Evaluation Report

“Telemedicine helps us jump over the wall of separation of the Israelis.”

Assessment of the Results and the Sustainability of the Palestinian Telemedicine Programme

By Eva Sigrid Braaten

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Summary:

This report contains an assessment of the results of the work that has been done in establishing a telemedicine programme in the rehabilitation field in Palestine and an evaluation of the sustainability of the programme. The evaluation was commissioned by the Norwegian Centre for Integrated Care and Telemedicine in Tromsø, Norway. The data material in the study was collected through interviews with relevant actors in Norway and Palestine and through the study of core project documents.

The report concludes that the work to develop a telemedicine programme within the Palestinian rehabilitation field has come a long way since the first telemedicine project was established in 2006. Taken into consideration especially the extremely difficult political, humanitarian and economic situation the four involved rehabilitation centres have had to deal with and still are facing, significant progress has been made to realise the objective of obtaining sustainable and institutionalised telemedicine services in Palestine. The report therefore concludes that the efforts that have been made to connect the four national rehabilitation centres in Palestine to each other and to relevant institutions abroad indisputably constitute a valuable contribution to improved health care for disabled persons in Palestine. At the same time the technology, infrastructure and the organisational set-up are vulnerable, making the future of the programme somewhat uncertain.

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Preface

This evaluation report concerns the results and the sustainability of the telemedicine programme in the rehabilitation field in Palestine. The report is first and foremost based on the experiences of the involved actors in Norway and Palestine, and would not have been possible without all these actors' valuable thoughts and feedback. I would therefore like to extend my gratitude to all informants for taking the time to share their experiences.

Tromsø, September 23, 2013
Eva Sigrid Braaten

Summary

This report contains an assessment of the results of the work that has been done in establishing a telemedicine network in the rehabilitation field in Palestine and an evaluation of the sustainability of the programme. The project was coordinated and managed by the Norwegian Centre for Integrated Care and Telemedicine in Tromsø, Norway. Four rehabilitation centres in Palestine have been the target group but also the main stakeholders of the project. The four centres are Patients Friends Society K. KARRC Rehabilitation Centre, Jerusalem Princess Basma Centre for Disabled Children, Bethlehem Arab Society for Rehabilitation, and El Wafa Medical Rehabilitation Hospital.

The main project objective was the obtainment of *sustainable and institutionalised telemedicine services* in Palestine. This was to be achieved through two types of telemedicine or eHealth services defined as two work packages: Videoconferencing (VC) and e-learning. Based on this objective the first research question of the evaluation was: *To what extent has the project managed to obtain sustainable and institutionalised telemedicine services in Palestine?* The second research question was constructed from what we know about the in general difficult transition of telemedicine innovations from implementation projects to being a part of regular health services (Normann et al. 2011): *What is the probability of the telemedicine services being routine services after the end of the project period, and what factors influence this probability?*

The data material in the study was collected through interviews with relevant actors in Norway and Palestine and through the study of core project documents.

In relation to the first question, and based on an assessments of four indicators, the report concludes firstly that all the videoconference technology and infrastructure was working well in the last phase of the project, but at the same time the situation was extremely vulnerable due to the fact that the equipment soon would be outdated and because of the lack of upgrade possibilities and service agreements. The VC know-how at the centres is however an institutionalised asset to a large degree, both in terms of the technological skills and the competence among the staff in running complicated VC sessions. Secondly, steps have been made towards realising the potential for extended clinical and praxis-related use of the VC equipment. However the potential has not been fully realised, and there is a need to focus on the kind of systematic review of organisational, legal, financial and data security issues that constitute a prerequisite for telemedical applications to be used clinically (Normann et al. 2011). Thirdly, online resources are available for the project partners. First and foremost in the form of video lectures, and secondly in the form of the online courses that have been made available in the competence portal Palrehab.org. However there is a lack of progress in the e-learning work package, and the project has not reached its e-learning objectives. The report concludes that a substantial work effort is required to ensure that both Palrehab.org and the online courses will play an important role in the Palestinian rehabilitation network. Fourthly, telemedicine, especially VC, helps the centres “jump over the wall” of separation of the Israelis and constitutes a significant contribution to the

rehabilitation field in Palestine. Through the telemedicine programme the contact between the four rehabilitation centres has become more intensive and stronger. The telemedicine services also connect the centres to the outside world, and the centres want to develop these kinds of connections further in the future.

Summing up the relevant factors influencing the sustainability of the telemedicine programme (second research question), firstly all the centres emphasise that they have benefitted from the programme. In addition they find the programme important for the enhancement of the rehabilitation field in Palestine, and there is will and commitment at the centres to continue the programme. Secondly the VC service seems to be integrated in the day-to-day running of the centres, even though the potential for the use of the equipment in clinical settings is not realised. At the same time e-learning is not incorporated into the centres in the same way. A major challenge for the programme is to maintain and upgrade the VC technology and infrastructure. This mainly has to do with the fragile economic situation at the centres. It is also challenging that there is not more time set aside for the project, especially to develop the e-learning courses.

The report concludes that the work to develop the telemedicine programme within the Palestinian rehabilitation field has come a long way since the first telemedicine project was established in 2006. Taken into consideration especially the extremely difficult political, humanitarian and economic situation the four involved rehabilitation centres have had to deal with and still are facing, significant progress has been made to realise the objective of obtaining sustainable and institutionalised telemedicine services in Palestine. The report therefore concludes that the efforts that have been made to connect the four national rehabilitation centres in Palestine to each other and to relevant institutions abroad indisputably constitute a valuable contribution to improved health care for disabled persons in Palestine. At the same time the technology, infrastructure and the organisational set-up are vulnerable, making the future of the programme somewhat uncertain.

Table of Contents

1 Introduction

Since the feasibility study conducted by the Norwegian Centre for Integrated Care and Telemedicine (NST) and Sunnaas Hospital in September 2004 was summed up in the report "Breaking the Wall with Telemedicine" (Sørensen et al. 2004) the NST has dedicated itself, through two consecutive projects, to help establish a telemedicine[1] programme for four national rehabilitation centres in Palestine. The four centres are:

- Patients Friends Society K. KARRC Rehabilitation Centre, Ramallah
- Jerusalem Princess Basma Centre for Disabled Children, Jerusalem
- Bethlehem Arab Society for Rehabilitation, Beit Jala, Bethlehem
- El Wafa Medical Rehabilitation Hospital, Gaza

The first project was established in November 2006 and lasted till October 2009. This project was a collaboration between the NST, the four centres, the Norwegian Association of Disabled (NAD) in cooperation with Diakonia[2], Sunnaas Rehabilitation Hospital (Sunnaas) and TANDBERG (now Cisco). The project was funded by the Norwegian Ministry of Foreign Affairs (MFA) and NAD/Diakonia, and managed by the NST. The main goal of the project was to set up the first national telemedicine network in Palestine, linking the four centres to each other and also to relevant institutions abroad. In 2009 the network had been set up, and the centres were connected to each other and the outside world. At the same time the project management at NST recognised that they had faced many challenges in implementing telemedicine services in Palestine. They found that this was due to the politically unstable situation, lack of infrastructure and partly limited economical resources at each centre. Also there was in effect a monopoly on IT supplies in Palestine at the time and the costs on services and equipment were high. On that basis the NST concluded that there was a need for further development of the telemedicine services, and applied for funding for a new project from the MFA.

The NST received funding for the new project called New Telemedicine Activities in the Palestinian Territory (2010–2013), and this report is mainly an evaluation of the results of this second project. That said, the work that was conducted from 2010 to 2013 must be seen as a continuation of the previous project, and in this way the findings presented in this report are also results of the work that was carried out between 2006 and 2009. In the first telemedicine project the main focus was on the set-up of equipment and infrastructure needed to implement a telemedicine rehabilitation network in Palestine. In the second project (2010–2013) the focus has been more on the day-to-day use of the services within each rehabilitation centre and in the network of centres and relevant international institutions.

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[1] Telemedicine or eHealth is understood as the use of telecommunications to provide medical and health care at a distance. Distance education and supervision is included in the definition. Telemedicine applications are tools for improving or extending health care services (Sørensen et al. 2004).

[2] Diakonia is the international aid and development organisation of five Swedish churches, see www.diakonia.se

1.1 Background: Why a Telemedicine Programme in Palestine?

In the 2004 report Sørensen et al. (2004) described how the difficult political situation in Palestine, especially in relation to the extensive travel restrictions, made it very complicated, sometimes even impossible, for the professionals at the four centres to meet and to make use of each other's expertise and experience. The travel constraints also applied to patients, and this made it difficult for patients to seek help at the institutions with the appropriate expertise (ibid.). Sørensen et al. concluded that the situation made cooperation and coordination extremely difficult for the centres, and as a consequence the development of a unified rehabilitation system on a national level was hindered (ibid.). Furthermore, the situation increased the general feeling of isolation and separation both inside Palestine, as well as between the West Bank and Gaza (ibid.).

Sørensen et al. (ibid.) also stressed the difficulties that the centres experienced in cooperating with similar rehabilitation centres around the world, a kind of cooperation that the centres needed in order to develop the quality of their services. This was due – in addition to the lack of opportunities for the Palestinian experts to travel outside Palestine – to the fact that international experts were hesitant to visit Palestine (ibid.). This made the four centres (through NAD) approach NST in 2004 to investigate the possibilities for establishing a telemedicine network to help overcome the isolation and the difficulties that they were experiencing.

