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Health Service Providers' Preferences in ICT Use for Health Service Delivery in Namibia

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Abstract

Health service providers (HSP) in both the private and public health service institutions in Namibia have adopted information and communication technologies (ICT) for health service delivery (HSD). The extent to which ICT are currently being used is, however, not yet fully known. Also unknown are the preferences of the HSPs in the use of different types of ICT applications and hardware. Lastly, the perception of HSPs on various issues on the use of ICT for health service delivery is also unknown. Without a clear understanding of these issues, it is difficult for government to formulate strategies and policies to promote the effective adoption of ICT in the healthcare sector. Patients are also likely to make a sub-optimal use of the available ICT to improve their access to health services in Namibia. A study was conducted to address these unknown points. The study highlights the importance of ICT use by HSPs and the imperative to align the ICT use expectations, needs and requirements of patients with those of HSPs in Namibia to ensure effective use. The results of the experiment are reported in this paper.

Keywords: Health Service Delivery, Health Service Providers, Information and Communication Technology, ICT Use Preference, Namibia.

1. Introduction

The delivery and management of health services to deprived communities and regions in developing countries is a truly complex task.¹ In today's information society, health professionals need to maximize the potential benefits offered by ICT as a means to improve public access to health care and information.² In Namibia, it is not clear to what extent health service providers (HSP) use Information and Communication Technologies (ICT) for health service delivery (HSD). There seems to be a gap between existing use of ICT by HSP in HSD and the kinds of ICT that patients are currently using or prefer to use in order to access health services. The study reported in this paper is aimed at addressing these problems.

Toward this end, in this paper, we examine how HSPs in Namibia use ICT to deliver health services to their patients, describe the ICT channels that HSPs use for internal and external communication with other healthcare stakeholders, and suggest possible ways to align ICT needs of patients with those of health services providers. The paper reports on a statistical experiment conducted to enable us resolve the various problems and issues mentioned above.

In the rest of the paper, we next review the use of ICT for health service provision in developing countries. Particular mention is made of the emerging trend of ICT use in Telemedicine, because of its significant application potential in these countries. In section 3, our statistical experiment is reported. This is followed in section 4 by a presentation of our findings from the experiment and some discussion on the findings. The paper ends in section 5 with a conclusion and a brief pointer to future related studies that need to be conducted.

2. Use of ICT for health service delivery in developing countries

The application of ICT in HSD to Namibian patients is expected to generate two key benefits (i) improved quality of health care and (ii) increased patient outreach. The anticipated benefits of improved quality of service from relatively easier access to health information and faster diagnosis are widely acknowledged worldwide.

Most health institutions in developing countries are seriously considering the potential use of ICT as a technique to improve the quality of health services through enhanced efficiency and effectiveness³. ICT can be utilized to overcome geographic isolation for the population in rural areas, and it can facilitate access, dissemination, utilization and exchange of information on combating debilitating diseases.

According to Chandrasekhar⁴, ICT plays a mediatory role between HSP and patients; and has the potential to improve the availability and delivery of health services. In an intermediation role, ICT is used as a medium to deliver health services to patients or can be used as a tool to organize information more efficiently and effectively. The role of ICT is not limited to HSP-patient relationship. According to Yamuah³, ICT are crucial in facilitating communication between different levels of delivery units (e.g., district hospitals, health centres, clinics and referral hospitals).

At the referral level, ICT helps in the promotion of more effective resource management and planning, efficiency in processing transactions and access to more reliable information. Additional advantages of ICT use by HSP include (i) sharing information with other health professionals, (ii) internal and external communication between health professionals and bodies, (iii) reporting on disease surveillance, (iii) reduction of costs of patient transfers,

and provision of quality health care across distances.⁵ Moreover, patients do not have to embark on long and arduous trips to receive health service; thereby saving time and money, as majority of them are poor and even too weak to travel.

However, before ICT can approach a full realization of its potential in HSD, there are several obstacles and challenges that developing countries need to overcome or resolve.⁶ These obstacles or barriers hinder ICT access *extrinsically*, meaning obstacles that the user does not have control of, or *intrinsically* meaning those obstacles that are based on personal preference.⁷ These obstacles have been categorised into ‘*internal*’ (first order) and ‘*external*’ (second order) barriers. Studies conducted by Ertmer, *et al.*⁷ and Lim & Khine⁸ describe ‘*internal barriers*’ as the type of barriers that are ‘*extrinsic*’ to the ICT user and this includes lack of access ICT, insufficient time to plan instruction, and inadequate technical and administrative support. All of the above can inhibit ICT access in health institutions. On the other hand, ‘*external barriers*’ are more concerned with the ‘*intrinsic*’ obstacles or the unwillingness to change from the user’s side and attitudes about ICT use; such barriers are referred to as “fear factors”^{3, 7}. These barriers and hindrances notwithstanding, ICT seems to be making an inroad in the landscape of health service delivery in developing countries, as can be seen in the growing use of telemedicine in some of these countries.

Telemedicine, which refers to the use of ICT to provide medical information and healthcare services across large geographic distances, has transformed the way health services are delivered to patients.^{11, 5} Telemedicine is therefore a health intervention designed to improve the care delivered to patients⁹. This phenomenon is more widespread in developed than developing countries as new ICT are being developed each year to improve HSD.

Although most of the advances in telemedicine have been operational in developing countries, there is growing evidence of its use in developing countries in Africa as well. According to (Geissbuhler, Ly, Lovis & L’Haire : 2003)¹¹, there are functioning networks of telemedicine in Mali. However, Namibia is not yet exposed to the use of telemedicine but will be connected through the Tygerberg hospital (International Atomic Energy Agency, 2006) in South Africa.

