by the North governorate (23 participants; 20%). The Midzone, Khan Younis and Rafah were represented with 8.7%, 6.1% and 5.2% respectively. These differences could be explained as the majority of NGOs head quarters and main facilities are located in the Gaza governorate due to aforementioned reasons. The type of work of participants ranged from hospital (51 participants; 44.3%), PHC (43 participants; 37.4%) to head quarters with 21 participants (18.3%).

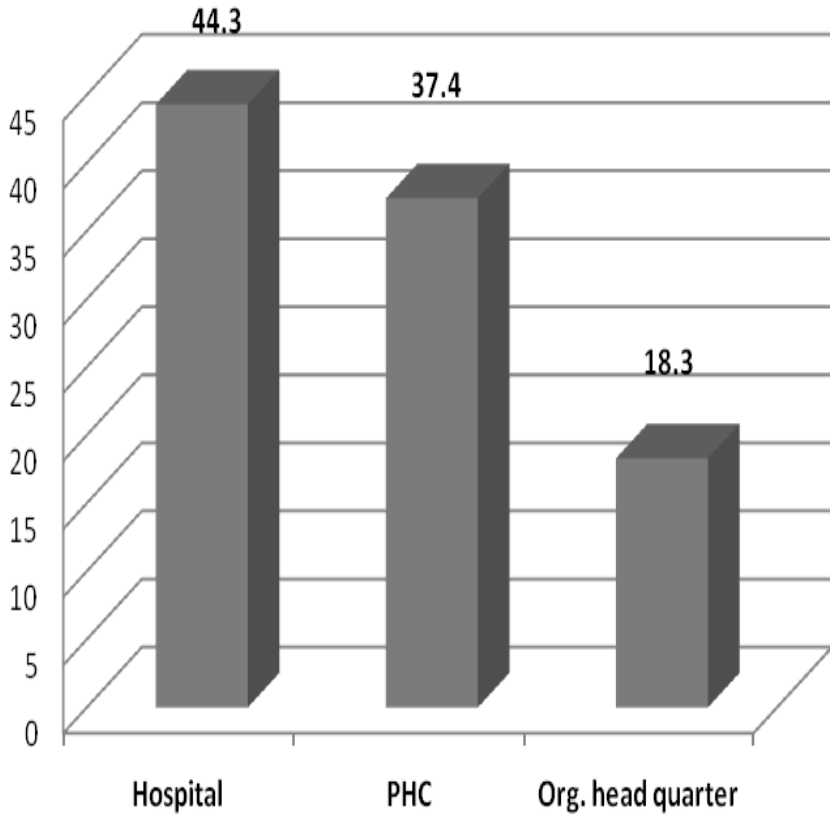


Figure 4.2: Distribution of participants' percentages by type of work

4.2.2 HIS resources:

The HIS resources component was divided into two sub components; general individual perceptions with 13 questions and a maximal score of 65 points and the available human & technical resources with 8 questions and a maximal score of 20 points. The scores of perceptions & attitudes questions were evaluated according to a scale ranging from1 for "strongly negative attitude" to 5 for "strongly positive attitude" and the scores of the other sub component were computed according to the scales mentioned above. The results were as following:

4.2.2.1 General perceptions & attitudes to HIS:

Table 4.12: Distribution of participants by general perceptions & attitudes about HIS

No	Domain	Strongly agree		agree		uncertain		disagree		Strongly disagree	
		#	%	#	%	#	%	#	%	#	%
	Individual perceptions about HIS										
1	Overload with data	10	8.7	26	22.6	2	1.7	75	65.2	2	1.7
2	Data is wasting of time	0	0	7	6.1	0	0	88	76.5	20	17.4
3	Adequate allocated HIS resources	5	4.3	57	49.6	11	9.6	38	33.0	4	3.5
4	Feedback encourage use of data	8	7.0	69	60.0	5	4.3	27	23.5	6	5.2
5	Community based data are essential for rational planning	51	44.3	59	51.3	3	2.6	2	1.7	0	0
6	Importance of timely information dissemination for DM	59	51.3	51	44.3	1	0.9	4	3.5	0	0
7	Importance of HIS for performance evaluation	28	24.3	82	71.3	0	0	5	4.3	0	0
8	Importance of HIS for analysis of numbers	19	16.7	84	73.7	3	2.6	6	5.3	2	1.8
9	Importance of HIS for tracking progress	27	23.5	86	74.8	0	0	1	0.9	1	0.9
10	Importance of HIS for anticipating problems	20	17.4	87	75.7	2	1.7	5	4.3	1	0.9
11	Importance of HIS for removing problems	13	11.3	78	67.8	8	7.0	15	13.0	1	0.9
12	Importance of HIS for accelerating DM	21	18.3	84	73.0	1	0.9	8	7.0	1	0.9
13	Importance of HIS for improving the quality of DM	28	24.3	83	72.2	0	0	3	2.6	1	0.9
	Overall	**Mean = 51.03 /65**		**Median = 52**			**SD = 4.634**			**% = 78.51**	

Responses reflected positive attitudes in general towards the importance of working with data among NGO managers. The resources allocated for HIS were perceived as the least satisfactory point with the mean of 3.18 and the importance of timely information dissemination for decision making had the highest score with the mean of 4.43 out of 5. These findings are consistent with the findings of Shorafa (2004) and could be considered as one of the main strengths of the existing HIS in NGOs and encourage NGO top decision makers to build on these points and promote the existing positive attitude trend by allocating more resources to strengthen the system.

4.2.2.2 Available human & technical resources

Table 4.13: Distribution of participants by their perceptions about HIS resources-related variables

No.	Domain	Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
	Available HIS resources								
1	Actual HIS fit to the needs of managers	12	10.4	53	46.1	45	39.1	5	4.3
2	Perception about received training in the use of HIS technology	1	0.9	20	17.4	21	18.3	73	63.5
3	Perception about received training in information management	0	0	12	10.4	18	15.7	85	73.9
4	Perception about received training in DM & problem solving	2	1.7	17	14.8	23	20	73	63.5
5	Perception about computer proficiency	27	23.5	58	50.4	14	12.2	16	13.9
		Not at all		**Minimal change**		**Moderate change**		**Major change**	
6	Level of needed change at current HIS technology	3	2.6	12	10.4	47	40.9	53	46.1
		Yes		**No**					
		#	**%**	**#**	**%**				
7	Availability of a computer at the workplace	99	86.1	16	13.9				
8	Access to internet	80	69.6	35	30.4				
	Overall	**Mean = 8.03**		**Median = 8**		**SD = 3.553**		**% = 40.15**	

According to participants' responses, actual HIS fit to the needs of managers seems to be adequate with the mean of 1.63 (median 2). One of the most revealed weaknesses was the lack of training and capacity building activities. Numbers of received training courses in the last three years on the use of HIS technology, information management and decision making and problem solving techniques had the average of 0.77; 0.4 and 0.55 respectively (Annex 10). The weaknesses in conducting training activities in the use of HIS technology confirm the findings of Shorafa (2004) who found that only 35% of study participants received training on computer by the MOH. However he explained that as most database users were young people with good computer proficiency. The findings of this study are also consistent with that of Al-Ghareeb (2009) who considered that training in HIS related topics and in decision making & problem solving areas of most urgent training needs among managers in MOH hospitals.

The level of needed improvement on the current HIS technology was perceived as high with the mean of 0.7 and the median of 1 (moderate to extreme change). Of participants 86.1% have computers at their work places but only 69.6% have access to the internet. However, the relatively high coverage of computers in addition to the increasing use of database systems found by the organizational questionnaire could be signs for top management's commitment towards full automation of the systems which could be seen as an opportunity for improvement in the future. The participants perceive their computer proficiency as adequate (mean 1.83; median 2). Considering the young age of participants discussed before, this seems congruent with the findings of Shorafa (2004), who found that MOH prefers to hire young people with adequate computer proficiency so that training costs could be saved. Although, it might be similar at NGOs there are still big training gaps in information management and decision making & problem solving skills that are essential for practicing evidence based decision making properly.

The aforementioned tables show strong positive perceptions & attitudes towards working with data represented in a score of 78.51% for this sub component but there are obvious weaknesses in the available personal and technical capacities that reached the total score of only 40.15% with most weaknesses in the human resource development activities. These results could motivate NGO top managements to invest more in this till now neglected field. The revealed perceived HIS resources total score of **69.51**% is clearly over the score of the organizational questionnaire with 52.11% and the score of the previous assessment

of HIS in the Gaza Strip with 36% (WHO, 2010c). This result is also higher of that found in Syria (2009), Sudan (2007) and Yemen (2009) with 44%, 42%, and 35% respectively. This could be referred to the high scores of the attitudes & perceptions sub-component that was rarely considered in the other assessments.