When the first project had come to an end in December 2009, the situation had not bettered. The travel restrictions still posed a challenge to the work within the national rehabilitation sector in Palestine, hindering rehabilitation expertise and services to be used optimally (NST 2010). Moreover the separation wall along and within the West Bank made the situation even more complicated. On the basis of this and as a consequence of the acknowledgement that there was a need for further development of the telemedicine services, the project called New Telemedicine Activities in the Palestinian Territory was put in motion.

1.2 New Telemedicine Activities in the Palestinian Territory

1.2.1 Objectives and Focus

The overall objective of this new project that lasted from the autumn of 2010 till July 2013 was to contribute to improved health care for disabled persons in Palestine (NST 2010). This contribution was to be given through obtaining *sustainable and institutionalised* telemedicine services (ibid.). The activities in the new project would centre around two types of telemedicine or eHealth services, defined as two work packages; *videoconferencing* and *e-learning*.

VC session, June 2012. Photo: Torbjørg Lindquist

Videoconferencing

Videoconferencing (VC) is the "conduct of a videoconference (…) by a set of telecommunication technologies which allow two or more locations to communicate by simultaneous two-way video and audio transmissions" (Wikipedia 2013). Videoconferencing is the most tested technology for use in telemedical services and is applied in treatment, supervision, teaching, training and meeting activities (Normann et al. 2011: 24).

Installing the equipment and starting to use videoconference as a way of communicating had been the main focus of the first telemedicine project, and the centres had been connected in a network consisting of dedicated broadband lines suitable for computer and video transmission. Each centre had been equipped with videoconference units with necessary accessories.

The second project set forth to sustain and develop further the use of the videoconference equipment. This would be done through improving and further develop its use in clinical settings and through guidance and sharing of competence and knowledge both internally within the Palestine rehabilitation network, as well as with partners abroad (NST 2010).

E-learning

E-learning can be defined as training or instruction delivered on computers or similar electronic devices (Clark and Mayer 2008). The content of e-learning can be presented using different kinds of media, for example text, graphics, photos, animations, video or audio (Schopf 2013). E-learning is web-based when it involves the use of the Internet (ibid.).

The implemented telemedicine network and its infrastructure described above could also be used as a computer network accessing digital information, and during the course of the first project, NAD and Diakonia had supported the development by Sunnaas of e-learning

materials for use within the telemedicine network. A web portal was set up to present the e-learning material. In the new project there was to be a focus on e-learning, and the plan was both to develop e-learning courses based on needs from the centres, and to link to already existing relevant e-learning courses (NST 2010).

Project workshop in Amman, March 2013. Photo: Torbjørg Lindquist

1.2.2 Organisation and Structure of the Project. Partners and Roles

The project has involved several partners with different roles.

Project manager

Norwegian Centre for Integrated Care and Telemedicine (NST)

NST is the world's largest centre for research and development in telemedicine and e-health. The centre aims to shape the health care of the future. NST is situated in Tromsø in northern Norway. NST's activities cover all the major aspects of telemedicine.

As in the first telemedicine project, also the second was coordinated and managed by the NST through a project manager and a project group. In addition the NST contribution consisted of pedagogic competence, web development and design, and expertise in videoconferencing.

The Rehabilitation Centres

The four Palestinian national rehabilitation centres are an important part of the national rehabilitation sector in Palestine and the only providers of specialised rehabilitation services to disabled Palestinians in the West Bank, Gaza and Jerusalem. The four centres have been the target group but also the main stakeholders of the project. To organise the work with the programme they all selected a coordinator for the telemedicine programme, and the centres'

contribution consisted both of their professional expertise in rehabilitation and their administrative capabilities.

Patients Friends Society K. KARRC Rehabilitation Centre (KARRC)

KARRC is located in Ramallah, and was established in 1990 as a result of Swedish financial and technical support. KARRC is the national rehabilitation centre for adults and children with spinal cord injuries and spina bifida. It also treats patients with brain injuries. The centre also provides out-patient services through its outreach programme.

Before the Palestinian National Authority was established to govern the West Bank and Gaza Strip as a consequence of the 1993 Oslo Accords, all referrals were handled individually and there was duplication of work (Nordic Consulting Group 2009). In 1996 the three centres in the West Bank (KARRC, BASR and JCDC) signed an agreement with the Ministry of Health to coordinate the services provided to the disabled, assigning responsibility for categories of services to the institutions based on their particular strengths and capacities (ibid.). According to this agreement the areas of responsibility for KARRC are spinal cord injury and spina bifida for adults and children.

Bethlehem Arab Society for Rehabilitation (BASR)

BASR is located in Beit Jala, Bethlehem, and was originally established in 1960 as a home for disabled children. It developed into a rehabilitation centre in 1988, and provides intensive and comprehensive rehabilitation services for both children and adults with special needs at centralised and decentralised levels.

According to the mentioned referral agreement BASR is the national referral centre for children and adults with head injuries, peripheral nerve injuries, Cerebral Vascular Accidents, Cerebral Palsy, Neuropathy, fractures, Musculo-Skeletal and rheumatic disorders, joint replacement, and different types of disability (physical, mental and sensory).

BASR has several rehabilitation sections. Other activities include day care provision for 700 children, some of whom are disabled, and the provision of in-kind technical aids such as wheelchairs.

The Jerusalem Princess Basma Centre for Disabled Children (JCDC)

JCDC is located in Jerusalem, and was founded in 1965. JCDC's main activities include diagnosis, investigation, and formulation of treatment programmes in order to ensure continued support for children with special needs and their families.

Services are provided primarily to children and young adults living in East Jerusalem and the central and northern areas of the West Bank through the rehabilitation centre itself and its outreach clinics in Ramallah and Nablus. The aim is to integrate disabled children into their communities. According to the referral agreement JCDC has the responsibility to treat children with cerebral palsy, psychomotor retardation, and other childhood pathologies from the northern part of the country except spina bifida, spinal cord injury and head injury patients (Nordic Consulting Group 2009).

JCDC actively involves family members as partners in the assessment, treatment and rehabilitation process. It also offers integrated educational programmes for disabled children and vocational training opportunities for disabled adults in East Jerusalem.

El Wafa Medical Rehabilitation Hospital

El Wafa is located in Gaza, and was established in 1996 as the only centre specialising in rehabilitation medicine in Gaza. The centre accepts referrals for all ages and different types of disabilities resulting from spinal cord injury, brain strokes, cerebral palsy, traumatic brain injuries and neuromuscular diseases in addition to chronic illness, fractures, rheumatic disorders and amputations. El Wafa also handles cases resulting from complications from disability such as pressure sores, joint contracture, spasticity and voiding disorders. El Wafa mainly treats patients in-house, but also has outreach programmes.

Despite the central role El Wafa plays in providing rehabilitation services in Gaza, due mainly to the political situation, it has few possibilities for input and/or exchange programmes with the other rehabilitation centres in Palestine. Since the closure of Gaza and restricted access of Gaza residents to the West Bank during the Intifada, El-Wafa Medical Rehabilitation Hospital was made a referral centre for tertiary rehabilitation care for patients from the Gaza Strip. Today El Wafa is the only in-patient hospital in Gaza for the major diagnostic categories (Nordic Consulting Group 2009).

Partners

Sunnaas Rehabilitation Hospital

Sunnaas Rehabilitation Hospital (Sunnaas) is Norway's largest specialist hospital in the field of physical medicine and rehabilitation. The hospital provides multidisciplinary rehabilitation treatment for patients with complex functional impairment following illness or injury. The hospital provides services at both regional and national levels. Sunnaas has been working internationally and in Palestine for many years, and also has many years' experience in applying videoconference in rehabilitation.

Sunnaas had the role as the professional coordinator in the project. That entailed communicating with the centres about rehabilitation matters, for example through videoconference lectures or discussing patient cases. Sunnaas also had the responsibility, alongside the NST and the centres, for developing a lecture plan on the basis of the expressed needs from the centres. Sunnaas translated and adapted already existing courses to fit the need of the four centres.

The Norwegian Association of Disabled (NAD) and Diakonia

NAD is an NGO that works for equality and community participation for people with functional reduction. NAD organises about 15 000 members.

NAD has extensive experience in development cooperation, Community Based Rehabilitation, and organisational development. NAD, in cooperation with Diakonia (see

above), were involved in an early phase of the project giving advice on the basis of their experience working in Palestine.

2 The Scope and Methodology of the Evaluation

Evaluating telemedicine undertakings, such as this effort in Palestine, is important because it can give knowledge about different aspects of the application of telemedicine or eHealth services. It can provide valuable information about the results of applying telemedicine solutions, and also about the possibilities and limitations in relation to having these kinds of services integrated in the day-to-day management of different institutions.

2.1 Focus of the Study and Main Research Questions

In this report I will distinguish between the telemedicine projects, the telemedicine services and the telemedicine programme. The *services* refer to the two telemedicine applications in the project (videoconferencing and e-learning) and the competence, network, technology and infrastructure required to run and use the applications.

With the telemedicine *projects* I refer to the two defined and consecutive efforts managed by the NST to implement the telemedical services and a telemedical rehabilitation network in Palestine, i.e. the network between the four national rehabilitation services and between the centres and relevant institutions abroad. The project under scrutiny in this report is mainly the last of the two projects; New Telemedicine Activities in the Palestinian Territory.