The advances in ICT use in telemedicine offer remarkable opportunities to developing countries for alleviating poverty and the improvement of health services. Telemedicine offers a wide range of benefits, be it to rural or urban areas. Benefits vary from accessibility to health services, efficiency, improved professional education, quality control of screening program and reduced health-care costs (Hjelm, 2005:60)¹². Despite the numerous benefits from telemedicine, resolving the problem of lack of resources, especially physical infrastructure and human capital skills, is a pre-condition for its successful uptake by health service providers in developing countries. Graig and Patterson (2005:6)¹⁰ caution that African countries cannot fully utilize telemedicine and therefore cannot reap its benefits. However, Hjelm (2005: 61)¹⁶ argues that telemedicine offers improved access to services and increases opportunities to provide quality health care delivery. Contrary to what these two seemingly opposite views might convey, in actuality they are not contradictory. This implies that, even though developing countries may not be currently positioned to fully utilize telemedicine and, therefore, not benefit fully from it, they can nevertheless employ it to launch health service delivery on a path of development, with its attendant multiplicity of opportunities and benefits. This point appears to have been recognized in Namibia, as

evidenced by the use of telemedicine to provide health service to its vastly rural geographically dispersed communities.

3. Experiment

Although the adoption of ICT in HSD in Namibia appears to be on the increase, as the discussion above on the use of telemedicine suggests, the extent and depth to which it is being used remains known. Also unknown are the preferences of the HSPs in the use of different types of ICT applications and hardware. Lastly, the perception of HSPs on various issues on the use of ICT for health service delivery is also unknown. And yet, for effective government policies aimed at promoting and improving HSD to be formulated, it is necessary for these issues to be resolved and unravelled. **In this paper, therefore, we report on a statistical experiment we conducted to investigate the following:**

- The different kinds of ICT that are being used to deliver health services to patients
- HSP perceptions on the importance of ICT uses for HSD
- ICT applications for internal and external communication with other stakeholders in the healthcare sector
- The constraints in the delivering of ICT-based healthcare services in Namibia, particularly in the Khomas and Oshana regions

The experiment is presented in the rest of the paper.

3.1. Research Method

The experiment was conducted on the Khomas and Oshana regions in Namibia between July and August, 2006. The rationale for choosing these regions is that Khomas represents a typical urban area, while Oshana region is situated in the northern part of the country that is primarily rural in setting. By conducting the survey in these two different geographical areas, we hope to compare and contrast the major differences and similarities in ICT use by HSP and patients based in the two contrasting regions.

A total of 134 patients were surveyed and 21 HSP participated in the survey. This particular study reports results of the HSP survey. The researcher administered a structured questionnaire on HSP in both the private and public health sector. The questionnaires aimed to investigate (i) different kinds of ICT that are being used to deliver health services to patients (ii) HSP perceptions on importance of ICT uses (iii) ICT applications for internal and external communication with other health stakeholders and (iv) any constraints in delivering of ICT-based health services in Namibia, particularly Khomas and Oshana region.

3.2. Primary data

The 21 HSP were drawn from various health facilities selected from the two regions (see Table 1). The health facilities and HSP that were selected in one region matched (the number of HSP and their roles) the sample selected in the other region for comparative purposes. A structured questionnaire was used to collect primary data from HSP. The questionnaire included both open ended and closed ended questions. The data was collected during face-to-face interviews between the researchers and the HSP. The interviews lasted about an hour each. The questionnaire covered mainly the use of ICT for health services, ICT-based internal and external communication among HSP and key stakeholders, areas of ICT application, key constraints and perceptions held by HSP on the use of the modern technologies in HSD.

3.3. Secondary data

Secondary data on ICT use in Namibia was acquired from different publications such as journals, white papers and health policies. The researcher examined policies related to HSD. Namibia's policy on ICT use in different economic sectors was also investigated. In cases where the documentations were not easily accessible, it was deemed necessary to interview Government officials from the policy and planning directorate to further investigate policies that engender ICT use in HSD. Semi-structured interviews were conducted with the policy directorate in the Ministry of Health and Social Services (MOHSS), to enquire about the policy documents on ICT and to also find out if there are existing government policies affecting HSD in Namibia. Secondary data sources from literature review, policy documents and interviews provided supplementary information to that generated from the primary data collection.

4. Results and Discussions

This section describes the use of ICT for HSD as perceived by HSP. It covers areas such as ICT applications, perceptions about the importance of ICT in HSD and how ICT is aiding the internal and external communication process of HSPs in Namibia.

4.1. ICT use for health service delivery: Health Service Provider's perspective

A number of health facilities, type of institution, target respondents and the names of health facilities that were visited during this study are presented in Table 1. In Graph 1, the different perceptions on ICT use for HSD by HSP in Namibia are shown. There was overwhelming consensus among the HSP that ICT are very important to use especially for medical services (100%). For example, such medical services range from the use of Internet to research new health information in the medical field, use of ICT tools in the theatre and basic use of ICT-based communication devices to communicate with other HSP (e.g. Doctors on call perceived the use of a pager device very crucial for communication). Clinical support (91%); and nursing services (91%) ranked second as the services that HSP perceived very important ICT application areas. However, in general most (86%) HSP viewed that it is very important to use ICT for HSD (See Graph 2).