4.2.3 HIS indicators

Table 4.14: Distribution of responses by HIS indicator-related variables

No.	Domain	Yes seen		Yes		No			
		#	%	#	%	#	%		
	HIS indicators								
1	Existence of indicators (any)	38	33.0	42	36.5	35	30.4		
		Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
2	Routine measurement of indicators	10	8.7	56	48.7	11	9.6	38	33.0
3	Evaluation against targets/benchmarks	10	8.7	52	45.2	8	7.0	45	39.1
4	Simplicity of the in-use indicators	16	13.9	59	51.3	5	4.3	35	30.4
5	Affordability of indicators	16	13.9	58	50.4	6	5.2	35	30.4
6	Representativeness of the in-use indicators	21	18.3	54	47.0	5	4.3	35	30.4
7	Reliability of the in-use indicators	33	28.7	42	36.5	5	4.3	35	30.4
	Overall	**Mean = 9.72**		**Median = 13**		**SD = 6.815**		**% = 48.6**	

Although the majority of study participants (69.6 %) claimed to have clearly defined indicators against which their performance or the performance of their units is evaluated, only 33% could really show and describe these indicators clearly. These results are more positive than at the organizational questionnaire which could imply that the used indicators could have more technical nature and are rather used in the field.

Responses indicate that the culture of routinely tracking indicators (mean 1.33/3) and also the evaluation of these indicators against predetermined targets and benchmarks is weak (mean 1.23/3). This could raise some concerns regarding the effectiveness of these measurements as the lack of continuity and absence of comparison data implies that people

collects data and measure some indicators without being aware of their importance for decision making at their work. Also, combining these indicators with tangible targets and benchmarks would facilitate managers with the needed tools to track progress and motivate people. The quality of the used indicators regarding simplicity, affordability, representativeness and reliability is perceived as on the border line of satisfaction level (mean 1.49; 1.48; 1.53; 1.63 out of 3 respectively).

The total score of the indicators component was still low (48.6%); although higher than the result of the organizational questionnaire (40.47%). This result is largely below the finding of the WHO assessment of HIS in the Gaza Strip (2010c) or in Syria (2009), Yemen (2009) and Sudan (2007) with 55%, 87%, 67% and 69% respectively. Although this could be referred to the national character of the assessed indicators in other studies as mentioned before, this result could be motivating to focus more on establishing measurable performance indicators at the service level and use them as motivation tools by combining them with incentive systems. This is more crucial for NGOs than for other service providers as these organizations suffer from chronic turn over problems at their human resources. On the other hand, it is also needed to develop continuous monitoring systems for these indicators based on agreed standards to use them effectively.

4.2.4 Data sources

Table 4.15: Distribution of responses by HIS data sources-related variables

No.	Domain	Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
	HIS Data sources								
1	**Internal reporting**								
	Submission of reports to supervisor	51	44.3	46	40.0	2	1.7	16	13.9
	Receiving feedbacks from supervisor	42	36.5	30	26.1	9	7.8	34	29.6
	Receiving reports from supervisees	22	19.1	33	28.7	14	12.2	46	40.0
	Sending feedbacks to supervisees	25	21.7	31	27.0	4	3.5	55	47.8
2	**Use of external data sources**	6	5.2	27	23.5	14	12.2	68	59.1
	Overall	**Mean = 7.09**		**Median = 7**		**SD = 4.003**		**% = 47.27**	

There were five scale questions for this component with the same above mentioned scoring system and a maximum score of 15 points. Similarly to the organizational questionnaire the questions attempted to explore the internal data sources represented in reporting and feedback systems in addition to external data sources in the form of using them to verify the internal data. The total elicited score had the mean of 7.09 that is equal to a total percentage of 47.27%.

There is a functioning reporting mechanism among the higher managerial levels with the mean of 7 reports in the last 6 months. Receiving feedbacks to these reports was less active with the mean of 4.88 in the last 6 months (Annex 11). The use of external data sources to verify the organizational reports was very poor (mean 0.75; median 0), which is mainly responsible for the low total score of the component with 47.27%. This finding is congruent with these of Yemen (2009) with 44% & Sudan (2007) with 41% but slightly below the results of the last HIS assessment of Gaza Strip (WHO, 2010c) with 55% and widely below the results of Syria (2009) with 62%. Lack of effective indicator based, standards oriented monitoring systems could weaken the motivation among these young managers to collect external data. Even the apparently functioning reporting practices could be more a “Habits Style” than a meaning full system as revealed by Shalaby (2009) who found the “Blind Automation Syndrome” as most organizational learning model among MOH managers.

4.2.5 Data management & data quality

Table 4.16: Distribution of responses by HIS data management-related variables

No.	Domain	Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
	Data management & data quality								
1	Review of internal data/reports	46	40.0	48	41.7	1	0.9	20	17.4
2	Follow up & analysis of trends in performance	16	13.9	75	65.2	14	12.2	10	8.7
3	Speed of access to information	30	26.1	49	42.6	28	24.3	8	7.0
4	Timeliness of reports	39	33.9	49	42.6	14	12.2	13	11.3
5	Accuracy of reports	49	42.6	48	41.7	13	11.3	5	4.3
6	Comprehensiveness of reports	36	31.3	60	52.2	15	13.0	4	3.5
7	Disaggregating of data	47	40.9	50	43.5	14	12.2	4	3.5
	Overall **Mean=14.31**		**Median=15**			**SD = 4.143**		**% = 68.14**	

The component of data management had seven questions regarding review of internal reports submitted by the supervisees, follow up and analysis of trends in the unit's indicators, speed of access to information, timeliness, accuracy and comprehensiveness of reports in addition to disaggregating level of data with each one question and the maximum score of this component was 21points.

Data management practices regarding review of data/reports and the regular follow up and analysis of trends are generally reported as adequate (mean 2.04 and 1.84 respectively). The quality of the HIS regarding speed of access, timeliness, accuracy of reports, comprehensiveness and disaggregating of data were also perceived as adequate (means 1.88; 1.99; 2.23; 2.11; 2.22 respectively). The reached mean score was 14.31 (median 15) which equates a percentage of **68.14%**. This is congruent with the results of the organizational questionnaire with 61.46% but it is clearly over the result of the last HIS assessment in the Gaza Strip (WHO, 2010c) with only 18% and also those of Syria (2009) with 33%, Sudan (2007) with 17% and Yemen (2009) with 13% which has been

previously explained due to the limited managerial levels and the less bureaucratic nature of NGOs.

4.2.6 Information products

Table 4.17: Distribution of responses by HIS information products-related variables

No.	Domain	Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
	HIS information products								
1	Use of graphs in presentation of HIS results	10	8.7	32	27.8	18	15.7	55	47.8
2	Use of maps in presentation of HIS results	1	.9	9	7.8	8	7.0	97	84.3
3	Discussion of the HIS results in official meetings	17	14.8	54	47.0	29	25.2	15	13.0
4	Level of technology support in data presentation	26	22.6	57	49.6	18	15.7	14	12.2
5	Quality of data storage	41	35.7	55	47.8	13	11.3	6	5.2
	Overall **Mean = 6.83**			**Median = 7**		**SD = 2.957**		**% = 45.53**	

The results showed obvious weaknesses in the presentation practices of information in user friendly formats. The use of graphs reached the mean of 0.97 only and the use of maps even the mean of 0.25 whereas the discussion of HIS results in official meetings, the technology support in data presentations and the data storage methods were around the adequate level (means 1.63; 1.83 and 2.14 respectively).

The total score of the information products component reached the mean of 6.83/15 (median 7) accounting for a total score of **45.53%**. The reached score significantly differs from the reached score by the organizational questionnaire (64.0%) and also the results of neighboring countries which implies that the use of information products is mainly at the top management level. Indeed, having adequate capacities and tools to provide information in user friendly formats is much more important at higher managerial levels with limited available time for managers and policy makers to read through the figures jungle. This could be effectively achieved through the use of end results summarizing graphs showing

trends & relations and modern GIS digital maps that could send informative quick messages regarding distribution of population, diseases, health care centers and other health related conditions. On the other hand, the use of information products is not exclusively limited to the top managers but also the field workers should be equipped with some skills and tools while providing some information to the community (e.g. primary health care staff while performing health education and counseling).

4.2.7 Dissemination & use in decision making

Table 4.18: Distribution of responses by HIS information dissemination & use in DM

#	Domain	Yes		No	
		#	%	#	%
a.	**Information dissemination**				
1	Used information dissemination tools				
	E mail	58	50.4	57	49.6
	Written reports	108	93.9	7	6.1
	Staff meetings	101	87.8	14	12.2
	Other tools	46	40.0	69	60.0

		Highly adequate		Adequate		Existing but not adequate		Not existing	
		#	%	#	%	#	%	#	%
2	Quality of information dissemination among the org.	33	28.7	52	45.2	21	18.3	9	7.8
	Total score of information dissemination	**Mean = 4.67**		**Median = 5**		**SD = 1.336**		**% = 66.714**	

		Highly adequate		Adequate		Existing but not adequate		Not existing	
b.	**Use in decision making**								
1	Use of HIS in determining priorities & setting future plans	23	20.0	64	55.7	17	14.8	11	9.6
2	The level HIS is supporting DM	20	17.4	68	59.1	22	19.1	5	4.3
3	Appreciation of the use of HIS in DM	13	11.3	79	68.7	18	15.7	5	4.3
4	Level of accountability according to HIS results	20	17.4	51	44.3	21	18.3	23	20.0
5	Common applications of HIS	**Yes**		**No**					
	Patient appointments	44	38.3	71	61.7				
	Defaulters follow up	35	30.4	80	69.6				
	Payments exemptions	65	56.5	50	43.5				
	Order of medical supplies	99	86.1	16	13.9				
	Setting staff schedules	72	62.6	43	37.4				
	Total score of HIS use in DM	**Mean = 9.96**		**Median = 10**		**SD = 2.776**		**% = 58.59**	
	Grand total score of HIS dissemination & use	**Mean = 14.63**		**Median = 15**		**SD = 3.645**		**% = 60.96**	

The component was divided into two sub components similarly to the organizational questionnaire; information dissemination with a maximum total score of 7 points and the use in decision making with a maximum score of 17 points. The elicited results were a total score of 66.714% (mean 4.67; median 5) by the information dissemination sub component and a total score of 58.59% (mean 9.96; median 10) by the use in decision making component. The total score of the two sub components was 60.96% (mean 14.63; median 15). Although the reported total score is less than by the organizational questionnaire of 69.13%, it is still largely over the results of the last WHO assessment of HIS in Gaza Strip with only 36% (WHO, 2010c), and also much higher than the documented results of Syria (2009), Yemen (2009) and Sudan (2007) with scores of 27%, 20% and 40% respectively. This confirms the higher use of information at small entities like NGOs than at huge bureaucratic bodies with fragmented and uncoordinated structures. The resulted lower total score of this component in comparison to the organizational questionnaire could be referred to the centralized character of NGOs where the role of information dissemination and the main decisions are done at the top level.