With telemedicine *programme* I mean the entire telemedical system that the two projects have tried to implement, i.e. the two services, the required competence, technology and infrastructure, and also the existence of a network between the four rehabilitation centres and between the centres and relevant institutions abroad.

In agreement with the project management at NST the evaluation has been designed mainly to assess the *results* of the last of the two telemedicine projects (2010–2013) and the *sustainability* of the telemedicine programme. Focusing on *project* results means studying what has been achieved within the frames of the project. Looking at the sustainability of the *programme* means assessing whether prerequisites for a stable future of the programme are in place.

2.1.1 Results

When assessing the results of the telemedicine project from 2010–2013, I take as my starting point the objectives of the project as they were stated in the project description from 2010 (NST 2010). As I have shown in Chapter 1, the overall objective of the second telemedicine project was to make a *contribution* to improved health care for disabled persons in Palestine. It was also specified that this contribution was to consist of the obtainment of *sustainable* and *institutionalised* telemedicine services in Palestine. Based on this the primary research question of this evaluation is:

1. *To what extent has the project managed to obtain sustainable and institutionalised telemedicine services in Palestine?*

To answer this question firstly I will make use of what the project itself defines as the indicators of sustainable and institutionalised services, i.e.:

- the existence of implemented clinical telemedicine solutions, including second opinion online in various clinical situations,
- the existence of e-learning and web based resources (NST 2010).

Secondly, I have added two indicators:

- the existence of stable technological solutions and infrastructure,
- the existence of networks between the centres and between the centres and relevant institutions abroad.

The first of these last two indicators was added on the basis of the need for secure and stable technology and infrastructure as a prerequisite for successfully implemented telemedical services (Hartvigsen 2013, Normann et al. 2011). The second was included because one of the key elements in the telemedicine programme from the beginning has been a unified Palestinian telemedicine rehabilitation network, and also the establishment of connections between the centres and relevant institutions abroad.

2.1.2 Sustainability

Based on what we know about the in general difficult transition of telemedicine innovations from implementation projects to being a part of regular health services (Normann et al. 2011), an important aim for this evaluation is to assess the sustainability of the telemedicine programme in Palestine. The research question that serves as a starting point for this investigation is:

2. *What is the probability of the telemedicine services being routine services after the end of the project period, and what factors influence this probability?*

The sustainability of the programme firstly has to do with the possibilities to *integrate* or fit the telemedicine services into the running of the centres. This focus on integration must be seen in relation to the knowledge that successful telemedical solutions must be adapted to the context they are meant to operate in on a day to day basis, and must be given as much attention as traditional ways of providing health services (Normann et al. 2011:11). In other words, telemedicine services must not be treated as parallel services, but as part of the regular health services in the host institutions.

From research we know that the factors influencing the degree of sustainability of telemedicine services can be one or more of the following, legal and economic conditions, managerial involvement, structural and cultural circumstances, system skills, that the services have a common technological platform, that the services are connected to a clinical work surface or arena, and that good models for cooperation, economy and financing schemes must be in place (Normann et al. 2011:11). In this report however I will pay special attention to what Obstfelder et al. (2007) present as six characteristics of or criteria for success for telemedical applications that have been implemented into routine clinical practice (see Table 1). These will be the point of departure in the discussion at the end of Chapter 4.

Table 1: Criteria for success for telemedical applications, from Obstfelder et al. (2007).

	Criteria for Success
1	Local health care service delivery problem is clearly stated. The challenges that telemedicine is meant to solve is described.
2	Telemedicine is recognised as a benefit. Cf. 1, the telemedicine application is seen as the solution to the challenge.
3	Telemedicine is seen as a solution to medical and/or political issues. E.g. equal access to health care.
4	There is collaboration between promoters and users. Success depends on teamwork between initiators of the technology, the managers, clinicians and patients.
5	Issues regarding organisational and technical arrangements are addressed. Often sound anchoring is secured in established organisations and technical structures, or by establishment of new structures.
6	The future operation of the service is considered, especially future use and future financing.

In addition I will look carefully at the *challenges* that the programme and its actors are facing in relation to being able to continue with the telemedicine services after the end of the project period. Finally the centres' *wishes* for the future of the programme need to be taken into consideration.

2.2 Methods and Data Collection

The evaluation has been conducted by two researchers at the Norwegian Centre for Integrated Care and Telemedicine. Frank Larsen conducted the first part of the project (2010–2012) and Eva S. Braaten finished the project and wrote this final report (February–September 2013).

The evaluation originally was designed to follow the second telemedicine project in real time and give the project administration feedback on findings along the way. There were plans to "tap" regularly into the project and collect data as the project moved forward. Due to time constraints however, it was decided to reduce the scope of the evaluation, and only collect data at two defined phases or points in time: In Autumn/Winter 2011, i.e. early phase/halfway through the period (Phase 1 data collection), and in the very last phase of the project, in the spring/summer of 2013 (Phase 2 data collection).

Designing the evaluation like this we wanted to assess the situation at two decisive junctures of the project. "Tapping into" the situation in the project early/halfway we wanted to

get information about the speed, possibilities and challenges in the project organisation and at the four centres. At this point both the Norwegian and the Palestinian partners would have had enough time to set the course for the project, and they probably would have encountered what were to be the main challenges for the implementation, use and sustainability of the telemedicine services.

The reason for assessing the work in the last phase of the project was to evaluate first of all the results of the projects, and second the basis for a sustained effort from the centres in developing their use of videoconference solutions and e-learning after the termination of the project. At this point in the project the actors would have sufficient experience to be able to reflect both on the process they had been through and the future of the services.

2.2.1 Semi-Structured Interviews and Document Studies

The evaluation has primarily been conducted with the use of *semi-structured qualitative interviews* (1:1 and in focus groups). As a secondary source relevant project *documents* were included, e.g. plans, internal summaries of activities and formal reports to the Ministry of Foreign Affairs.

Conducting semi-structured qualitative interviews is a much used and well-documented method if the aim is to get access to information about how telemedicine solutions are organised and what experiences the actors have with the solutions. Individual interviews work well if you want to go deep into a topic with the informant. Doing focus group interviews means interviewing several informants at the same time and using the dynamics between the participants to produce relevant data. The advantage with this type of interview is that it saves time and resources compared to doing individual interviews. In addition the informants can respond to the other informants' statements, so that the interviews have more the characteristics of a conversation than a question-and-answer-session. The challenge is that one or more of the informants in the group may dominate the situation and therefore define the understanding of the topics in question. This challenge may be overcome if the interviewer is active and alert throughout the interview, making sure all the informants contribute to the conversation.

In addition to the "live" interviews, some interviews and interview follow-ups were conducted in writing, using email. In Phase 1 one the evaluator visited Palestine and three of the four rehabilitation centres (except El Wafa in Gaza).

We interviewed altogether three groups of informants that were defined as relevant representatives from the three main partners in the project: The NST, the four rehabilitation centres, and Sunnaas. All together we conducted 14 interviews (see Table 2). The grey mark-ups indicate interviews from the Phase 1 (December 2011). The non-shaded are interviews conducted Phase 2 (spring/summer 2013).

Table 2: Overview, interviews, Phase 1 (December 2011) and Phase 2 (spring/summer 2013).

Type	When	NST	Sunnaas	KARRC	BASR	JCDC	El Wafa
Individual	Phase 2		1		1		½
Focus groups	Phase 2 Phase 1	2	1	1 1	 1	1 1	 1
E-mail	Phase 2			1	1		½

Three of the four interviews from the first phase of the evaluation (December 2011) were conducted face to face in Palestine, whereas the last one was conducted via videoconference. All the interviews in the last phase were conducted via videoconference from Norway.

Conducting interviews using videoconference technology poses different and more challenges than meeting informants face to face. First of all there is always the risk of suboptimal audio or video conditions. In especially one of the interviews in 2013 the sound was so poor I eventually decided to continue the conversation via email. This was unfortunate for the interview, but had the unintended effect of giving me, the interviewer, a better understanding of the challenges that using videoconference equipment for communication may pose.

2.2.2 Analysis

In Phase 1 careful notes were taken from the four interviews. In Phase 2 the interviews were recorded and transcribed. Summaries of the Phase 2 interviews were also made and sent to the informants for feedback, corrections and/or amendments. Together with the relevant project document these notes and transcriptions constituted the data material used for analysis in this study.

The analysis of the data has been guided by the research questions presented above. At the same time I aimed to include other perspective that might appear in the material and that could be used to shed light on the main research questions.

The results of the study will be outlined with reference to the two main aspects that I presented in the beginning of the chapter, i.e. *results* and *sustainability*, and the research questions connected to each of these aspects (see sections 2.1.1 and 2.1.2).

3 Results

Norwegian and Palestinian counterparts, Amman 2013. Photo: Torbjørg Lindquist

As I stated in Chapter 2, the overall research question in the investigation the results of the telemedicine project is:

1. *To what extent has the project managed to obtain sustainable and institutionalised telemedicine services in Palestine?*

I will base the answer to this question on an assessment of the indicators presented above (section 2.1.1). In the following sections I will assess the results from the project using these four indicators. I start my investigation by looking at the performance of the technological solutions.