HSP had different views on how ICT could intervene to make the delivery of services effective and efficient. Most HSP perceived that staff members in the health institutions need to be educated on how to use computers and other ICT to enable effective use of ICT tools and to render better services to patients. Graph 3 shows that all (100%) HSP perceived that free computer lessons would enhance ICT use in HSD, as they can be trained in using ICT tools more effectively and efficiently.

Some of the key challenges common to all health institutions in Namibia are budget constraints and lack of basic infrastructure such as electricity or telephone lines. Most health institutions reported that insufficient funds were allocated to provide necessary investment level in ICT deployment and in particular to assist in the process of service provision to patients.

HSP also perceived that health institutions were not aware of the likely future investments in ICT, as the budget is set at the national government level. For example, clinics and health centres at the lower level of the hierarchy of health institutions indicated that their budgets

are set at the district level, and it is also the district level that determines the priority needs and uses for new equipment or ICT on behalf of health facilities. Additional key constraints that were mentioned were lack of technical support, unreliable energy supply, low computer employee ratio and low priority on ICT investments. Some of the health institutions in the Oshana (e.g. Ompundja clinic) lacked even basic infrastructure such as electricity, and were instead using solar energy at the time of this study.

HSP had different opinions on how existing ICT in their institutions has helped them to enhance the services provided to patients. As shown in Graph 4, it is remarkable to see that there was complete consensus among HSP on the view that ICT help them to access new health information. It was observed that the use of computers helps to improve efficiency and effectiveness of health management information. This mostly applied to departments such as admissions where patient data needed to be captured and stored effectively.

Ninety-one percent of HSP viewed ICT as helping them to interact with other HSP in other health institutions. Eighty-one percent of HSP strongly agreed that ICT does provide ways to improve health services even though there are costs involved in the introduction, maintenance and utilization of ICT. More training of staff on ICT use is required to achieve more effectiveness. Ninety-five percent of HSP strongly agreed that the GRN needs to play a more prominent role in the provision of ICT for HSD as they felt that the public sector is lagging behind in ICT use as compared to the private sector. HSP felt that the public sector should learn from the private sector on how ICT could be used in HSD to the patients. Specific use of different ICT applications is discussed in the next section.

4.2. Main functional areas for ICT use in health service delivery

This section identifies specific use of ICT in different departments of health institutions in Namibia. ICT use in functional areas of health institutions offers insights into the degree and extent of the deployment of these modern technologies into HSD by HSPs. Deployment of these ICT might in turn enhance the health services delivered to patients. There seems to be a clear variation in ICT applications across the different functional areas.

Graph 5 shows departments in which different ICT are used for health services. The commonly used ICT for health services across all the functional areas was telephone. Telephone was reported as the commonly used ICT in the admission areas of most health institutions (36%) followed by PC (23%). For clinical support services, telephone (86%), email (23%) were the key ICT channels used for health service provision. In the maternity department telephone (36%) and TV (9%) were the mostly used forms of ICT. HSPs also mentioned that they use telephone (27%) and TV (9%) in the family planning departments. Telephone (91%) was also the leading ICT channel used for emergency services and referral services (73%). The results clearly show that telephone and television services were the leading forms of ICT used across all the functional areas of health institutions.

In Table 2 the specific purposes for ICT use in the different functional areas of health institutions are provided. Overall, telephone was the mostly used ICT across all the functional areas. It is interesting to note that HSP mentioned that TV was used as a communication channel for health education, and this corresponds with the patient's responses that they use TV as their main source of health information.

4.3. Communication strategies: internal vs. external

HSP use different communication strategies to interact with patients, other employees, institutions and the higher levels of management. In this section, communication strategies with the above-mentioned groups are discussed.

Graph 6, shows different ICT channels used for communication between HSP and patients. Meetings (32%) were the commonly used method of communication between HSP and patients. This specifically referred to health education meetings held between patients and various health facilities. Health education in this context refers to HSP one-on-one session with patients and holding meetings for patients as a group to present health related information. The second communication strategy used by HSP with patients was TV (23%). In this case, patients were shown videos of health-related information on diseases such HIV/AIDS, TB, etc. Telephone (20%) was also used for communication with patients and this ranged from consultations, making appointments and follow up by HSP. It is surprising to see that the results demonstrated that HSP were not really using radio (8%) as one of the main communication channel for health information provision as stated by patients. The reason for this disparity could be that most health programmes and health information services broadcasted on the radio are not necessarily initiatives of the MOHSS, but from other non-governmental organizations.

In terms of ICT use for internal communication by the HSP, Graph 7 shows how HSP communicate with other employees in the same health institution. Meetings (43%) are widely used as a communication strategy in major institutions (e.g. reporting of information from low levels to the health institution management). Most institutions mentioned that they hold daily, weekly and monthly meetings and this is where issues concerning their health institutions are addressed. Telephone (24%) was used for internal communication with other medical personnel especially in larger health institutions. HSP from some smaller health institutions, particularly clinics and health centres in both the Khomas and Oshana regions, noted that it was not necessary to use ICT such as telephone constantly for internal communication in their health institution. The argument was that some of these institutions were small and would rather use verbal communication by way of holding meetings for employees working in the same health facility.

In Graph 8, different communication strategies that are used by HSP to interact with other health institutions in HSD are displayed. The most commonly used ICT by HSP for external communication with other institutions is the telephone (52%), followed by postal services (20%). It is however very interesting to note that 10 percent of HSPs are using emails services to communicate with other institutions. Only 7% used courier services. Another 7% used fax machines. Other ICT used were virtual meetings (video conferencing) specifically for the Oshakati hospital. The virtual meetings were used to communicate with other health institutions in different geographical regions.