The main used information dissemination tools were the written reports (93.9%) similarly to the organizational questionnaire and the findings of Yaghi (2009). The most common use of HIS in decision making on operational level was by the order of medical supplies (86.1%) followed by setting staff schedules (62.6%) whereas the lowest use was by the follow up of defaulters with only 30.4%. The positive attitudes of study participants towards the use of HIS were reflected in their evaluation of the level of appreciation of HIS use with a score of 62.3% for this item. Also the evaluation of the extent of HIS use in determining priorities & setting future plans and the level it supports decision making in general scored high with 62.0% & 63.2% respectively. The level it supports accountability was only around the satisfaction level with a score of 53%. This could be referred to the general poor use of performance indicators as measurable criteria and prerequisites for accountability.

4.2.8 Other decision making influencing factors:

a) Transparency in decisions

Table 4.19: Distribution of participants' perceptions towards transparency in DM in their NGOs

No.	Domain	Excellent		good		moderate		weak		Very poor	
		#	%	#	%	#	%	#	%	#	%
1	Hiring & Recruiting decisions	38	33.3	46	40.4	20	17.5	7	6.1	3	2.6
2	Procurements decisions	48	42.5	56	49.6	6	5.3	3	2.7	0	0
3	Patient payments decisions	62	53.9	46	40.0	7	6.1	0	0	0	0
4	Performance evaluation of staff	27	23.5	50	43.5	20	17.4	15	13.0	3	2.6
	Overall	**Mean = 12.4 /16**		**Median = 13**				**SD = 2.535**		**% = 77.81**	

The researcher used 4 scale questions to evaluate the transparency in decisions by NGOs that were scored 4 for "excellent", 3 for "good", 2 for "moderate", 1 for "weak", and 0 for "very poor" with the total maximum score of 16 points. The total score of this component was 77.81% (12.45/16) which implies a transparent decision making process. This transparency could be a result of intensive use of evidence in decision making. But it is important to highlight that this result comes from the perceptions of decision makers themselves and should be cautiously considered until it could be validated through the perceptions of other employees or using other methodologies. However, despite this limitation the transparency in decisions was least perceived by performance appraisal of staff followed by hiring & recruiting decisions with scores of 68% & 73.9% respectively. This implies some weaknesses in the human resource management decisions which are consistent with the findings of Yaghi (2009) who found that such decisions are partially subjects to personal connections, tribal and political affiliations particularly at the top management levels. However, transparency in decision making remains a chronic problem in the Palestinian health care system as it became a common event when decision makers use their authorities to secure loyalty and other personal benefits (Giacaman, et al, 2009).

b) Other decision making influencing factors

Different variables were evaluated according to a scale ranging from 0 (No influence) to 3 (Strong influence) and the results were as following:

Table 4.20: Distribution of participants' perceptions towards different DM influencing factors

No.	Factor	Strong influence		Moderate influence		Weak influence		No influence		Mean	Median	SD
		#	%	#	%	#	%	#	%			
1	Personal relations	40	34.8	26	22.6	26	22.6	23	20.0	1.72	2	1.144
2	Manager's mood & attitudes	31	27.0	29	25.2	28	24.3	27	23.5	1.56	2	1.125
3	Available financial resources	71	61.7	38	33.0	4	3.5	1	.9	2.57	3	0.609
4	Experience & skills of decision maker	75	65.2	33	28.7	5	4.3	2	1.7	2.57	3	0.663
5	Available information	68	59.1	40	34.8	5	4.3	2	1.7	2.51	3	0.667
6	Transparency in the authorities	53	46.1	46	40.0	11	9.6	5	4.3	2.28	2	0.812
7	Organizational culture & beliefs	41	35.7	51	44.3	12	10.4	11	9.6	2.06	2	0.92
8	Pressure of the community	28	24.3	39	33.9	26	22.6	22	19.1	1.63	2	1.054
9	Political trends & interest	19	16.5	19	16.5	28	24.3	49	42.6	1.07	1	1.122
10	Pressure of the media	10	8.7	15	13.0	33	28.7	57	49.6	0.81	1	0.972
11	Donor agendas	35	31	30	26.5	29	25.7	19	16.8	1.72	2	1.081

The most perceived influencing factors on decision making were the available financial resources and the experience & skills of the decision maker with the mean of 2.57 for both followed by the available information with the mean of 2.51. The weakest influence had the media pressure with the mean of 0.81. Although the available information came on the third rank the researcher finds that this position is encouraging and confirms that the use of

information in decision making is highly appreciated in NGOs as mentioned in the organizational questionnaire. Strengthening the used HIS systems would effectively promote the use of information in decision making in the future. On the other hand, it is important to recognize that real world decisions must consider the general overall context including the common values, culture and resources available (Clancy & Cronin, 2005). Special attention needs to be given to the level of experience and skills of the decision maker as one of the most influencing factors in decision making especially due to the inadequately transparent selection criteria of managers in the Palestinian context discussed before. Therefore, any future HIS improvement strategies need to consider training managers in management and leadership skills that might improve their utilization of information in decision making.

c) Barriers to the use of information in decision making:

Table 4.21: Distribution of participants' perceptions towards the main potential barriers to the use of information in decision making

No.	Factor	Yes		No	
		#	%	#	%
1	Lack of access to information	38	33.0	77	67.0
2	Inadequate HIS resources	64	55.7	51	44.3
3	Lack of time to work with data	50	43.5	64	55.7
4	Low motivation to demand data	51	44.3	63	54.8
5	Lack of interpretation skills	43	37.4	72	62.6
6	Lack of reading culture	31	27.0	83	72.2
7	Resistance to change	49	42.6	66	57.4
8	Feeling of lack of ownership	36	31.3	79	68.7

Inadequate HIS resources were perceived as the most important barrier to the use of information in decision making with a percentage of 55.7% followed by low motivation to demand data with a percentage of 44.3%. These findings are consistent with that reported by Godlee, et al (2004) and Mataria, et al (2009). Nevertheless, it should be here distinguished between the low motivation to demand data that could be a result of lack of

effective indicator based monitoring systems, and poor data presentation capacities from the general positive attitudes towards the use of data.

4.2.9 Summary of HIS evaluation:

Table 4.22: Summary of HIS evaluation

#	Domain	Org. questionnaire		Ind. questionnaire	
		%	Mean	%	Mean
1	**HIS resources**				
	Available HIS infrastructure	59.31	7.71 / 13		
	Policies & regulations	36.5	2.19 / 6		
	General perceptions & attitudes			78.51	51.03 /65
	Available personal & technical capacities			40.15	8.03 /20
	Total	52.11	9.905 /19	69.48	59.06 /85
2	**HIS indicators**	40.47	12.95 /32	48.6	9.72 /20
3	**HIS data sources**	53.46	6.95 /13	47.27	7.09 /15
4	**HIS data management & data quality**	61.0	9.76 /16	68.14	14.31 /21
5	**HIS information products**	64.0	5.762 /9	45.53	6.83 /15
6	**HIS information dissemination & use in decision making**				
	Information dissemination	72.16	13.71 /19	66.714	4.67 /7
	Use of HIS in DM	67.39	22.24 /33	58.59	9.96 /17
	Total	69.13	35.95 /52	60.96	14.63 /24
	Overall score	**57.65**	**81.29 /141**	**62.02**	**111.63 /180**

The above mentioned table shows wide gaps in the evaluation of HIS resources and information products between the perspectives of individuals and their organizations. HIS resources were much better perceived among individuals (69.51%) than among the organizational top managements (52.13%), whereas the perspectives were contradicted towards information products (45.53% by individuals and 64.02% by the organizations).

These contradicted perceptions could indicate lack of system thinking at NGOs that need to be addressed in the future.

However, the table obviously illustrates the main strengths and weaknesses of the system. To the positive points it is worth to mention the positive personal perceptions and attitudes of individuals, the good potential in data management and in information dissemination. On the other hand there is an obvious consensus that the existing policies & regulations, the use of external data sources, current use of indicators and finding appropriate criteria for their measurement should be counted to the weaknesses of the system.