3.1.1 The Technology and the Infrastructure: Extremely Vulnerable

The main question in relation to the first indicator is whether there exist stable technological solutions in terms of equipment and the required infrastructure to have a well-functioning telemedicine network. I am here mainly concerned with the VC equipment[3] and infrastructure. The technology needed to produce and make use of e-learning is not complicated or unique. Basically what is required is a computer with Internet access and a web browser. Furthermore the e-learning technology has not been seen as a major challenge in the project. Therefore, in this section I am concerned with the VC technology, which is much more comprehensive and specialised in comparison. Also the VC technology is the most critical and valuable input in the telemedicine programme. After all, if the VC equipment does not run properly and if the lines are not open, there is no telemedicine programme.

[3] The equipment that they have in the centres is Tandberg MXP 3000 machines (the MXP series were launched in 2004) with firmware: SW Release Date: 2012-01-10 (F9.1.2 PAL).

After the previous project ended in 2009, both KARRC in Ramallah, El Wafa in Gaza and BASR in Bethlehem cut their lines due to the economic costs of keeping them open. This meant that when the new project was established late in 2010 only JCDC in Jerusalem had a VC system that worked. Because of this the project staff both in Norway and in Palestine spent the first half of 2011 sorting out the technological "puzzle" that had arisen. It took some time to get new lines in place that satisfied the need for capacity and stability that VC equipment is dependent on to run properly. Finally, during the summer of 2011 all the centres had signed new agreements with Internet suppliers, and testing could commence. The lines proved to be stable, and the planned VC sessions started in September 2011.

Three of the centres then had stable lines and equipment that was working. JCDC's equipment however was at this point in need of maintenance, and did not run satisfactorily until January/February 2012. From that time however all the four centres for the most part have had VC equipment that has been running well and the lines have been stable. Still the project management in Norway worked intensively during 2012 to get an upgrade of the VC equipment that was originally donated by TANDBERG (now Cisco) in the first project. And even though there was no prior service agreement, the project management was able to get an upgrade from Cisco in the fall of 2012. This immediately gave better quality VC sessions, and NST's assessment is that if no grave or comprehensive errors occur, the equipment can run well some more years.

In the last phase of the project therefore the informants at the centres report that the equipment is performing satisfactorily. At the same time they underline that there have been challenges along the way and still are. Especially if more than two centres try to connect there are frequently interferences in the sound or image or both. Sometimes the voice is gone, sometimes it is muffled. As a consequence the centres throughout the project period have felt that frequently

> (…) there is one centre "missing". Not because they are not there, but because the technology is not working properly (interview, May 2013).

Also the centres have experienced problems when they try to include Power Point presentations in the VC sessions. The presentations often are too small and unclear on the screen.

The collected data material then shows that there is still a degree of instability and insufficiency on the technological side. This makes the technology an element of uncertainty in the project. This fact is even more accentuated in light of the economic challenges at the centres (see below), and also because the last possible upgrade of the VC system has been carried out. This means that the system will be outdated in a few years. Also the technological vulnerability is reinforced by the lack of IT staff especially at three of the centres. At one centre there is no full-time IT person. Now they at least hope to get a person half time.

This instability and sometimes poor performance of the technology has had some negative consequences for the telemedicine programme. At one centre they feel that too

often the sub-standard quality of the images or the sound has meant that even though the VC session topics might be interesting for the staff members, they are reluctant to come because they fear it will be a waste of time.

However, in spite of the technological challenges that the project actors have faced, the quality of the VC sessions gradually has improved, especially compared to the first project period (2006–2009) when the technological challenges were great at times. One informant recalls the following:

> At that time it felt as if nothing ever worked. Meetings were planned, but then something almost always didn't work (interview, May 2013).

In its 2012 report however Sunnaas writes that

> (…) the majority of the videoconferences run without trouble (….) All in all we are impressed with the quality and running of the conferences (Sunnaas Rehabilitation Hospital 2012:6)

This improved quality of the conferences must be seen in relation to the more stable VC technology and infrastructure, but it also has to do with the involved actors' improved competence both in operating the equipment, participating in conferences and solving problems that may occur during VC sessions. At the same time this factor also is vulnerable since often only a small number of persons at each centre have the necessary VC skills.

Summing up this means that the VC technology and the infrastructure work to satisfaction at present, but the technological set-up is extremely vulnerable. Sometimes also problems may occur in VC sessions that are not possible to solve in the course of the session. That said, as long as the equipment is working and the lines are open, core actors at the centres have the necessary know-how to operate and manage complicated VC sessions.

3.1.2 Clinical Telemedicine Solutions?

As we have seen the project has defined the existence of implemented *clinical* telemedical solutions, including the availability of second opinion, as an indicator of sustainable and institutionalised telemedicine services. This indicator is related to work package 1 in the project, the use of VC.

"Clinical telemedicine solutions" are not defined in the project documents, but are generally understood as the use of telemedicine to provide clinical health care at a distance, e.g. diagnosis, treatment, follow-up, patient logistics and patient-doctor/therapist-consultations (Normann et al. 2011). Second opinion is in health-related literature often described as the possibility for *patients* to get a different point of view about their diagnosis or their treatment plan, face to face or online, from another health professional than the one they previously have visited. In this project mostly another definition is applied, a definition that involves the possibility for *health professionals* to get a different point of view or from *other* health professionals in relation to patients they are treating or a type of patient cases,

what we can call decision making support (Normann et al. 2011). I will therefore explore only this second understanding of this indicator in the analysis that follows.

It is important at this point to distinguish between VC used in clinical activities and VC for meetings and competence building (teaching, supervision and professional networks) (Normann et al. 2011). The basic technology is the same for both types of employment, but the purpose and the use are different (ibid.). In addition other requirements for medical quality, flexibility, security and integration with other types of equipment are demanded when VC equipment is used in clinical activities such as treatment (ibid.).

The VC Sessions

In this assessment I take as my starting point the VC sessions that have been carried out in the second telemedicine project and that are outlined in the table in Appendix 2. The table gives an overview of the main videoconference sessions conducted in 2011, 2012 and 2013, and shows that the main VC activity in the project has been *lectures* given by staff connected to Sunnaas (mainly the research department), the four rehabilitation centres and Nordvoll School and Autism Centre in Norway. The participants in the lectures have mainly been personnel at each centre for whom the topics of the lectures have been relevant. In addition for example JCDC frequently has brought into the sessions students from different universities in the West Bank that visit the centre, i.e. students in occupational therapy, physiotherapy and speech therapy.

The table shows that in less than two years, from when the VC lines were re-established in September 2011 to the end of June 2013, altogether around 25 video *lectures* were held within the frames of the project. That is an average of more than 1 lecture per month. This is a considerable amount of lectures, given that the lectures are not part of a formal education programme, and also taken into consideration that the VC lines were open only from September 2011.

If we look at the number of participants in the lectures, Sunnaas' annual reports from 2011 and 2012 show an average of around 30 participants in each session. Taken into consideration that the centres' main focus is on the treatment and the day-to-day-running of the rehabilitation services, and also considering the fact that there are no educational or qualifying incentives connected to the participation in the lectures, this is a large number of participants. This alone signals a large degree of commitment from the centres to the telemedicine programme. However in relation to the relevant indicator, the *existence of clinical telemedical solutions*, the lectures represent the use of VC for competence building more than for clinical activities. Perhaps because of this, in the interviews the centres state that although the lectures mostly have been relevant and useful for them, from an early phase they wanted the VC sessions to be more connected to their fields of praxis and especially centred around patient cases, in other words they wanted the sessions to be more clinically relevant. They felt that the lectures overall had been too focused on the kind of theoretical knowledge that can be studied in books or research articles, or that might very

well be topics in the continuous education programme that the centres run continually for their members of staff. One informant puts it like this:

> Both e-learning and VC has been focusing on exchanging theoretical information on arbitrary selected topics distributed between the four centres (interview, May 2013).

These sentiments seem to be shared by all the centres more or less, and also they seem to have been taken seriously in the project. The table in Appendix 2 shows that the VC sessions started out with only theoretical lectures, but later included more patient case discussions and clinical matters in general. For example in 2011 there were no patient case discussions, whereas in 2012 and 2013 these kinds of sessions were conducted frequently. In these last two years the centres have been discussing patient cases with each other through VC, but most of the patient case discussions have been a topic in meetings with Sunnaas and the other centres. About eight such sessions were conducted in 2012 and 2013. In addition Sunnaas also has had 1:1 meetings with the centres on the basis of special cases or topics that the centre in question has wanted to discuss or study in depth. One example is the speech therapists at BASR.

These kinds of activities point in the direction of more clinical usage of VC, but still to a smaller degree than what was planned in the project description from 2010. Here it was underlined that the potential for extended use of videoconference in the clinical field cannot be underestimated, and that the aim was to improve and further develop the use of VC in clinical settings. Based on the experiences of the relevant actors and from the relevant project documents, I can conclude that the potential for such extended use has not been fully realised. By the end of the project there is not a wide-ranging use of VC in clinical settings in the Palestinian rehabilitation network. There have, as we have seen, been patient-related discussions as part of the VC schedule, and also some meetings where the equipment has been used clinically. But this is not yet an institutionalised activity in the network.