Communication between institutions and administrative offices at the district level were mostly through telephone (62%). Postal service (57%) was also used as a way of sending reports to the MOHSS head office. In addition to meetings and couriers, another method of communication that did not directly involve the ICT related communication tools but commonly used by almost all the public health institutions involved sending reports with

people going from one health institution to another (43%). The reports are normally sent with the ambulance driver or with the district drivers.

The district has a schedule that is rotated to all the public health facilities when the reports are supposed to be picked up. The district owns vehicles that are then sent out to GRN health facilities to collect weekly reports. Reports are then sent to higher levels (regional and National headquarters) via email or floppy diskettes. Some institutions mentioned that video conferencing is also used to report to administrative offices and this mainly occurred in major hospitals. Email (19%) was used more than courier services (14%) as a communication strategy between HSP and higher levels in HSD. Graph 9 shows communication between HSP and higher levels in the HSD.

4.4. ICT awareness among HSP

The HSP survey revealed the need to increase awareness of ICT before its widespread use. High awareness of ICT was observed in both regions despite the slight differences between Khomas and Oshana region. Most respondents in both regions are aware of ICT even though not all have access to them. This was more common in the Oshana region, where HSPs or medical personnels were aware about computers and Internet, but some have never used them and they have limited access to these ICT.

5. Conclusion

The use of ICT for HSD plays an important role in the health sector. This article which is based on a survey of 21 HSP in private and public health facilities in Namibia, examined how HSP make use of ICT to deliver health services to their patients. It also described the ICT channels that HSP use for internal and external communication with other stakeholders in the health sector. The study highlighted the importance of ICT use by HSPs and some of the functional areas where ICT is already deployed. There is need to align the ICT needs of patients with those of HSP in Namibia to ensure effective use.

The results from HSP indicate that the commonly used channels for communication were telephone followed by TV. HSP reported that they were not really using radio as the main communication channel for health information provision, as stated by patients and this could imply that most health programmes and health services broadcast on the radio might not have been initiated by the MOHSS.

From the study results, it was observed that key constraints in delivering health services are as follows:

- Budgetary constraints: Finances are not enough to buy all the necessary ICT to assist in the process of service provision to patients.
- Lack of basic infrastructure to support HSD: Some health facilities, especially those in the rural areas, lacked basic infrastructure like electricity, and this was a constraint in using ICT, such as personal computers and emails.

The “Vision 2030” document aims to tackle challenges the country faces, and amongst them are health-related issues. There is scope for greater use of ICT for HSD to patients by HSP in general. Recommendations that should be considered to enhance the use of ICT in HSD in Namibia include the following:

- Draft a comprehensive ICT-based health service delivery policy.
- Provide personal computers, especially at operational level, since capturing and processing of the data at district level is prone to errors.
- Establish training sessions for HSP on ICT-related tools to facilitate use of these tools in the various health institutions in Namibia.

In terms of further research, future studies should assess the willingness to use modern technologies, such as mobile phones, as they are the likely future platforms for HSD. The risks and benefits associated with the use of modern ICT for HSD also require scrutiny.

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Table 1: Namibian Health Service Providers Particulars by Region 2007

| Area | Institution | Type of Facility | Target respondent |
|---------------|-------------------------|-------------------------|--------------------------|
| Khomas | Katutura state hospital | intermediate hospital | Matron |
| Khomas | Roman catholic | Private hospital | Matron |
| Khomas | Rhino park | Private hospital | Medical director |
| Khomas | Khomasdal | Health centre | Officer in charge |
| Khomas | Katutura | Health centre | Matron |
| Khomas | Hakahana | Clinic | Acting officer in charge |
| Khomas | Wanahenda | Clinic | Supervisor |
| Khomas | Okuryangava | Clinic | Supervisor |
| Khomas | Robert Mugabe | Clinic | Supervisor |
| Khomas | Donkerhoek | Clinic | Acting officer in charge |
| Oshana | Oshakati | State Hospital | HIS officer |
| Oshana | Oshakati | State Hospital | Chief medical officer |
| Oshana | Ou Nick | Health centre | Acting officer in charge |
| Oshana | Okatana | Health centre | Matron |
| Oshana | Ondangwa | Health centre | Supervisor |
| Oshana | Uukwiyuushona | Clinic | Supervisor |
| Oshana | Eluwa | Clinic | Supervisor |
| Oshana | Ompundja | Clinic | Supervisor |
| Oshana | Eheke | Clinic | Acting officer in charge |
| Oshana | Okaku | Clinic | Supervisor |
| Oshana | Ongwediva | Clinic | Supervisor |