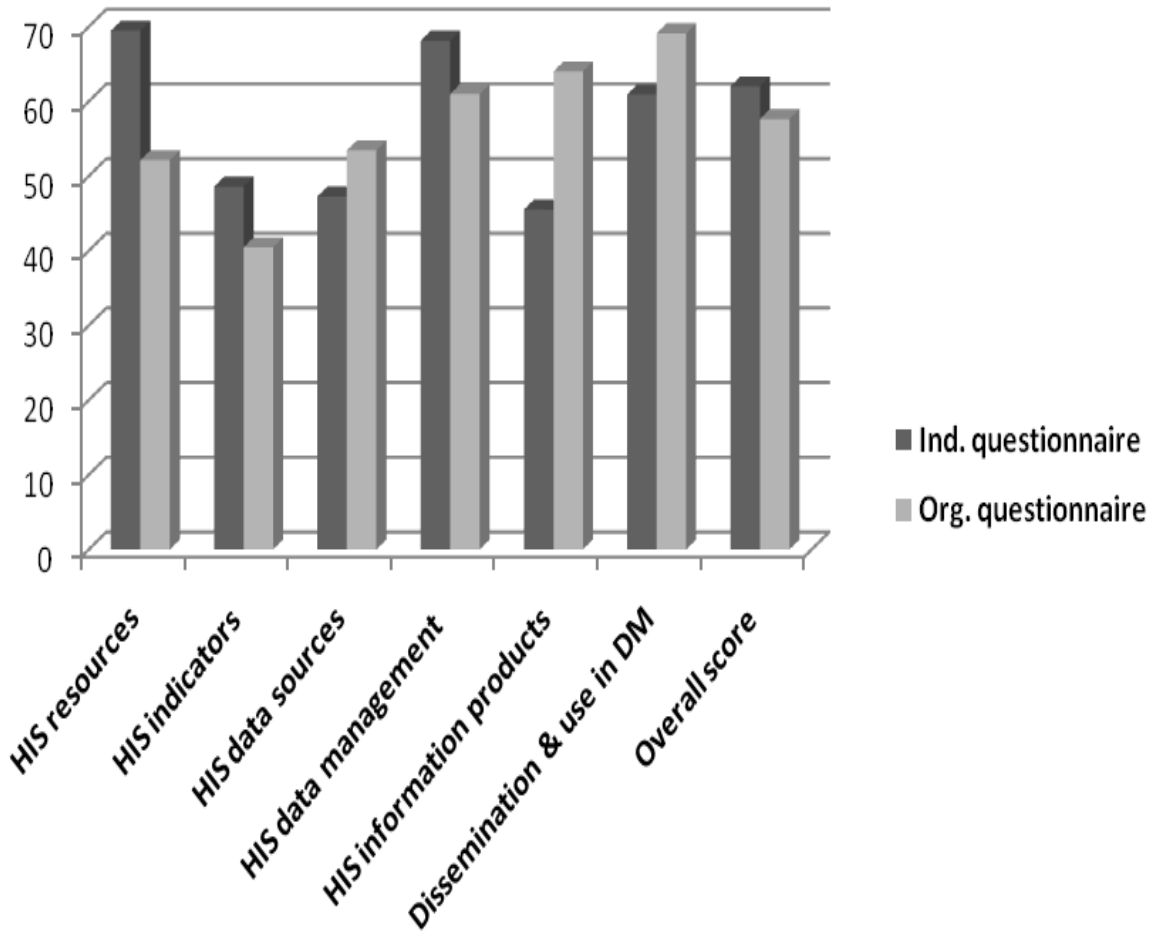


Figure 4.3: Final scores of HIS components in the individual & organizational questionnaires

4.3 Differences in perceptions about HIS components

4.3.1 Gender

Table 4.23: Differences in perceptions about the performance of HIS components by gender

HIS components	Gender	N	Mean	SD	t	Sig.
HIS resources	Male	82	58.67	6.276	1.005	0.317
	Female	33	60.03	7.235		
HIS indicators	Male	82	9.21	6.791	1.28	0.203
	Female	33	11.00	6.810		
HIS data sources	Male	82	7.22	4.095	0.558	0.578
	Female	33	6.76	3.808		
HIS data management	Male	82	14.15	4.119	0.679	0.499
	Female	33	14.73	4.237		
HIS information products	Male	82	6.96	3.000	0.784	0.435
	Female	33	6.48	2.863		
HIS dissemination & use in DM	Male	82	14.55	3.396	0.357	0.722
	Female	33	14.82	4.253		
Overall	Male	82	110.76	20.452	0.68	0.498
	Female	33	113.82	25.036		

An independent t-test was used to compare the means of the six HIS components and their overall score in reference to the gender (Table 4.23). The analysis revealed no statistically significant differences between males and females regarding the performance of any of the HIS components. It can be concluded that gender does not play a role in the perception of participants towards the performance of HIS components. This is congruent with the findings of Shorafa (2004) and implies that any future HIS strengthening strategies should focus on both groups at the same level.

4.3.2 Availability of a computer at work place

Table 4.24: Differences in perceptions about the performance of HIS components by the availability of a computer at the work place

HIS components	Computer	N	Mean	SD	t	Sig.
HIS resources	Yes	99	60.32	5.933	5.826	0.001
	No	16	51.25	4.655		
HIS indicators	Yes	99	10.32	6.584	2.403	0.018
	No	16	6.00	7.257		
HIS data sources	Yes	99	7.77	3.758	4.988	0.001
	No	16	2.88	2.754		
HIS data management	Yes	99	14.87	3.624	3.78	0.001
	No	16	10.88	5.476		
HIS information products	Yes	99	7.39	2.583	5.814	0.001
	No	16	3.31	2.750		
HIS dissemination & use in DM	Yes	99	15.08	3.416	3.486	0.001
	No	16	11.81	3.868		
Overall	Yes	99	115.76	19.317	5.700	0.001
	No	16	86.13	19.138		

The above table clearly shows that participants having computers on their work places have higher perceptions towards the performance of all HIS components than others without computers as this group had the higher means by all components and the mean differences reached statistically significant levels ($P< 0.05$). This is expected as the existence of a computer at the work place will enormously facilitate data processing, management and retrieval especially in overburdened work environments. It is important that according to this result NGO top management would not only completely equip their managers with needed hardware but also expand that to all workplaces where some information processing is needed and provide also supporting software to enable connectivity and smooth information flow.

4.3.3 Managerial level

Table 4.25: Differences in perceptions about the performance of HIS components by managerial level

HIS components	Managerial level	N	Mean	SD	F	Sig.
HIS resources	Top level	15	63.53	4.357	4.247	0.017
	Midlevel	32	58.53	4.174		
	First level	68	58.32	7.488		
HIS indicators	Top level	15	11.53	6.278	0.642	0.528
	Midlevel	32	9.72	5.865		
	First level	68	9.32	7.347		
HIS data sources	Top level	15	8.73	3.654	1.526	0.222
	Midlevel	32	7.03	4.418		
	First level	68	6.75	3.838		
HIS data management	Top level	15	15.20	3.385	0.435	0.648
	Midlevel	32	14.00	3.724		
	First level	68	14.26	4.491		
HIS information products	Top level	15	8.53	2.356	4.116	0.019
	Midlevel	32	7.19	2.348		
	First level	68	6.28	3.185		
HIS dissemination & use in DM	Top level	15	16.60	2.923	2.604	0.078
	Midlevel	32	14.28	2.876		
	First level	68	14.35	3.999		
Overall	Top level	15	124.13	18.574	2.985	0.055
	Midlevel	32	110.75	15.820		
	First level	68	109.29	24.074		

As the independent variable here has three categories; top level, midlevel and first level managers, it was necessary to test the differences in perceptions towards the performance of HIS components using the one-way ANOVA test. The Post Hoc – Scheffe option was implemented to identify which groups have statistically significant differences. Although the found means were gradually increasing according to managerial levels with highest means in all HIS components by the top managers, only by HIS resources and HIS information products reached these differences statistically significant level (P=0.017 and 0.019 respectively). According to Scheffe test the differences in the perceptions towards HIS resources between top managers and both other groups were statistically significant (Sig.=0.047 & 0.019) but regarding the information products only the differences between

top managers and first level managers reached statistically significant level (Sig.=0.026). This might confirm the findings of the descriptive analysis that showed gaps in the human resource development activities, some weaknesses in the available infrastructure at lower managerial levels and also in the use of information in user friendly formats. The researcher hopes that these findings will be encouraging for NGO top managers to allocate more resources to fill these gaps.