At the same time centres express a desire to use the equipment more clinically. One informant puts it like this:

> The telemedicine programme and the lectures in particular, should have as its main goal to be clinically applicable. In other words: Theoretical information should be a part of the course only if joined with some kind of bedside application or bedside training. This would mean producing clinical applications of the theoretical topics discussed in the lectures (interview, May 2013).

Another centre emphasises that they would like to explore the possibilities to use the telemedicine in the outreach programme that they are running.

The shortcomings in the use of VC sessions for praxis-related and clinical matters must be seen in light of three factors. First of all the mentioned delay in the beginning of the project due to technological and infrastructural challenges. This meant that the programme itself could not be implemented until September 2011. The idea behind this programme was to start with VC lectures on different topics chosen as a result of discussions with the centres about their needs. After more traditional lectures had been conducted, the plan was to go on to have the sessions more connected to and taken from the different centres fields of praxis.

This plan to move “from theory to praxis” was, as the table in Appendix 2 shows, to some extent carried out, but not as much as planned much because the initial delay that postponed the entire programme.

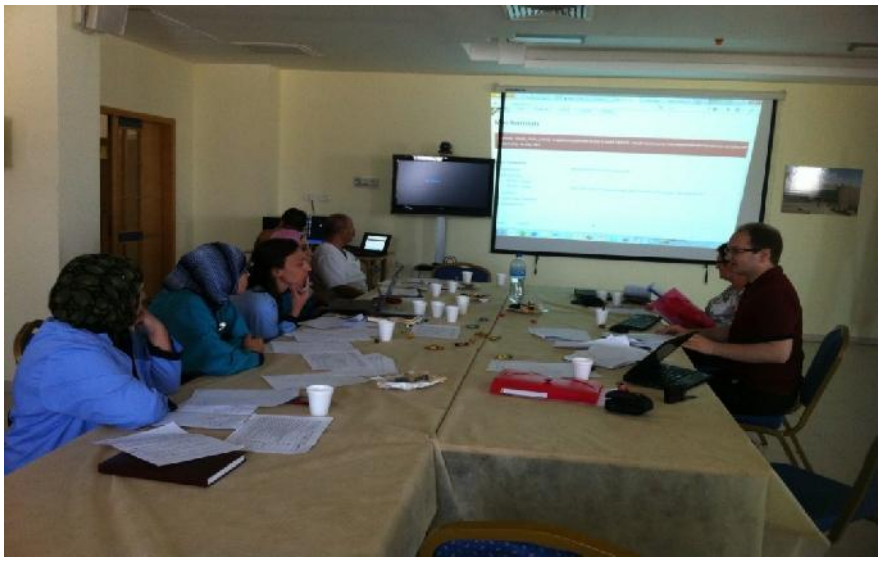
The second reason for the lack of clinical activities has to do with the insufficient focus on the kind of systematic review of organisational, legal, financial and data security issues that is a prerequisite for telemedical applications to be used clinically (Normann et al. 2011). This inadequate focus probably also has to do with the postponement of the programme, which meant that there was not enough time to resolve these issues before the project deadline.

Thirdly also clinical VC use demands specific functional requirements in terms of VC equipment and quality (ibid.). As we have seen the VC technology throughout the project has been and still are unstable, and this has prevented the actors from engaging further in clinical use of the equipment. One informant says:

> To really benefit from discussing protocols and cases or to do some kind of telemetric bedside application through VC, for instance follow bedside training of a patient through VC, you need a fast line with clear audio-visual techniques, so that whatever is done on one location is quickly and appropriately received on another. This we want in the future (interview, May 2013).

3.1.3 E-learning and Web-Based Resources

The fourth indicator of sustainable and institutionalised telemedicine services is the existence of e-learning and web based resources. This is the topic for this section.



Training in development of online courses. Photo: Eirik Øvernes

As I wrote in Chapter 1, in the project outline for the second telemedicine project there was a description of two work packages; videoconferencing and e-learning. Also, in core project documents there is early mention of a competence portal, www.palrehab.net (later

www.palrehab.org). This portal[4] was first and foremost designed to be a web site or a "home" for the e-learning courses. In addition it was meant to be a "place" where the partners in the project could find upcoming and recorded video lectures and information about meetings in the network etc. The work by NST to set up and design the portal started in the autumn of 2011. In the portal two courses on the topics dysphagia and pressure ulcers have been translated from Norwegian to English and made available in the portal, in addition to courses on acquired brain injury and insight after brain injury. An instruction video showing how patients with tetraplegia can learn how to dress themselves can also be viewed in the portal.

In the autumn of 2012 the centres began the development of online courses based on their specialities. These courses were to be developed in and through Palrehab.org using a premade structure in the portal. None of the courses had however been completed when the project period ended in the summer of 2013. This means that altogether three courses have been made available on Palrehab.org in the course of the project. In addition 18 of the video lectures conducted on VC (see above and the table in Appendix 2) can be streamed from the portal.

The centres were introduced to the idea of integrating e-learning into the telemedicine project in the previous project period (2006–2009). Being one of the core competences of the NST, the Norwegian project management felt that this could be a valuable contribution to the Palestinian telemedicine programme. Initially however the centres were uncertain about both the need for online courses in the programme. In the last phase of the project however the centres stress that they see e-learning as a useful tool both for their own centres and for the rehabilitation network. One of the centres says that they see e-learning – and also the portal Palrehab.org – as a way to share knowledge about specific topics or techniques, and that this sharing process makes it possible to change the way rehabilitation is done. In addition all the centres have decided on topics for the courses that they are going to develop and they have most of the content of the courses available. The centres see several target groups for the e-learning courses that they are producing. First of all staff members at each centre constitute a primary target group. Some of the centres are cooperating with local or national universities, and aim to integrate their e-learning courses with university programmes. This means that students in rehabilitation (e.g. physiotherapy, occupational therapy or speech therapy) could take the courses. One centre looks at the possibility of having all new employees (e.g. nurses) take specific e-learning courses before they start working at the centre. Furthermore some centres see e-learning courses in the future as part of the continuous education programme at their centres, and also as something that can be targeted at patients and their relatives.

[4] It is important to distinguish between an e-learning or competence portal and an e-learning platform. The former is a web site with a structured display of e-learning and professional content hosted locally on the site or elsewhere.
An e-learning platform is a *technical* solution that enables hosting and management, and in many cases authoring, of e-learning content.

Nevertheless neither the centres nor Sunnaas has completed the development of e-learning courses as planned. This means that there is a lack of progress in this second work package, and the aims for this activity have not been fully realised. In addition Sunnaas stress that they are uncertain about the relevance of one of the courses that they have made available, since it was developed in Norway and not initially adapted to a Palestinian setting. That said the first round of online courses in Palrehab.org was only meant to constitute *examples* of how the competence portal and e-learning as a learning tool could be utilised.

The online courses, as we have seen, are made through and located on Palrehab.org. This portal itself must also be updated and maintained independent of the e-learning content made available in the portal. In relation to this the same feeling of shortcomings are expressed as in relation to the online courses. The centres believe that they need more training to be able to use and update the portal. And indeed by July 2013 the portal appears fragmentary. The information given in the portal is scarce, and the addressee of the portal and its content is unclear. The indeterminate addressee is reinforced by the fact that the portal is in English whereas the target group for the portal first and foremost is Palestinian rehabilitation workers or students. The fact that the courses also are presented in English makes them less accessible for many staff members at the centre. Furthermore, even though the aim of the portal is to be a place where the partners in the project can find upcoming and recorded video lectures, information about meetings in the network etc., the centres very seldom refer to the portal as anything but a "storage room" for the e-learning courses and the VC lecture recordings, although they see that in the future it can be a "resource center for rehabilitation services in Palestine and other countries" (email, September 2013).

Altogether I conclude that in relation to the indicator *existence of e-learning and web-based resources,* there *are* online resources available for the project partners. First and foremost in the form of video lectures, and secondly in the form of the online courses that have been made available. However, the project has not reached its e-learning goals, and the future of this part of the project is unclear and uncertain. How can we understand these shortcomings?

There seem to be several reasons, and in many ways they are connected. First of all Sunnaas was delayed in the development and adaptation of relevant online courses. This lead the project management at the NST to propose that the centres develop courses themselves. Second, developing online courses normally takes a substantial amount of time and resources, and the Norwegian project management stresses that they started to implememt the e-learning work package too late. In hindsight they see that in many ways it was unrealistic that the centres would develop courses in the little time that they had left before the project deadline. The centres themselves stress that being new to web-based learning programmes they are not familiar with the technicalities and functionalities of e-learning. As a consequence they feel that they lack the needed *competence* in how to develop and design online courses. The problem, they say, is both the lack of competence in

the form of available IT experts at the centres, and in the form of sufficient IT skills among the professional staff. As a consequence they feel that their centre lacks what is needed to finalise courses online, and they all emphasise the need for more training from the NST. In addition the actors stress that it takes a lot of *time* to prepare learning programmes online, and that they have problems finding sufficient space in their schedules to develop e-learning courses.

In many ways the two factors – lack of the required competence and time – can be related to the difficult economic situation at the centres (see below). Generally also, the factors *can* be connected to a lack of managerial support that can lead to a shortage of the required space needed to develop online courses. The emphasis that the actors put on the challenges for the development of e-learning in this project is most likely a sign that one or both of these preconditions are not in place. Within the scope of this evaluation however it has not been possible to pinpoint one of the factors as the more significant one.