Source, Survey data, 2006

Table 2: Main purposes of ICT use in health institutions functional areas, 2007

| | Admission | Consulting/ Clinical Support | Maternity | Family planning | Emergency services | Purpose of use |
|---------------------------|-----------|------------------------------|-----------|-----------------|--------------------|--|
| ICT | | | | | | |
| PC | √ | | | | | -Patient record's keeping Administrative duties |
| Internet | | √ | | | | -Search new health information Office duties |
| Email | | √ | | | | -Communication with higher levels (e.g. District) |
| Mobile phone | √ | | | | | -Used in cases where landline is not functional. |
| | | | | | √ | -Contact emergency vehicles (ambulance) -Communication with other HSP (e.g. Polio campaigns) |
| Radio | √ | | | | | -Used for personal reasons |
| TV | | √ | √ | | | -Display videos on health education on diseases such HIV/AIDS, TB etc. |
| Telephone | √ | | √ | | | -Making appointments |
| | | √ | | | | -Consultations -Ordering medication for pharmacies -Commutation with district office |
| | | | | √ | | -To call ambulance -To call doctors in emergency cases -Communication with district office, in cases of urgent documents |
| | | | | | √ | -For referral cases to big hospitals |
| Fax Machine | | √ | | | | -For administrative duties e.g. sending fax to higher levels such as district |
| | | | | | √ | For referral cases |
| Pagers | | √ | | | | To page doctors on call |
| | | | | | √ | To page doctors on call |
| Electronic patient record | | √ | | | | Used to keep track of medication (ARVs) intake for HIV/AIDS patients. |

Source: Survey data, 2006

√ = Use of ICT in the health institution's functional area

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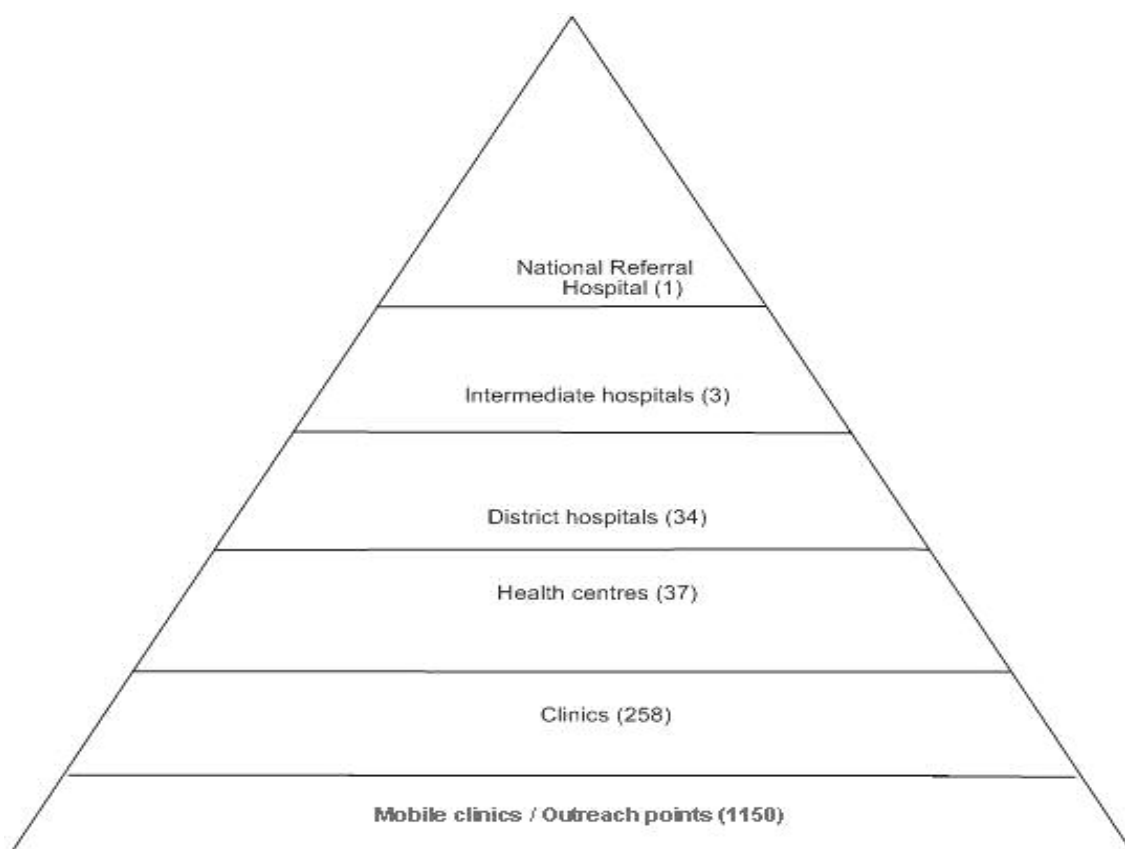
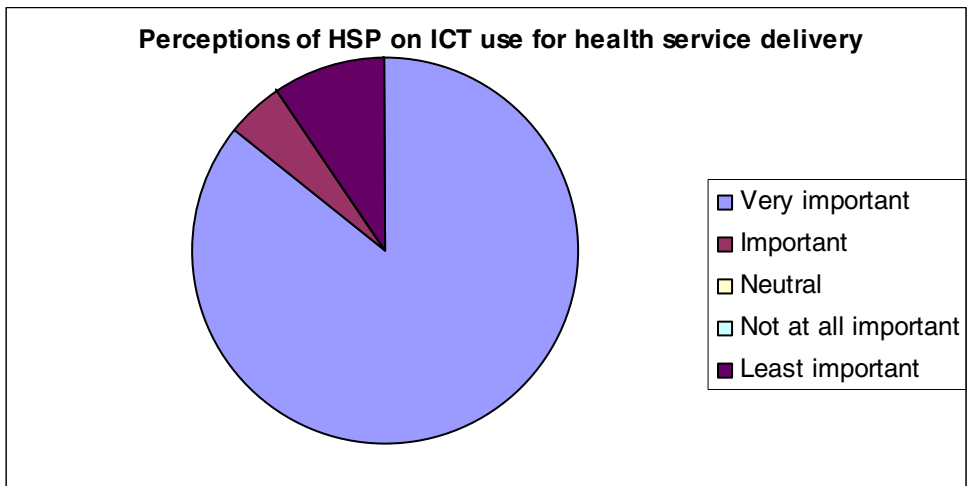
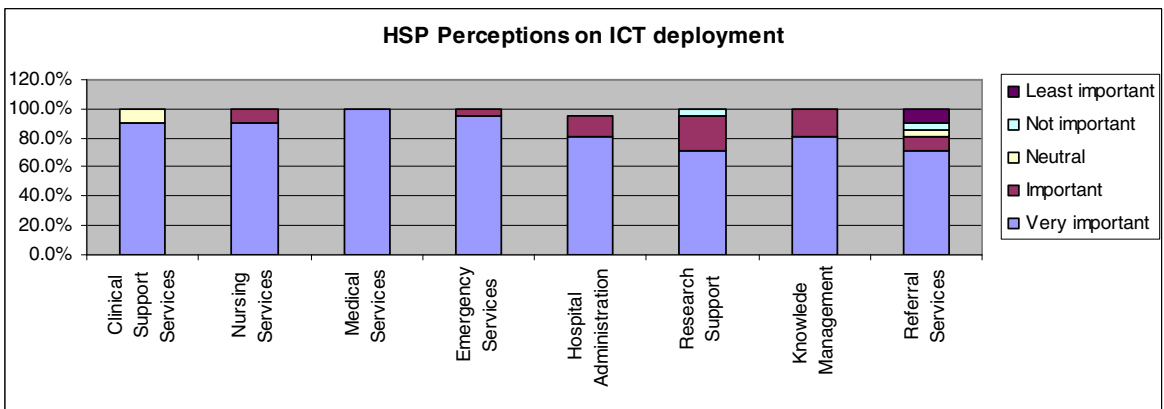