4.3.4 Type of work

Table 4.26: Differences in perceptions about the performance of HIS components by type of work

HIS components	Work place	N	Mean	SD	F	Sig.
HIS resources	Hospital	51	56.08	7.202	11.374	0.001
	PHC	43	61.12	5.039		
	Main office	21	62.10	4.582		
HIS indicators	Hospital	51	8.18	6.884	3.157	0.046
	PHC	43	10.26	7.185		
	Main office	21	12.38	4.873		
HIS data sources	Hospital	51	5.47	3.812	8.447	0.001
	PHC	43	8.40	3.513		
	Main office	21	8.33	4.139		
HIS data management	Hospital	51	12.57	4.721	9.571	0.001
	PHC	43	15.93	2.995		
	Main office	21	15.24	2.998		
HIS information products	Hospital	51	5.35	2.945	15.390	0.001
	PHC	43	7.65	2.429		
	Main office	21	8.71	2.239		
HIS dissemination & use in DM	Hospital	51	12.92	3.698	12.025	0.001
	PHC	43	16.09	3.061		
	Main office	21	15.76	2.914		
Overall	Hospital	51	100.57	22.261	14.858	0.001
	PHC	43	119.44	17.481		
	Main office	21	122.52	16.108		

One way ANOVA test was used to examine the differences in perceptions about different HIS components in reference to type of work. The test showed that participants working in hospitals have lower means in all components than other groups and all these differences reached statistically significant levels ($P< 0.05$). This result might be alarming for NGO

top managers especially those who operate hospitals as the need to have functioning HIS could be there more essential than elsewhere. The reality that hospitals act as close systems with little interactions with the surrounding environment in addition to lack of managerial capacity building activities among hospitals' managers, particularly in HIS related field, as found by Al Ghareeb (2009), could explain this underperformance. Therefore building HIS related capacities including basic knowledge in statistics, data collection methods, analytical and problem solving & decision making skills need to be placed on the top priorities of hospitals' training strategies in the future.

4.3.5 Number of employees working in the NGO

Table 4.27: Differences in NGOs about the performance of HIS components by number of employees working in the NGO

HIS components	Nr. of employees	N	Mean	SD	F	Sig.
HIS resources	up to 25	6	6.17	3.764		
	26 to 75	8	10.25	5.825	3.822	0.041
	76 and above	7	12.71	1.890		
HIS indicators	up to 25	6	10.17	11.583		
	26 to 75	8	14.25	11.029	0.280	0.759
	76 and above	7	13.86	9.907		
HIS data sources	up to 25	6	5.67	3.141		
	26 to 75	8	7.88	3.563	0.855	0.442
	76 and above	7	7.00	2.517		
HIS data management	up to 25	6	10.17	1.835		
	26 to 75	8	9.50	4.342	0.068	0.934
	76 and above	7	9.71	3.039		
HIS information products	up to 25	6	5.83	.753		
	26 to 75	8	6.38	1.506	1.651	0.220
	76 and above	7	5.00	1.826		
HIS dissemination & use in DM	up to 25	6	32.00	9.737		
	26 to 75	8	38.13	9.031	0.976	0.396
	76 and above	7	36.86	6.067		
Overall	up to 25	6	70.00	23.958		
	26 to 75	8	86.38	30.580	0.830	0.452
	76 and above	7	85.14	19.360		

This test was made by the organizational questionnaire to examine the variations in the perceived performance of HIS components among different NGOs regarding the numbers

of their employees. ANOVA test was used and the results showed that the number of available employees had only a statistically significant influence on the perceived HIS resources (P=0.041), whereas NGOs with biggest volume of available human resources had higher means than medium level and small level ones. This could be associated with the organization's financial capacities that are normally better by larger organizations than by smaller ones and that could be reflected on the allocated resources for HIS. Influence of the volume of human resources on other HIS components did not reach statistically significant levels.

Chapter 5

Conclusion and Recommendations

5.1 Conclusion

The study was conducted to examine the extent local health NGOs follow information based decision making by using the information produced by their HIS and to identify the barriers for strengthening those systems. It could reveal many important findings that could help in promoting the use of information in these organizations in the future and could provide some baseline information towards establishing an effective and comprehensive national HIS. In the following paragraphs a brief summary of the findings of the study and its conclusions will be illustrated.

The study utilized a descriptive, analytical cross sectional design with a quantitative approach. The researcher followed the census model by targeting all eligible health NGOs and used the interviewed questionnaire as data collection tool. Two questionnaire forms were developed based on the HMN assessment tool for national HIS after modification and adaptation to the Palestinian NGO context. Both organizations as whole and individual managers at these organizations were targeted covering organizational facts and individual perceptions. High response rates both among organizations and individuals ensured high validity of the study findings. Other measures like standardized data collection, data cleaning and reentry contributed to high reliability levels by both organizational & individual tools (Cronbach Alpha coefficient 0.954 & 0.904 respectively).

In consistency with general gender distribution in the Palestinian health organizations the majority of participants were male. Promising demographic and work related characteristics were found as almost two thirds of participants were aged up to 45 years and more than two thirds were holding at least the Bachelor degree. A considerable portion had long work experience as more than three quarters had work experience of 10 years or more. In congruence with their real distribution, first level managers comprised more than half of participants followed by midlevel managers and least were the top managers. More than two thirds of participants have their work place in Gaza which is consistent with the

geographical distribution of NGO facilities and main offices. Their type of work ranged from hospitals, primary health care centers to main administrative offices.

The majority of assessed NGOs use computerized database systems to some extent but their most focus is on incorporating financial and administrative components in these systems with little concern to technical ones. Most participants had adequate computer proficiency skills and had computers at their work places but only two thirds had access to the internet. Highly positive individual attitudes and perceptions were found towards working with data, which is essential for improved HIS performance. However, little efforts are done towards developing policies & regulations to enhance the information use. Big training needs were identified especially in the areas of information management and problem solving & decision making skills. Variations in the general evaluation of HIS resources were found between the individual and organizational questionnaires, as this was slightly over the satisfaction level in the organizational questionnaire whereas it was highly evaluated by the individual one. This was referred to the high scores in the general attitudes component in the individual questionnaire.

The use of performance indicators was found to be inadequate as a third of participating NGOs revealed that they do not use them at all and only a fifth could show or describe the used indicators. However, it seems that indicators are less used by top managers than in the field and most attention is given to indicators related to financial aspects. Measuring indicators is less likely to be routinely conducted and they generally lack predetermined targets or benchmarks to be compared with.

Positive points could be seen in the internal reporting patterns as they could reveal a well functioning system, but severe shortages were found in the use of external data sources. Only a third of assessed NGOs rely to some extent on published data in developing their programs and about a quarter of participating NGOs do not conduct their own need assessments. Other NGOs that use this practice, annually conduct in average about one assessment only. More than a third of organizations do not consider population projections to estimate coverage of their services. Inadequate data collection capacities and lack of effective indicator-based and standards oriented monitoring & evaluation systems are argued to be responsible for the low commitment to collect external data. Generally, the performance of HIS data sources was perceived around the satisfaction level.

The quality of data management revealed to be adequate regarding review of internal reports, analysis of trends, and quality of produced information. Clear weaknesses were found in the verification of the accuracy of produced information through external sources.

Variations in the evaluation of the quality of information products were found between the organizational and individual questionnaires as it was perceived under the satisfaction level by the individuals whereas it scored high at the organizational questionnaire. This was referred to the relatively exclusive use of information products at the top management level. However, the study showed some obvious weaknesses in presentation capacities of produced information. Around a half of individual participants do not use graphs and less than a fifth use maps as data presentation tools.

The study revealed effective internal communication systems mainly with verbal nature whereas the use of E mail was found by only half of participants. Reluctance to use other modern information dissemination tools such as websites was found in the external communication with other stakeholders. However, first address of external communication revealed to be donors whereas MOH came secondly. Information sharing with the community and other NGOs was inadequate as about a third of assessed NGOs have no connections with these stakeholders. It is argued that the use of stereotyped communication tools and the poor information presentation skills at the operational levels could be responsible for this gap. The general use of HIS in decision making was evaluated as good but most use was concerning financial issues including revenue, costs and budget analysis. The transparency in decisions was highly perceived but with less scores in the human resource management decisions implying for the need for strengthening the use of indicators and standards in this area.

Variations in the perceptions towards HIS performance were found among participants by type of work. Participants working in hospitals revealed lower scores in all HIS components in comparison to other groups whereas all these differences reached statistically significant levels. Also, computer users revealed higher evaluation of all HIS components than non-user whereas all these differences reached statistically significant levels. Statistically significant differences were found among different managerial levels in

the evaluation of HIS resources and information products with higher perceived performance among top managers than the other groups.

To sum up the assessed HIS by local health NGOs in Gaza Strip showed some strengths but also revealed several weaknesses and improvement needs. The main strengths could be summarized in the highly positive individual attitudes, the young age of most NGOs managers, the effective internal communications and the felt commitments of top managers towards computerization and increasing accountability & transparency in decision making. Main weaknesses were the lack of appropriate HIS policies & regulations, lack of HIS training activities, poor use of performance indicators and lack of standardized systems for their measurements and evaluation, poor use of external data sources, inadequate data presentation capacities at the operational levels, inadequate information sharing with the community and shortages in the general HIS performance in hospitals.