The desire for more training is directed at the NST, since they have been responsible for the instruction in how to develop online courses in and through the Palrehab.org portal. They have conducted several training sessions with the centres, both through VC and face to face, but still the centres feel that they need more training to be able both to successfully produce e-learning and to use Palrehab.org the way it was planned. There seems to be agreement among all the centres that to be able to complete at least the first set of courses, they must go through more training sessions. At the same time they emphasise that they need more time to develop the courses.

All in all there is a need for a substantial labour input in both the portal and the online courses in order for e-learning to be a significant contribution to the Palestinian rehabilitation programme.

3.1.4 Network through Videoconference Technology

The last indicator of sustainable and institutionalised telemedicine services in Palestine is the existence of *networks* between the centres and between the centres and relevant institutions abroad. To what degree has this been achieved through the project?

As the table in Appendix 2 shows the centres have been using the VC equipment to connect with the other national rehabilitation centres, but also with other institutions inside Palestine, e.g. universities. For example KARRC's physiotherapists get training in pulmonary rehabilitation in a hospital in Jerusalem. In addition they have used VC to cooperate with institutions outside Palestine, most of all Sunnaas and Nordvoll School and Autism Centre, but also institutions elsewhere in the Middle East, such as Saudi Arabia. The centres have been cooperating with Sunnaas for many years (visits etc.), and because of the telemedicine project this cooperation has been continued and expanded especially through the use of VC.

Cooperation with institutions abroad is frequently mentioned by the centres, and they are all looking for possibilities to expand their networks through VC and e-learning, for example join in on workshop and other activities in the other institutions. The centres focus on and feel ready to expand their international networks and to advance telemedicine

internationally. In such networks they are planning to employ e-learning and VC to communicate with rehabilitation centres and universities worldwide. The main concern is to find partners that have some common fields of interest with the centres, and they are doing extensive research to find such partners.

Especially in relations to networking the centres have stated clearly that they feel that telemedicine is a tool to "bridge" or "jump over the wall" of separation in Palestine in light of the Israeli occupation. This, they are sure, will help them to provide humanitarian services such as rehabilitation to the Palestinian people on a level that they deserve. The centres underline however that they have had a relationship with each other for a long time, since before the telemedicine programme, but also that through the programme this relationship has become more intensive and stronger.

Furthermore the centres stress that the political situation means that the majority of the people from the West Bank and Gaza cannot reach Jerusalem. Earlier this meant that the centres were unable to meet at the same time, and were forced to meet separately, if they could meet at all. This in addition meant that the entire staff could not take part. Now the telemedicine programme enables the whole staff to join in on discussions with the other centres through VC, and the informants emphasise that the VC service makes them feel "as if we are visiting each other", as one informant put it. In line with this the centres communicate that the most important benefit of the telemedicine programme is that the four centres can communicate more and better with each other.

My assessment is that indeed there exist networks between the centres and between the centres and relevant institutions abroad. The centres tell of a more profound and institutionalised relationship with the other centres and with Sunnaas and NST especially. At the same time the potential for international relationships has not been realised, and the centres are eager to establish connections abroad with relevant institutions. In addition I believe that beyond the obvious *professional* aspects of abroad connections it is important for the actors to be recognised as professionals who practise their work in difficult political and humanitarian circumstances. A network outside Palestine thus can give them support in the challenging situation they are in. The significance of this kind of network can be seen through the way the centres talk about "our friends at NST and at Sunnaas". This entails that these Norwegian institutions are friends in more than a professional meaning of the word.

3.1.5 Sustainable and Institutionalised Services?

Summing up the fundamental question in this evaluation concerning to what degree sustainable and institutionalised telemedicine services have been put in place, I can at this point conclude as follows.

First of all the VC technology and infrastructure is working at the moment. At the same time this se-up is extremely vulnerable due to the fact that that the equipment soon will be outdated and the lack of upgrade possibilities and service agreements. This can very well jeopardise the sustainability of the services. The VC know-how at the centres is however an

institutionalised asset to a large degree, both in terms of the technological skills and the competence among the staff in running complicated VC sessions.

Secondly, steps have been made towards realising the potential for extended clinical and praxis-related use. For example a range of patient cases have been discussed in VC sessions between the centres and between the centres and Sunnaas. However the potential has not been fully realised. There is a need therefore to focus on the kind of systematic review of organisational, legal, financial and data security issues that constitute a prerequisite for telemedical applications to be used clinically (Normann et al. 2011). Also knowing that VC use in clinical settings demands specific functional requirements in terms of VC equipment and the quality of the transmissions (ibid.), the VC equipment and infrastructure have been too unstable throughout the project to have been utilised more in clinical settings.

Thirdly, there *are* online resources available for the project partners. First and foremost in the form of video lectures, and secondly in the form of the online courses that have been translated and made available in the portal. However there is a lack of progress in the e-learning work package, and the project has not reached its e-learning objectives. I conclude that a substantial work effort is required to ensure that both the competence portal Palrehab.org and the online courses will play an important role in the Palestinian rehabilitation network.

Fourthly, telemedicine, especially VC, helps the centres “jump over the wall” of separation of the Israelis and constitutes a significant contribution to the rehabilitation field in Palestine. Through the programme the contact between the four rehabilitation centres has become more intensive and stronger. The telemedicine services also connect the centres to the outside world, and the centres want to develop these kinds of connections further in the future.

4 Sustainability

As I stated in Chapter 2, based on what we know about the in general difficult transition of telemedicine innovations from implementation projects to being a part of regular health services (Normann et. al 2011), an important aim for this evaluation has been to assess the sustainability of the telemedicine programme in Palestine. The research question that constituted the point of departure for the investigation of this was as follows:

2. *What is the probability of the telemedicine services being routine services after the end of the project period, and what factors influence this probability?*

This question will be discussed in relation to 1) the possibilities to *integrate* or fit the services into the running of the centres, 2) the *challenges* that the centres face, and 3) the *wishes* that the centres have for the future. I will start with the last of these three factors.

4.1 What do the Centres Want?

In the interviews the centres all stress that they see the telemedicine programme as very beneficial and useful for their own development and for the enhancement of the whole rehabilitation field in Palestine. They especially emphasise how the telemedicine programme, in the face of the extensive travelling restrictions, enables them to share knowledge and experiences and develop their work in relation to relevant colleagues in the rehabilitation field – inside and outside Palestine. One centre says very clearly that

> (…) we think that this project is one of the most important projects we have, and we will try to do our best to continue the project (email, August 2013).

In sum however the centres feel that the potential of the telemedicine programme has not yet been fully realised. They stress that their goal is to provide the best and the most modern rehabilitation services in Palestine, and that the use of telemedicine technology is one “tool” to attain this aim. On the basis of this they all express a strong wish to continue the work with and within the Palestinian telemedicine programme, something that must be seen as a fundamental precondition for the sustainability of the programme. This strong desire to prolong and strengthen the programme has manifested itself in an agreement between the centres to develop a shared *sustainability plan* for the telemedicine programme (see under).

4.2 Integration

Looking at the possibilities to integrate the telemedicine services in the daily management or treatment routines at the centres, first of all the number of VC sessions and participants alone (see above) is an indicator of a strong foothold for the telemedicine project in the four centres. Furthermore, from other studies we know that crucial components in successful and integrated telemedical services are well-organised services, regularity and fixed routines (Normann et al. 2011). In relation to this a fixed schedule for both coordinator meetings (first Tuesday of each month) and lectures or patient case discussions (Mondays) has given a

good structure to the telemedicine programme. The centres themselves underline that this schedule has given a much desired structure and routine to the project. One informant puts it like this:

> The fixed schedule made sure that there was a system in place to help the centres stay in touch on a regular basis. It became routine, and routine is always good for such a project (interview, May 2013).

The centres have agreed to maintain this routine, even though the formal project period has come to an end. This strengthens the probabilities of a sustained telemedicine programme in Palestine.

Also studies of telemedicine undertakings have shown that a strong organisational commitment alongside an acceptance in the management of the required investment (time and resources) is needed to ensure success and sustainability for the services (Normann et al. 2011). Although the scope of this evaluation has not made it possible to study these factors of the programme in depth, the four points that the centres agreed on in a workshop in March 2013 in Amman are an indicator of this type of commitment and acceptance. Through the four points the centres agreed to:

- Produce a letter signed by the top management committing the centre to the continuation of the programme.
- Appoint a group to draft a set of shared policies for the programme.
- Appoint technical staff and a Liaison Officer at each centre.
- Use the web site Palrehab.org for communication and e-learning.

In addition there is the agreement to develop a shared sustainability plan. The content of this plan is not yet clear, but for the sake of the sustainability of the programme it is crucial that the work with such a plan is under way.

4.3 Challenges

4.3.1 Time and Costs

To succeed with telemedical services it is absolutely necessary to include running expenses for the services in the budget (Normann et al. 2011). This financial prerequisite is a fundamental challenge for the four centres, although to varying degrees. The economy in Palestine is generally vulnerable, and this is also the case for the rehabilitation centres. The VC equipment, computers and the infrastructure in terms of stable Internet lines constitute substantial items of expenditure on already limited budgets at the centres. In the last phase of the project therefore none of the centres could guarantee to uphold the programme economically, although the will to continue was in place (see above). The centres must prioritise their resources every day, and the access to donor funds is not sufficiently stable – at least not for all the centres.