Figure 1: Organization of Health Service Delivery in Namibia
(Source: Namibia, 2003:7)



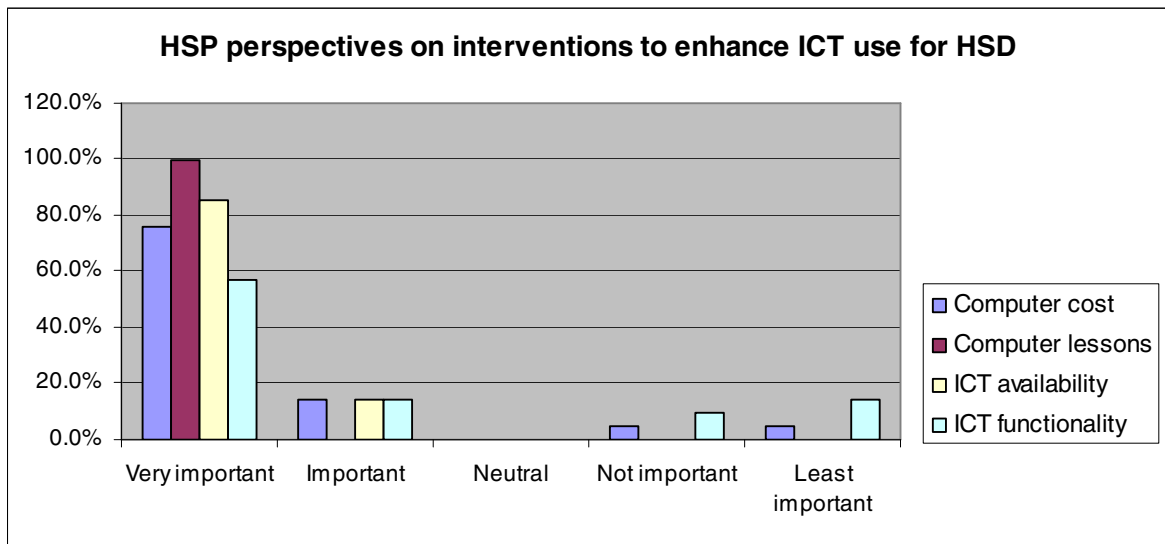
Graph 1: HSP perceptions on ICT for health service delivery

Source: Survey Data, 2006



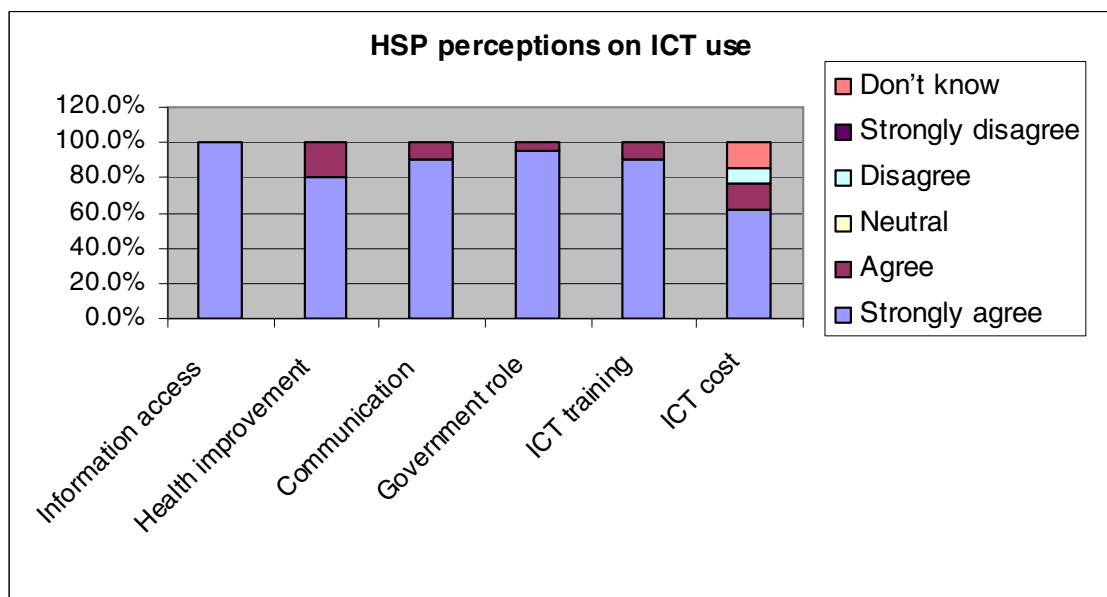
Graph 2: HSP perceptions on ICT deployment