5.2 Recommendations

After reviewing the study findings the researcher made some recommendations that aim to improve the HIS systems and enhance the information based decision making including:

1. Identifying information needs and building consensus on a set of performance indicators including operational definitions, methods of data collections, data sources, data collection rhythm and evaluation standards.
2. Increasing investments in developing guidelines and policies to reinforce the use of information systems in decision making.
3. Developing human resources capacity to address gaps in the HIS including enhancing data management and analysis and using results in problem solving & decision making
4. Developing long term HIS improvement plans including allocating human resources and budgets with focus on automating data processes.
5. Establishing indicators based human resource development systems such as combining job descriptions and performance appraisals with measurable indicators with predetermined targets and setting achievement based promotion systems
6. Enhancing a culture of using HIS as a tool for decision making through;
    - Leadership commitment and support
    - Implementing policies and regulations
    - Supporting infrastructure
    - Teaming up among data people and different levels in the health system such as policy makers and health providers
    - Acknowledgement of appropriate performance and using effective incentive systems
    - Monitoring performance of HIS
7. Developing effective information sharing mechanisms among NGOs, other service providers and the community

5.2.1 Recommendations for further research

As one study could not cover all aspects of this complex topic and as many questions were raised during interpretation of the study findings, the researcher would recommend conducting new research studies covering the following areas:

- Assessment of the use of health information in decision making by other providers such as the MOH or UNRWA
- In-depth analysis of the barriers to practice information based decision making in hospitals
- Studying the employees' perspectives regarding the use of HIS in different health providers
- Action research of the effect of training in health information management on the use of evidence based decision making
- Costing analysis of HIS strengthening options
- Assessment of the effectiveness of different information dissemination tools
- Evaluation of socio-cultural factors affecting the use of information

Chapter 6

References and Annexes

6.1 References

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6.2 Annexes

Annex (1): Health care facilities in Gaza Strip (WHO, 2010d)

Annex (2): Ethical approval from Helsinki committee

(11)

Palestinian National Authority
Ministry of Health
Helsinki Committee

السلطة الوطنية الفلسطينية
وزارة الصحة
لجنة هلسنكي

التاريخ7/6/2010

Name:

الاسم: أكرم حسن نصار

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

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

Evaluation of the use of health information system in decision making in non-Governmental Organizations-Gaza Governorates.

In its meeting on June 2010
and decided the Following:-
To approve the above mention research study.

و ذلك في جلستها المنعقدة لشهر 6 2010
و قد قررت ما يلي:-
الموافقة على البحث المذكور عاليه.

Signature
توقيع

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 (3): Administrative approval from NGO

Al-Quds University
Jerusalem
School of Public Health
2010/7/17

جامعة القدس
القدس
كلية الصحة العامة

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

الموضوع: مساعدة الطالب أكرم حسن نصار

يقوم الطالب المذكور أعلاه بإجراء بحث بعنوان:

"Evaluation of the Use of Health Information System in Decision Making in Non-Governmental Organizations - Gaza Governorate"

كمتطلب للحصول على درجة الماجستير في الصحة العامة-مسار إدارة صحية و عليه نرجو التكرم للإيعاز لمن ترونه مناسب لتسهيل مهمة الطالب في جمع البيانات اللازمة للبحث.
علماً بأن المعلومات ستكون متوفرة لدى الباحث و الجامعة فقط.

و اقبلوا فائق التحية و الاحترام،،،

د. بسام أبو حمد
منسق عام برامج الصحة العامة

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Annex (4): Questionnaire's explanatory letter (Arabic)

عزيزي المشارك :

أنت مدعو للمشاركة في البحث المذكور أعلاه

هذه الدراسة هي جزء من متطلبات شهادة الماجستير في الصحة العامة بجامعة القدس .

الغرض من هذه الدراسة هو معرفة دور نظم المعلومات الصحية في صنع القرار في المؤسسات الأهلية بقطاع غزة

مشاركتكم هي مشاركة طوعية ومن حقكم رفض اجابة الأسئلة ، ولكن اذا ما وافقتم على المشاركة بالدراسة فستحتاجون فقط إلى اجابة أسئلة المقابل وستدون الإجابات في الإستبيان

البيانات التي سيتم جمعها من خلال الدراسة سيتم الحفاظ على سريتها وسيتم استخدامها فقط لأغراض علمية

اننا نثمن عالياً مساندتكم ومساعدتكم

الباحث :

أكرم نصار

جوال : 0599-772916

بيان الموافقة على المشاركة بالبحث :

لقد قرأت المعلومات المذكورة أعلاه . لقد طرحت بعض الأسئلة وحصلت على اجابات .

انا أفهم أنه من خلال اجابتي على أسئلة المقابلة فانني أعطي موافقتي على المشاركة بهذه الدراسة

Annex (5): Questionnaire's explanatory letter (English)

Dear participant:

You are invited to be in the above mentioned research study.

This study is conducted as a part of the requirements for Master program in Public Health at Al- Quds University School of Public Health, Palestine.

The purpose of this study is to identify the role of health information system in decision making in nongovernmental organizations in Gaza governorates.

Your participation is voluntary; you have the right to refuse to answer the questions. If you agree to participate in the study, you need to answer the interviewer questions that will be filled.

The data collected from this study will be kept confidential and will be used for scientific purposes only.

Your cooperation is highly appreciated.

Researcher

Akram Nassar

Mobile: 0599-773916

Statement of consent

I have read the above information. I have asked questions and received answers. I understand that by answering the interviewer questions, I give consent for participation in this study.

Annex (6): Organizational questionnaire

Title: Evaluation of the use of Health Information System in Decision Making in Non Governmental Organizations – Gaza Governorates

Questionnaire serial number: …… Date : ……

A) Organizational questionnaire

1. Organizational demographic data

1	Name & post address of the organization	……
2	Tel./ Fax	……
3	E mail	……
4	Year of actual beginning of health activities	……
5	Number of primary health care centers	……
6	Number of hospitals ……	
7	Total number of employees ……	

2. Health information system

2.1 HIS resources

8 Do you have an advanced data base system for information management?
Yes □ No □

9 If yes : which of the following components are included & used ? (choose all that applies)

Patient admissions/ discharge	□
Patient billing/ account receivables	□
Payroll	□
Taxonomy of workforce	□
Budgeting	□
Supply chain management	□
Patient records	□
Laboratory records	□
Pharmacy records	□
Patient referral system	□
Occupational health registry	□

		No	Yes	Yes seen
10	The organization has policies for reporting & information flow	□	□	□
11	The information flow policies include feedback mechanisms	□	□	□
12	There is a specific budget for the functioning of HIS	□	□	□

13 If yes: Percentage to total operational budget: ……..%

2.2 HIS indicators

14	Does the organization have a set of well defined indicators If the answer is "NO" skip to question 25	Yes seen □ Yes □ No □			
	If yes: To what extent do the indicators cover the following areas:	Highly adequate	Adequate	Existing but not adequate	Not existing
15	Human resources	□	□	□	□
16	Financial management	□	□	□	□
17	Commodity management	□	□	□	□
18	Service availability	□	□	□	□
19	Service coverage	□	□	□	□
20	Access level to provided services	□	□	□	□
21	Success rate of used interventions	□	□	□	□
22	Final impact on the community	□	□	□	□
23	Are the indicator definitions consistent with the national & international standards?	□	□	□	□
24	Are the indicators combined with targets / benchmarking?	□	□	□	□
2.3 Data sources					
25	Do you select your services after conducting need assessments of the target population	Yes □ No □			
26	If yes, which need assessments did you conduct in the last year?	1. …… 2. …… 3. ……			
27	Do you rely on information received from published studies in the design of your programs?	Yes □ No □			
28	Which of your programs are based on published studies	1. …… 2. …… 3. ……			
29	To what extent are population projections used for the estimation of coverage and planning for new services?	Highly adequate □	Adequate □	Existing but not adequate □	Not existing □

30	To what extent do the organization's units submit regular reports to the top management?	□	□	□	□
31	To what extent do the organization's units receive feedbacks from the top management?	□	□	□	□
2.4 Data management & data quality					
	How do you evaluate the quality of information received from your HIS regarding:	Highly adequate	Adequate	Existing but not adequate	Not existing
32	Consistency of data	□	□	□	□
33	Completeness of reports	□	□	□	□
34	Timeliness of reports	□	□	□	□
35	Disaggregation of data	□	□	□	□
36	Accuracy of reports	□	□	□	□
37	Do you regularly evaluate the information received from the units against other sources?	Yes □	No □		
2.5 Information products					
		Highly adequate	Adequate	Existing but not adequate	Not existing
38	To what extent are information products presented in user friendly formats for decision making	□	□	□	□
39	To what extent are information products discussed throughout the organization	□	□	□	□
40	To what extent are information products stored in a way that permits a prompt access	□	□	□	□
2.6 Dissemination & Use in decision making					
2.6.1 Information dissemination					
41	The organization has a system for communicating technical & administrative updates to all staff		Yes □	No □	
42	If yes: Which of the following tools are used? (choose all that applies)				
	E mail □				
	Written reports □				
	Regular staff meetings □				
	Telephon □				
	Others (classify) ……				

43	HIS products are regularly shared with other stakeholders	Yes	□
		No	□
44	With whom of the following stakeholders are HIS products regularly shared? (choose all that applies)		
	Ministry of Health	□	
	Donors	□	
	Other local health NGOs	□	
	Target beneficiaries	□	
	Universities	□	
45	The used dissemination tools of HIS products to external stakeholders include the following: (choose all that applies)		
	Website	□	
	E mail	□	
	Printed reports	□	
	Press release	□	
	Workshops	□	
	Community meetings	□	
	Others (classify)	…….	