The centres therefore stress that the financial instability is threatening the fruit, implementation and also the expansion of the programme. Because of this the future of the telemedicine programme is uncertain. As we have seen all the centres want to be part of the

future in the programme, but how much they can participate seems to be relying on the economic situation in each centre and the possibilities for external funding. As a consequence the centres have decided that to be able to continue with the programme they need to write proposals and launch fundraising activities to cover the running expenses. If they succeed in this, the probabilities for a sustained telemedicine programme will increase.

Alongside an unstable financial situation the relevant members of staff also find it challenging to find the *time* to engage in the telemedicine activities. In the interviews it became clear that one or more of the coordinators use their days off, typically weekends, to coordinate the programme. For the most part the work with the programme is secondary to the primary job for the staff members at the centres, i.e. treating patients. This is a major challenge for the continuation of the programme.

The centres especially talk of time constraints in relation to the development of the online courses. One informant underlines this point by saying that "those who are involved in the e-learning also are the ones who treat patients full time" (email, September 2013).

This said it is important to underline that the centres have dealt successfully with the time challenge throughout the project period, and that they to a large degree they have found solutions through fixed time for the VC sessions and the coordinator meetings. This is a major accomplishment in the project, and shows the great capability and capacity of the Palestinian coordinators especially, but also of the involved actors at NST and Sunnaas.

4.3.2 Common Fields of Interest

Another matter that must be considered to secure the continuation of the telemedicine programme is the centres' need to focus more on topics that all the centres can benefit from and agree on. One informant says that

> (…) there has been a lack of focus on topics that are a matter of interest for the four centres together (….). In other words, in the future the centres need to plan carefully in order to find shared topics that they will benefit from studying, sharing and discussing with each other (….) to yield a joint effort on fields that all the centres are interested in. This, in turn, should give advanced knowledge about these topics, and most importantly, give better and more specialised care for patients (interview, May 2013).

At the end of the project period then, the centres underline the importance of finding topics that are interesting for *all* the centres.

4.3.3 Technology and Infrastructure

For the sustainability of the telemedicine programme the required technology and infrastructure are a crucial factor, and I have already concluded that the VC equipment at the centres is extremely vulnerable (see 3.1.1). To secure the sustainability of the programme therefore, and especially to be able to use videoconferencing more in the clinical work at the centres, firstly the technical problems that the centres have been experiencing need to be sorted. Secondly the improvement and upgrading of the current telemedicine equipment is crucial.

In light of the economic situation at the centres it is clear that the centres need *reliable* technological solutions that are also *affordable*, and a number of different possibilities need to be explored.

4.4 Sustainability: Assessment and Discussion

Summing up the relevant factors influencing the sustainability of the telemedicine programme, first of all the centres emphasise that they have benefitted from the programme, and that they find it important for the enhancement of the rehabilitation field in Palestine. Furthermore there is will and commitment at the centres to develop the telemedicine services inside the network of rehabilitation centres.

Secondly the VC service seems to be integrated into the day-to-day running of the centres, even though the potential for the use of the equipment in clinical settings is not realised. At the same time e-learning is not incorporated into the centres in the same way.

A major challenge for the programme is to maintain and upgrade the VC technology and infrastructure. This mainly has to do with the difficult economic situation at the centres. It is also challenging that there is not more time set aside, especially to develop the e-learning material.

As mentioned in Chapter 2 I will pay special attention to what Obstfelder et al. in an article from 2007 present as six characteristics of or criteria for success for telemedical applications that have been implemented into routine clinical practice (see Table 1, section 2.1.2). These six characteristics will constitute the point of departure in the following discussion.

The first two criteria for success are that the local medical or health-related challenges are clearly described and that telemedicine is seen as a solution to overcome the challenges. The third criterion focuses on telemedicine as a tool to overcome not only medical but also political issues that might constitute a challenge to for example equal access to health care. In the context of the telemedicine programme in Palestine all three criteria are found. Most importantly the travel restrictions in the Palestinian territory are such that neither health professional nor patients can travel freely, a situation that poses a major threat to the principle of equal access to health care. In this situation telemedicine, especially VC, is presented as a critical tool to overcome these challenges and injustices. As long as this situation continues the need for telemedicine services will be great.

The fourth criterion for success concerns the collaboration between the promoters and users of telemedicine, where success depends on teamwork between the initiators of the technology and the managers, clinicians and patients. In the telemedicine programme in Palestine, the initiators of the technology are primarily the NST and secondarily Sunnaas Hospital in Norway, whereas the managers, clinicians and patients are located in Palestine. This partner constellation, although the cooperation to a large degree has been good, must be recognised as a challenge for the implementation, success, and sustainability of the programme in at least two ways. Firstly because in entails a *geographical* and secondly a *language* barrier between the partners.

In relation to especially the geographical factor Obstfelder et al. emphasise that acceptability and adaptation of the technology are promoted through a close dialogue between the initiators of the technology and its users (2007). A dialogue that is made possible through the *presence* of the project managers and the system developers in the local context in which the technology is to be implemented (ibid.). This local presence helps to establish a basis for developing a mutual understanding of the challenges, as well as the solution to the problem (ibid.). In the Palestinian telemedicine programme this kind of physical presence naturally has been for the most part lacking, since the initiators have been located in Norway. The Norwegian project management has of course been acutely aware of this challenge, and has sought to compensate for it by travelling to the centres frequently, and also by communicating regularly and frequently with the centres (electronically, through VC or telephone). Still the management has stressed that it is difficult to compensate fully for the challenge that the mere geographical distance constitutes.

Secondly there is the language barrier between the Norwegian and the Palestinian counterparts. The language of communication throughout the project has been English, and at times this has been a demanding element. As an example the Palestinian partners from time to time have turned to Arabic in meetings to resolve complicated issues. This may very well have helped to solve the matter at hand, but may at the same time have left the Norwegian project management uninformed about the content of the conversation, making the administration of the programme more complicated.

Although to some degree apparently a challenge, the relevance of geography and language as complicating factors must however be seen in relation to the degree in which the responsibility of the implementation of the telemedicine programme has been in the hands of the NST (and Sunnaas) or the four Palestinian centres themselves. In other words: If the implementation of the programme has resided mostly with the Palestinian centres and their coordinators, the geographical and language challenges are less likely to have complicated the implementation of the telemedicine services. From the interviews I conducted with the NST it is clear that they were well-aware of the importance of distributing the responsibility between them and the rehabilitation centres, and measures were taken to transfer the responsibility to the centres. Still the formal structure of the project itself, with the defined project management located in Norway, most likely has been posing a threat to this distribution.

The fifth and the sixth criteria for telemedical success concerns whether organisational and technical arrangements have been addressed, and whether the future operation of the service is considered. The technical arrangements certainly have been addressed in the telemedical project, but still the future operation of the services is uncertain, as we have seen. Firstly this has to do with the uncertain financing of the services, and a crucial concern is to secure funding for the upgrading and maintenance of the technology and the infrastructure. Secondly, in relation to the use of VC in clinical settings there are still technical issues (quality and stability) that need to be resolved. Thirdly in relation to

organisational matters concerning clinical telemedicine solutions there are still unresolved legal issues and security matters.

4.5 Concluding Remarks

Participants at workshop in Amman, March 2013. Photo: Torbjørg Lindquist

The work to develop a telemedicine programme within the Palestinian rehabilitation field has come a long way since the feasibility study (Sørensen et al. 2004) was written almost a decade ago. Taken into consideration especially the extremely difficult political, humanitarian and economic situation the centres have had to deal with and still are facing, significant progress has been made to realise the objective of obtaining *sustainable and institutionalised telemedicine services* in Palestine. I therefore conclude that the efforts that have been made to connect the four national rehabilitation centres in Palestine to each other and to relevant institutions abroad indisputably constitute a valuable contribution to improved health care for disabled persons in Palestine. At the same time especially the technology, infrastructure and the organisational set-up are vulnerable, making the future of the programme somewhat uncertain.

5 References

Clark, R.C. and R.E. Mayer, 2008: «e-Learning: promise and pitfalls». *In e-Learning and the Science of Instruction*, Pfeiffer.

Hartvigsen, G., 2013: "Ten Lessons for Successful Implementation of Telemedicine Services in North Norway". In Bellika, G., Bygholm, A., Dencker, M., Fossum, M., Galster, G., Hartvigsen, G., Hejlesen, O., Karlsson, D., Koch, S. and C.-E. Moe: *Scandinavian Conference on Health Informatics 2013*, Copenhagen, Denmark, August 20, 2013, 25–28

Nordic Consulting Group, 2009: «Evaluation of Diakonia/NAD Rehabilitation Programme in the Occupied Palestinian Territories (OPT), Jordan and Lebanon»

Normann, T., Breivik, E., Skipenes, E., Christiansen, E. K. and U. Knarvik, 2011: "Telemedisin i rutinedrift. Forutsetninger og tiltak" ("Telemedicine made routine. Prerequisites and actions").
NST-report: 02-2011

Obstfelder, A., Engeseth, K. H. and R. Wynn (2007): "Characteristics of successfully Implemented telemedical applications". In *Implementation Science*, 2007, 2–25.