Source: Survey Data, 2006



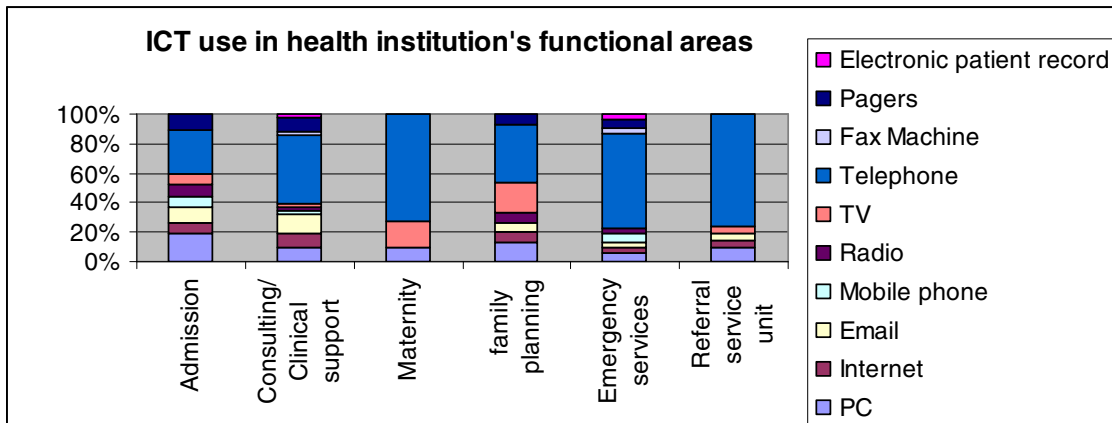
Graph 3: HSP perspectives on interventions to enhance ICT use in the HSD

Source: Survey Data, 2006



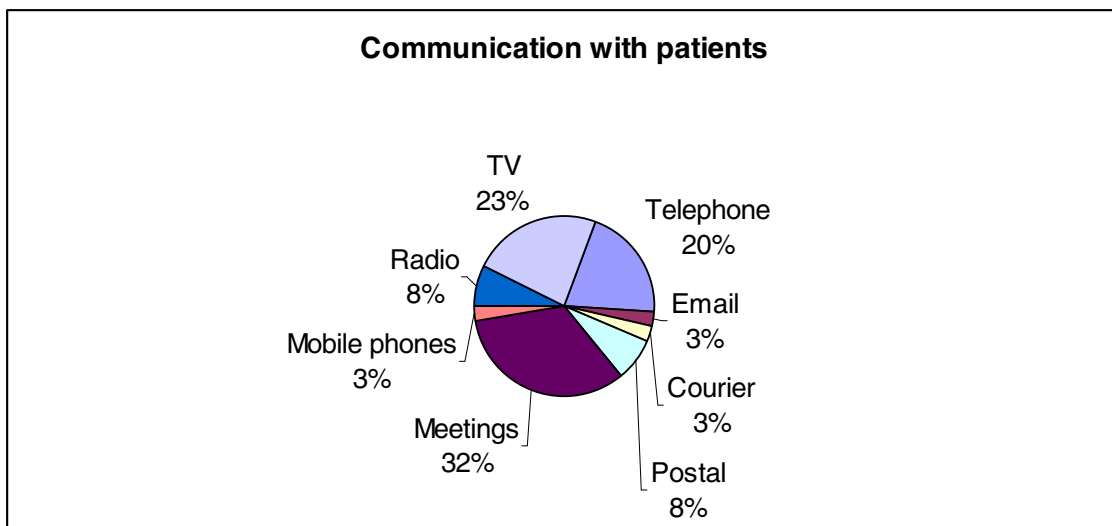
Graph 4: HSP perceptions on ICT use for health service delivery