2.6.2 Use in decision making

		Highly adequate	Adequate	Existing but not adequate	Not existing
46	The HIS results were used in changing some policies in the organization Examples: …… …… …….	□	□	□	□
47	The HIS results lead to introduction of new services or changing old ones	□	□	□	□
48	HIS information is used to advocate for equity and increased resources to the vulnerable groups & communities	□	□	□	□
49	HIS information is widely used in the performance evaluation of units & individuals	□	□	□	□
50	Managers are routinely held accountable for their performance based on the indicators received from HIS	□	□	□	□
	To what extent do you use the MIS to analyze the following				

51	Costs/ budget	□	□	□	□
52	Labor costs	□	□	□	□
53	Revenue	□	□	□	□
54	Quality of services	□	□	□	□
55	Expenditure forecasts	□	□	□	□
56	Beneficiaries forecasts	□	□	□	□
3. Other decision making influencing factors					
		Yes	No		
57	Does the organization have a documented structure with clear authorities?	□	□		
58	Is the decision making authority within the structure decentralized among all management levels?	□	□		
59	Does the common organizational culture and beliefs recognize the delegation & accountability of responsibilities?	□	□		
60	Does the common organizational culture and beliefs appreciate the use of evidence based decision making?	□	□		

Annex (7): Individual questionnaire

Title: Evaluation of the use of Health Information System in Decision Making in Non Governmental Organizations – Gaza Governorates									
Questionnaire serial number: ……						Date : ……			
B) Individual questionnaire									
1. Demographic data									
1	Gender	Female □							
		Male □							
2	Age: …….								
3	Level of education	PhD □				Bachelor □			
		Master □				Diplom or less □			
4	Total years of experience					……			
5	Managerial position					…….			
2. Health information system									
2.1 General perceptions to the use of HIS & the available resources									
2.1.1 General perceptions to HIS									
	Please give your opinion about the following statements:								
		SA		agree	DK		disagree		SD
6	Health workers are overloaded with excessive data demands	□		□	□		□		□
7	Working with data is a waste of care provider's time	□		□	□		□		□
8	Top management allocate adequate resources to support the HIS	□		□	□		□		□
9	Feedbacks from top management to peripheral levels encourage the creation of a culture of data generation & use	□		□	□		□		□
10	Community based data are essential for rational planning	□		□	□		□		□
11	Timely and fast information processing & dissemination can support decision making	□		□	□		□		□
	The HIS help me to:								
12	Evaluate performance	□		□	□		□		□
13	Dig behind the numbers	□		□	□		□		□
14	Track progress toward goals	□		□	□		□		□
15	Anticipate problem areas	□		□	□		□		□
16	Takes the complexity out of my job	□		□	□		□		□

17	Increases the speed at which I make decisions	□	□	□	□	□
18	Improves the quality of my decisions	□	□	□	□	□
2.1.2 Available HIS resources						
		Highly adequate	Adequate	Existing but not adequate	Not existing	
19	To what extent does your HIS fit to your needs as a manager?	□	□	□	□	
20	Did you receive training in the use of HIS technology in the last 3 years How often? …..	□	□	□	□	
		Not at all	minimal change	moderate change	extreme change	
21	To what extent does the HIS technology need to be improved to support the decision making in your organization?	□	□	□	□	
22	Do you have a computer at your work place?	Yes □ No □				
23	If yes: does your computer have access to the internet?	Yes □ No □				
		Highly adequate	Adequate	Existing but not adequate	Not existing	
24	Rate your computer proficiency skills that you use on the job	□	□	□	□	
25	Did you receive training related to information management in the last 3 years How often? …..	□	□	□	□	
26	Did you receive training related to management decision making & problem solving technique in the last 3 years How often? …..	□	□	□	□	
2.2 HIS indicators						
27	Do you have clearly defined indicators against which your performance or the performance of your unit is evaluated Examples: ……. …… If not existing skip to question 37	Yes seen □ Yes □ No □				
		Highly adequate	Adequate	Existing but not adequate	Not existing	
28	Are the performance indicators routinely measured?	□	□	□	□	
29	Are the indicators evaluated against predetermined targets / benchmarks?	□	□	□	□	

	How can you rate the quality of the used indicators regarding:				
30	Simplicity	□	□	□	□
31	Affordability	□	□	□	□
32	Representativeness	□	□	□	□
33	Reliability	□	□	□	□
2.3 HIS data sources					
		Highly adequate	Adequate	Existing but not adequate	Not existing
34	Do you timely submit performance reports to your supervisor? Number of submitted reports in the last 6 months: ….. ..	□	□	□	□
35	Do you receive regular feedbacks from your supervisor? Number of received feedbacks in the last 6 months: …..	□	□	□	□
36	Do you timely receive performance reports from your supervisees? Number of received reports in the last 6 months: …..	□	□	□	□
37	Do you regularly send feedbacks to these reports? Number of sent feedbacks in the last 6 months: ……	□	□	□	□
38	Do you use other data sources like community based data to verify the internal reports?	□	□	□	□
2.4 Data management & data quality					
		Highly adequate	Adequate	Existing but not adequate	Not existing
39	Do you regularly review the data /reports submitted to you by your supervisees?	□	□	□	□
40	Do you regularly follow and analyze the trends in your unit's indicators over time	□	□	□	□
	How do you evaluate the quality of your HIS regarding the following aspects:				
41	Speed of access	□	□	□	□
42	Timeliness of reports	□	□	□	□
43	Accuracy of reports	□	□	□	□
44	Comprehensiveness of reports	□	□	□	□
45	Disaggregation of data	□	□	□	□
2.5 Information products					

		Highly adequate	Adequate	Existing but not adequate	Not existing
46	To what extent do you use graphs in presentation the results of your produced reports	□	□	□	□
47	To what extent do you use maps in presentation the results of your produced reports	□	□	□	□
48	To what extent do you discuss the results of your reports in official meetings	□	□	□	□
49	Your used technology allows improved presentation of HIS information	□	□	□	□
50	Your used methods of data storage allow prompt access to the stored data	□	□	□	□
2.6 Dissemination & Use in decision making					
51	How do you rate the process of information dissemination in your organization	□	□	□	□
52	Which of the following information dissemination tools do you use? (choose all that applies)				
	E mail	□			
	Written reports	□			
	Regular staff meetings	□			
	Others (classify): ……				
		Highly adequate	Adequate	Existing but not adequate	Not existing
53	To which degree do the findings of the information system support the decision making in the organization?	□	□	□	□
54	Do you use the results of HIS in determining priorities or future planning?	□	□	□	□
55	Is the use of information in decision making appreciated in the organization?	□	□	□	□
56	Are you routinely held accountable for your unit's performance based on the indicators received from HIS	□	□	□	□
57	By which of the following applications do you use the HIS : (choose all that applies)				
	Patient appointments	□			
	Defaulters	□			
	Payments exemptions	□			
	Order of medical supplies	□			
	Staff schedules	□			
3.1 Decision making process					
How can you rate the transparency in decision making at your organization in the following areas?					

		excellent	good	moderate	weak	Very poor
58	Hiring & recruiting	□	□	□	□	□
59	Procurements	□	□	□	□	□
60	Patient payment system	□	□	□	□	□
61	Performance evaluation	□	□	□	□	□

3.2 Other decision making influencing factors

To what extent do you think that the decision making in your organization is influenced by the following factors?

		Strong influence	Moderate	Weak	No influence
62	Personal relations	□	□	□	□
63	Manager's mood and attitudes	□	□	□	□
64	Available financial resources	□	□	□	□
65	Experience and skills of the decision maker	□	□	□	□
66	Available information	□	□	□	□
67	Transparency in the authorities	□	□	□	□
68	Organizational culture and beliefs	□	□	□	□
69	Pressure of the community	□	□	□	□
70	Political trends & interests	□	□	□	□
71	Media pressure	□	□	□	□
72	Donor agendas	□	□	□	□

73 Which of the following factors are barriers to the use of information in decision making at your organization: (choose all that applies)

- Lack of access to information □
- Inadequate HIS resources □
- Lack of time to gather, analyze and evaluate the information □
- Low motivation to demand & use of information □
- Lack of interpretation skills □
- Lack of reading culture □
- Resistance to change □
- Feeling of lack of ownership □

Annex (8): Names of Experts

1.	Dr. Yehia Abed	Al-Quds University
2.	Dr Yousef Abu Safieh	Al-Quds University
3.	Dr Mohammad Al Magadmeh	UNRWA
4.	Mr Alaa Al Shorafa	MOH - Gaza
5.	Mr Jihad Okasha	MOH - Gaza
6.	Mr. Sadi Abu Awwad	Al-Quds University
7.	Dr Majed El-Farra	Islamic University - Gaza

Annex (9): List of participating NGOs

#	Name of NGO	Nr. of PHC	Nr. of hospitals	Nr. of participants
1	Union of Health Work Committees	5	1	29
2	Al Wafaa Society	0	2	9
3	Public Aid Society	0	2	8
4	Patient Friends Society	0	1	9
5	St. John Ophthalmic Centre	1	0	2
6	Ahli Arab Hospital	0	1	5
7	Patient Care Society	1	1	3
8	Salaah Society	3	1	6
9	Al Rahma Society	0	1	1
10	Islamic Society - Rafah	1	0	1
11	Palestinian Medical Relief Committees	5	0	7
12	Islamic Society - Jabalia	1	0	1
13	Red Crescent Society – Gaza Strip	3	0	7
14	Union of Health Care Committees	4	0	1
15	Falaah Charitable Society	1	0	1
16	Near East Church Council	3	0	8
17	Ard El Insaan Society	2	0	11
18	Al Hoda Medical Centre	1	0	1
19	Caritas society	1	0	1
20	Al Razzi Medical Complex	1	0	3
21	Culture & Free Thoughts Society	1	0	1
	Total	**34**	**10**	**115**