Schopf, Thomas G., 2013: *Using the Internet to Manage Atopic Eczema*. Dissertation for the Degree of Philosophia Doctor, University of Tromsø

Sørensen. Tove, Olsen, J.-H., Brustad. Ø., and O. Aanestad (2004): "Breaking the Wall with Telemedicine", NST-report

Project documents

NST (2010): "New telemedicine activities in the Palestinian territory". Letter to/application for funding from the MFA Middle East Section.

Sunnaas Rehabilitation Hospital, 2012: "New Telemedicine activities in the Palestinian Territory. Annual Report 2012", Sunnaas Rehabilitation Hospital

Internet sources

Wikipedia 2013: https://en.wikipedia.org/wiki/Videoconferencing. Accessed 23.09.2013.

6 Appendixes

6.1 Appendix 1: Design and Interview Guide, August 2013

Main Research Questions

The aim of the evaluation is to make an assessment of the results of the work that has been done from 2010 within the frame of the project New Telemedicine Activities in the Palestinian Territory (but of course: The situation now is a result of both periods). The main questions that I seek to answer in the evaluation are connected to the following topics: The ***implementation***, ***use, results*** and ***sustainability*** of the videoconference solutions and e-learning in the rehabilitation network.

The perspective in the evaluation is to see the work from the point of view of the four rehabilitation centres, so that there will be only a very small focus on the situation seen form the side of the NST. Furthermore the mentioned document presents an image of how the situation was in relation to the mentioned topics in December 2011, whereas I will try to assess the situation in the late spring/early summer of 2013, i.e. in the end of the project period. This will say something about the basis for a sustained effort from the centres in developing their use of videoconference solutions and e-learning after the project has been terminated from the NST.

Interviews and Document Studies

The evaluation will be conducted with the use of:

- Document studies of relevant documents and texts from both project periods.
- Semi-structured interviews with relevant representatives from the three main partners in the projects: the **NST, the four rehabilitation centres** and **Sunnaas**.

Overview of Topics and Main Interview Questions

Topic	**Generally**	**Videoconferencing**	**E-learning**
Imple-mentation	What sort of telemedicine solutions have you implemented/worked with?		
	What are the purposes of the telemedicine solutions?	What is the purpose of VC?	What is the purpose of the e-learning?
	How have you organised the work with the solutions? - Responsible persons? - Anchoring? - Practical work? - The board? The staff? - Etc.?	How have you organised the VC?	How have you organised the e-learning?
	How often do you use the solutions?	o Frequency: Log form? o (Time spent each time?)	- Have you made any courses yet? - Have anyone taken courses yet (who, how many)?

Use	Who take part in using the solutions?	Who participate in VC meetings (patients, health personnel, others?)	Anyone taken a course yet, who?
	What kind of use of the solutions?	o VC teaching? o VC meetings? o Knowledge sharing? o Between the centres? o Contact with international colleagues? o Contact with NST? o Administrative tasks? o Clinical issues? o Other matters?	o Teaching? o Knowledge sharing? o Between the centres? o Internally? o Internationally? o With other partners o Other matters?
	Experience with using the solution? o The technology (functionality, user-friendliness etc.)? o The solution: To what degree are the solutions fruitful?	Experiences? o Technological experiences o Is this fruitful? Do you benefit?	Experiences? o Technological experiences o Is this fruitful? Do you benefit?
Results	What are the results/outcome of using the solutions? o For you as professionals? o For other health professionals at the centre? o For the centre in general? o For patients? o For the rehabilitation work in Palestine?	What are the results/outcome of using the VC (for the different groups)? So far and in the future.	What are the results/outcome of using the e-learning (palrehab.org) (for the different groups)? So far and in the future.
	Are there negative results or challenges with using telemedicine solutions? o For you as professionals? o For other health professionals at the centre? o For the centre in general? o For patients? o For the rehabilitation work in Palestine?	Are there negative results or challenges with using VC (for the different groups)?	Are there negative results or challenges with using e-learning (for the different groups)?
Sustain-ability	How do you see the possibilities of the solutions becoming a routine in the near and distant future? Is it integrated in your work already, a natural part of it?	Future for VC? o For you? o For the centre?	Future for e-learning? o For you? o For the centre?
	What have you experienced or what do you see are the main possibilities or positive outcomes of using the solutions?	Possibilities or positive outcomes of the VC?	Possibilities or positive outcomes of the e-learning part (=palrehab.org)?
	What were/are the main challenges in getting the solutions implemented and used?	o Challenges for VC – professionally, technologically, organisationally? o What must be in place in order to secure sustainability?	o Challenges for e-learning – professionally, technologically, organisationally? o What must be in place in order to secure sustainability?

In addition: ***Possibilities*** and ***challenges*** are core aspects of the evaluation. These are connected to ***technological***, ***human*** and ***organisational*** factors. The analysis of the data material that come out of the document studies and the interviews will centre on these aspects.

Time Schedule

What	When
Design and main questions finished	May 2013
Document studies conducted	June 2013
Interviews conducted	Medio June 2013
Summaries of interviews sent to centres	Medio June 2013
First feedback to NST	Medio June
Main conclusions and analyses finished	September 1st 2013
Report finished	Medio September 2013

6.2 Appendix 2: Videoconference Sessions

Overview, VC sessions 2011, 2012 and 2013

Topic	Type	Year	Who
Mostly administrative matters, meetings with centres (one or more centres involved) and NST	Frequently		All centres, NST
Coordinator meetings	Monthly meetings		All centres, NST
Different topics, bilateral meetings between centres or between centres and Sunnaas	Patient cases		All centres, Sunnaas
Speech therapy	Special lectures		Sunnaas and BASR
Courses through VC in Palestine or abroad	Courses		El Wafa participant
Research	Research meetings		Centres, Sunnaas
Clinical matters, patient cases	Patient-related discussions		BASR, El Wafa,
About Sunnaas Rehabilitation Hospital and rehabilitation in Norway, and the research strategy at Sunnaas.	Lecture	2011	All centres, Sunnaas responsible
The Applicability and Outcome of Constraint Induced Language Therapy in Early Aphasia Rehabilitation.	Lecture	2011	All centres, Sunnaas responsible
“Lessons from a shaken self.” Presentation from Ph.D. thesis on brain injury	Lecture	2011	All centres, Sunnaas responsible
“Augmentative and alternative communication.”	Lecture	2011	All centres, Sunnaas responsible
“Clinical pathway for patients with spinal cord injury.”	Lecture	2011	All centres, Sunnaas responsible
Spinal cord injury, training and health	Lecture	2012	All centres, Sunnaas responsible
Treadmill therapy and head-injury including locked-in syndrome	Lecture	2012	All centres, Sunnaas responsible
A prospective study of traumatic brain injury:	Lecture	2012	All centres, Sunnaas responsible
Autism Spectrum Disorders. Approaches and methods that can enhance the quality of life to children with ASD and help them develop and learn.	Lecture	2012	All centres, Nordvoll School and Autism Centre responsible
A prospective study of traumatic brain injury: Neuropsychological functioning and post-concussion symptoms at 3 and 12 months after injury	Lecture	2012	All centres, Sunnaas responsible
Rehabilitation after moderate and critical traumatic brain injury. Prognosis and effect of early rehabilitation	Lecture	2012	All centres, Sunnaas responsible
The French Dysarthria Test and The Bilingual Aphasia test.	Lecture	2012	All centres, Sunnaas

			responsible
Presentation and discussion by all centres on topics in rehabilitation.	Lecture	2012	All centres, Sunnaas responsible
Physiotherapy after stroke.	Lecture	2012	All centres, Sunnaas responsible
Walking in adults with spastic cerebral palsy - the relation to pain, fatigue, gait and balance.	Lecture	2012	All centres, Sunnaas responsible
Studies on gait function in adults with spastic hemiplegic and diplegic Cerebral Palsy – 7 years follow-up and problem identification using gait analysis.	Lecture	2012	All centres, Sunnaas responsible
Pes equinus – how to treat. Presentations and discussion	Meeting/ Lecture	2012	All centres and Sunnaas
Dysarthria	2-3 VC meetings	2012	Sunnaas and BASR
Complicated tetraplegia.	Patient case	2012	All centres, KARRC responsible
Experiences from the new autism department	Patient case	2012	All centres, JCDC responsible
Management of ataxic gate	Patient case	2012	All centres, BASR responsible
Evidence based medicine	Patient case	2013	All centres, El Wafa responsible
Mother empowerment; securing involvement from the mothers	Lecture	2013	All centres, JCDC and Sunnaas responsible
Gait analysis in the clinic-a basic gait course	Lecture	2013	All centres, Sunnaas responsible
Autism	Lecture	2013	All centres, Nordvoll School and Autism Centre responsible
Errorless Learning and rehabilitation of memory impairments	Lecture	2013	All centres, Sunnaas responsible
Urinary tract infections and spinal cord patients.	Patient case	2013	All centres, KARRC responsible
"DIR- Developmental, Individual differences, Relationship based, and the practical implication of this model: "Floor Time".	Lecture	2013	All centres, JCDC responsible
"Cognitive control in the human brain"	Lecture	2013	All centres, Sunnaas responsible
Autism	Lecture	2013	All centres, Nordvoll School and Autism Centre responsible
Perspectives on OT	Patient case	2013	All centres, El Wafa and Sunnaas responsible

Wound dressing "Abu Raya model"	Patient case	2013	All centres, KARRC responsible
Autism	Lecture	2013	All centres, Nordvoll School and Autism Centre responsible