Source: Survey data, 2006



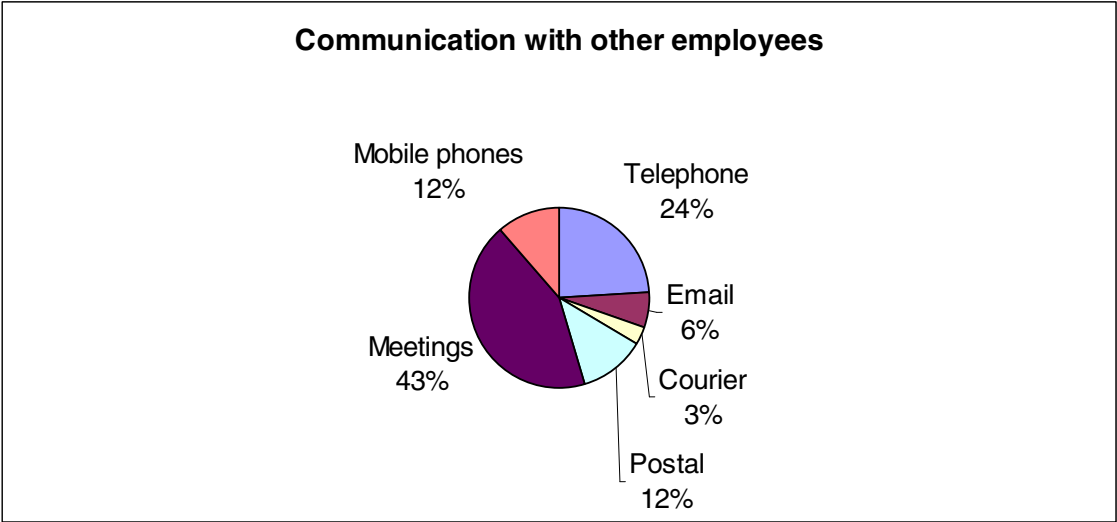
Graph 5: HSP perceptions on ICT use for health service delivery

Source: Survey data, 2006



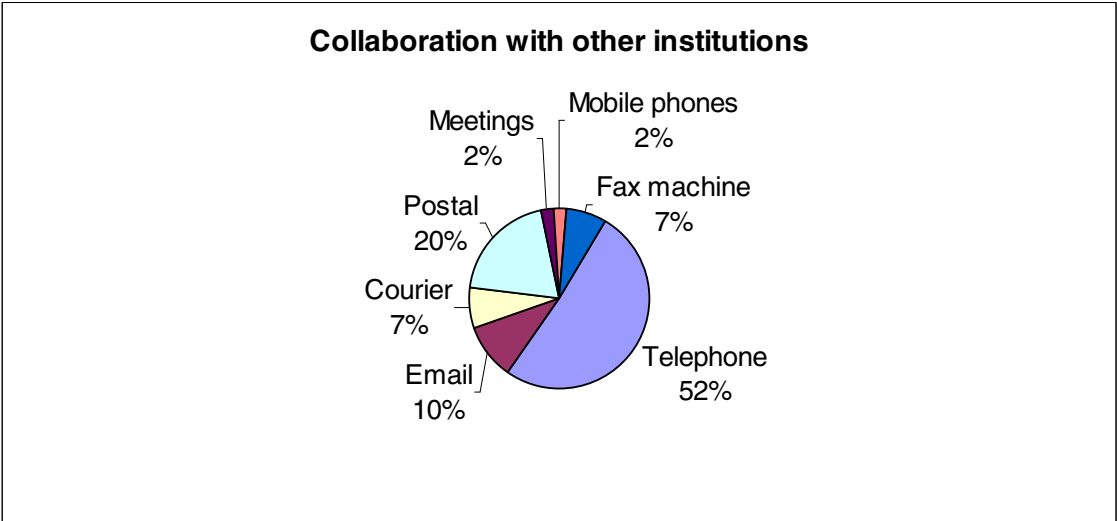
Graph 6: HSP communication channels with patients, 2007

Source: Survey data, 2006



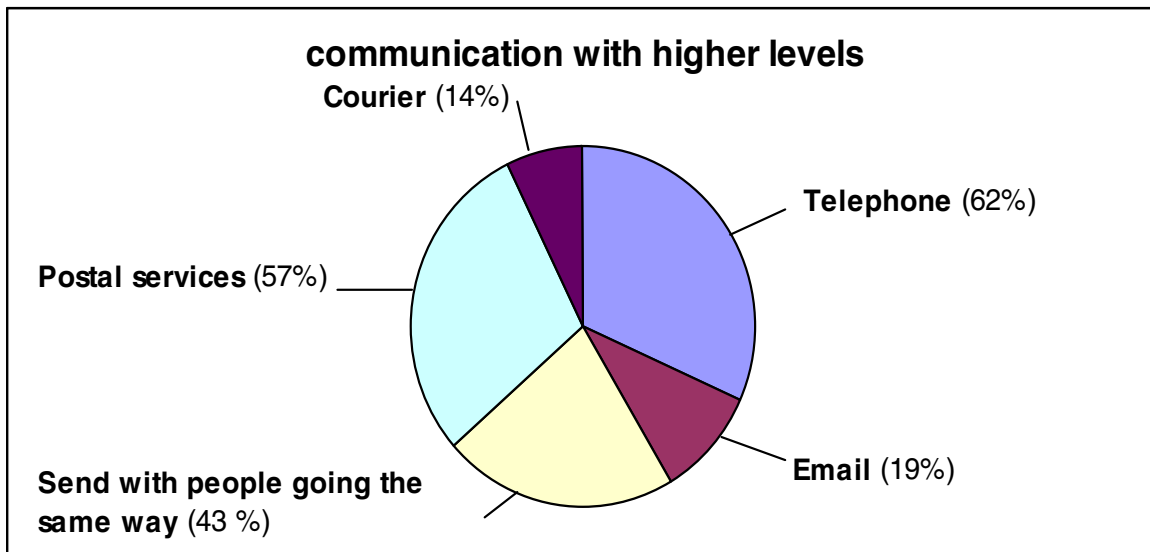
Graph 7: HSP communication strategies with other health employees.

Source: Survey data, 2006



Graph 8: HSP communication strategies with other institutions

Source: Survey data, 2006



Graph 9: HSP communication strategies with higher levels

Source: Survey data, 2006