Annex (10): Frequency of received HIS training courses in last 3 years by the study participants

#	Variable	Mean	Median	SD
	HIS training courses in the last three years			
1	Number of received training courses in the use of HIS technology in last 3 years	0.77	0	1.15
2	Number of received training courses in information management in last 3 years	0.4	0	0.817
3	Number of received training courses in decision making and problem solving techniques in last 3 years	0.77	0	1.41

Annex (11): Frequency of participants' internal reporting & feedbacks practices in the last 6 months

#	Variable	Mean	Median	SD
	Internal reporting in the last 6 months in numbers			
1	Number of submitted reports in last 6 months	7.04	6	6.991
2	Number of received feedbacks in last 6 months	4.88	3	7.045
3	Number of received reports in last 6 months	16.02	6	22.28
4	Number of sent feedbacks in last 6 months	10.61	0	19.994

تقييم استخدام نظم المعلومات الصحية في صنع القرار في المؤسسات الأهلية الغير حكومية بمحافظات غزة

إعداد: أكرم حسن نصار

إشراف: د. بسام أبو حمد

ملخص:

لقد أصبحت الحاجة لمعلومات صحية دقيقة لاستخدامها في صنع القرارات الصحية أكبر من أي وقت سابق، وتعتبر هذه الحاجة في النظام الصحي الفلسطيني أكثر الحاحاً من أي مكان آخر حيث قلة الموارد المتاحة والمشاكل الصحية المعقدة، ونظراً لقلة المعلومات المتاحة عن مدى استخدام المعلومات الصحية لدى المؤسسات الغير حكومية في قطاع غزة تأتي هذه الدراسة بهدف اكتشاف مدى اتباع هذه المؤسسات لعملية اتخاذ القرار الرشيد المبنى على نتائج نظم المعلومات الصحية لهذه المؤسسات حيث هدفت الدراسة إلى:

- تقييم أداء مكونات نظم المعلومات الصحية المعمول بها حالياً في المؤسسات الأهلية
- التعرف على الدور الذي تستحوذه المعلومات الصحية في عملية صنع القرار بهذه المؤسسات
- التعرف على الفروقات في استخدام المعلومات بين المؤسسات والأفراد
- تحديد معيقات استخدام المعلومات في صنع القرار بهذه المؤسسات
- وضع توصيات لتحسين عمل نظم المعلومات الصحية بالمستقبل وتقوية دورها في صنع القرار.

المنهجية :

- ✓ تم اجراء دراسة مقطعية بتصميم وصفي وكمي مع اتباع استبيان المقابلة كأداة لجمع المعلومات.
- ✓ تم اتباع نظام المسح الشامل باستهداف جميع عناصر مجتمع الدراسة حيث وافقت 21 مؤسسة من اجمالي 24 مؤسسة اشتملها مجتمع الدراسة على المشاركة، ومن مدراء هذه المؤسسات البالغ عددهم الاجمالي 138 مديراً استجاب 115 منهم للدراسة حيث بلغت نسبة الاستجابة الكلية 83.3%.
- ✓ تم استخدام شكلين من الاستبيان والذين تم تطويرهما بناء على أداة تقييم نظم المعلومات الصحية الوطنية الخاصة بشبكة القياسات الصحية الدولية وذلك بعد اجراءات التعديلات المناسبة عليها حيث تم استهداف كلاً من المؤسسة كمجمل والمدراء بشكل منفرد.
- ✓ ساهمت مستويات الاستجابة العالية واعتماد طرق جمع بيانات ممعيرة في تعزيز دقة النتائج التي أفرزتها الدراسة .

نتائج الدراسة :

أبرزت الدراسة العديد من النتائج التي توضح واقع وعمل نظم المعلومات الصحية بالمؤسسات الأهلية وأهمها:

- غالبية مدراء المؤسسات هم من الفئات العمرية الأقل من 45 عاماً وهو ما يسمح بفرص كبيرة للتطوير مستقبلاً.
- هناك التزاماً واضحاً لدى هذه المؤسسات نحو استخدام نظم المعلومات المحوسبة وإن كانت الاستخدامات الحالية تركز على الجوانب الادارية والمالية
- غالبية المشاركين يتمتعون بخبرات جيدة في استخدام الحاسوب وإن كان هناك نقصاً كبيراً في فعاليات بناء قدراتهم في مجالات ادارة المعلومة واستخدامها في وضع الحلول وصنع القرارات .
- هناك توجهات ايجابية جداً لدى المشاركين فيما يخص الاستخدامات المختلفة للمعلومات بينما ظهر أن هناك ضعفاً واضحاً في مجال وضع وتوثيق الآليات التي تنظم عمل نظم المعلومات .
- من أهم نقاط الضعف التي أبرزتها الدراسة كان الاستخدام الضعيف لمؤشرات الأداء الممعيرة حيث تبين أن ثلث مجتمع الدراسة لا يستخدمها، كما تبين أن استخدام مصادر معلومات خارجية كالدراسات المنشورة والتقديرات السكانية ودراسة احتياجات المجتمع المحلي تعتبر أيضاً من المجالات التي تحتاج لتعزيز في المستقبل
- أبرزت النتائج بعض نقاط القوة مثل أنظمة التواصل الداخلي وإن كانت هذه الأنظمة لا تزال تعتمد بشكل رئيسي على الطرق التقليدية كالاجتماعات والتقارير المكتوبة. بينما تبين أن التواصل الخارجي لهذه المؤسسات يتركز على الممولين ومن ثم وزارة الصحة بينما يتم التواصل مع المجتمع المحلي والمؤسسات الأهلية الأخرى بشكل غير كافي.
- على الرغم أن نسبة قليلة من مجتمع الدراسة قد أظهرت استخدامها لطرق عرض سلسة للمعلومات مثل الأشكال البيانية والخرائط فإن ذلك لم يؤثر على الاستخدام العام الجيد للمعلومات في صنع القرار والذي ظهر أيضاً جلياً في التقييم الايجابي لمستوى الشفافية في قرارات هذه المؤسسات .
- أظهرت الدراسة اجمالي أداء مقبول لنظم المعلومات الصحية حيث أظهر استبيان المؤسسات معدل 57.65% بينما أظهر استبيان الأفراد معدل 62.02%.
- ظهرت معدلات منخفضة في كلاً من مكوني مؤشرات الأداء (40.47% للمؤسسة، 48.6% للأفراد) و مصادر المعلومات (53.46% للمؤسسة، 47.27% للأفراد) بينما كان التقييم مرتفعاً لدى كلاً من مكوني ادارة المعلومة (61% للمؤسسة، 68.14% للأفراد) ونشر المعلومات واستخدامها في صنع القرار (69.13% للمؤسسة، 60.96% للأفراد)
- ظهرت اختلافات واضحة في تقييم مكوني الموارد المتاحة للنظام (52.11% للمؤسسة، 69.48% للأفراد) و مخرجات النظام (64% للمؤسسة، 45.53% للأفراد).

- أظهرت الدراسة وجود فروقات ذات دلالة احصائية لدى الأفراد فيما يخص طبيعة عملهم حيث أظهر المشاركين العاملين بالمستشفيات تقييماً أقل لجميع مكونات نظم المعلومات الصحية مقارنة بالمجموعات الأخرى مع وجود دلالات احصائية لهذه الفروقات.
- أظهر مستخدمي الكمبيوتر لدى تقييمهم لمكونات النظام تقييماً أفضل من غير المستخدمين وكانت النتائج ذات دلالة احصائية في كل المكونات.
- تم تقييم كلاً من الموارد المتاحة للنظام ومخرجاته من قبل مدراء الادارات العليا بنسب أعلى من تقييم باقي المدراء مع وجود دلالات احصائية.

التوصيات:

تم وضع بعض التوصيات التي تهدف إلى تعزيز دور نظم المعلومات الصحية في صنع القرار وأهمها:

- ضرورة الاتفاق على مجموعة من مؤشرات الأداء الممعيرة وخصوصاً في مجال القوى البشرية
- تطوير الموارد اللازمة لنظم المعلومات من خلال وضع الخطط التطويرية و رصد الموازنات الكافية و تنفيذ خطط تدريبية في مجال نظم المعلومات
- اقرار نظم وآليات عمل لنظم المعلومات الصحية ومتابعة تنفيذ هذه الآليات
- استخدام أساليب مبتكرة وفعالة لمشاركة المعلومات مع المؤسسات الصحية الأخرى ومع المجتمع المحلي.

كما أوصت الدراسة باجراء عدد من الدراسات التي تهدف إلى استكشاف بعض الجوانب وتوضيح بعض التساؤلات التي أثارتها الدراسة ومنها:

- تقييم دور نظم المعلومات الصحية لدى مقدمي الخدمة الآخرين مثل وزارة الصحة ووكالة الغوث
- تقييم آراء وتوجهات باقي الموظفين حول دور واستخدامات نظم المعلومات الصحية
- تحليل تكلفة الخيارات المختلفة المطروحة لتطوير نظم المعلومات الصحية
- تقييم فاعلية وسائل نشر المعلومات والاتصال المختلفة
- تحليل معيقات استخدام نظم المعلومات الصحية في المستشفيات