

Tele-psychiatry: socioeconomic results and the way forward

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Abstract. Over the past years, the scientific community has witnessed a tremendous growth of applications in health care telematics. The adoption rate of web based practices was not the same for all medical specialties. Others such as cardiology were fast adopters mainly due to the “electric” nature of the standard diagnostic tools (electro-cardiographer) but others such as psychiatry are still lagging from adopting new methodologies. Now that ubiquitous broadband Internet access is here to stay the time has come to explore the potential of mental care services that could be offered over the web.

Keywords: tele-psychiatry, health telematics, web based, electronic health record, AMC, direct costs, effectiveness

1 Introduction

From the early introduction of voice telephony, patients in distress and frustration used to call their physicians urgently seeking for consultation. These phone calls did not follow any clinical protocol and though efficient in terms of crisis management they did not qualify as a treatment method. Later on, suicides and crises intervention hotlines staffed with trained volunteers provided a more organized form of telephone counseling.

It was back in 1959 when the first tele-psychiatry system was set in operation in Nebraska, U.S.A. 2-way closed circuit microwave television was used to transmit demonstration of neurologic patients from the State mental hospital to Nebraska Psychiatric Institute 112 miles away in Omaha as part of the education of first year medical students [1].

Although tele-psychiatry has a long history, its practical consequences in every day mental health care practice have been limited. Development, construction and operation and maintenance costs have been prohibitively high. The majority of “on line time” was spent either on medical education as well as on administration purposes.

2 Identifying the beneficiaries of tele-psychiatry

Telemedicine is defined as the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interest of advancing the health of individuals and their communities [2]. If this definition were explicitly adapted for psychiatry it abides by the WHO definition on health that it is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [3].

Obvious applications for preserving population's health status include psychiatric care for people living in remote and isolated areas. The uneven distribution of medical practitioners between rural and urban areas is well documented even for the well developed countries. Tele-psychiatry makes it possible to provide universal access to the same quality level mental health care services regardless of the limitations imposed by geographic locations.

However it is not only the inhabitants of rural areas who are underprivileged regarding the accessibility to these particular services. Certain populations amongst them the elderly and people with disabilities find it really hard to cope with public transportation due to general poor health, specific mental condition e.g. agoraphobia and deprivation from financial affluence in order to finally visit the appropriate health care Institution and the specialized psychiatrist. Many are the cases when the mentally ill even lack the required family support and they are left either alone or in the care of the community with the fear of social stigmatization being the rationale behind the abandonment.

Finally offenders of all ages, races, religion etc feature the highest rates of mental disorders. In UK alone, only one in ten prisoners has no mental disorder [4].

Tele-psychiatry could enable patients to be examined, assessed and receive the benefits of specialized psychiatric services in their preferred surroundings and acting complementary to the primary care physician thus ensuring the continuity of care.

NHS or any form of private care today cannot afford to staff every single hospital or nursing home with specialized psychiatrists. When primary care physicians undergo the critical task of dealing with treatment resistant patients they would either deliver suboptimal care or refer the patient to very expensive tertiary hospital care away from his/her family and preferred surroundings jeopardizing their overall stability and well being.

It is not only the patients who benefit from the new tools such as remote consultations. The physicians could now have an incentive to remain in rural areas as geographic distance from the sources of knowledge (e.g. prestigious health care Institutions) is not synonymous to professional isolation.

3 Contemporary means of tele-psychiatry

Psychiatry is not a specialty that requires touch during examination of the patient. Sessions are mostly in the form of interviews where interviewer and interviewee have agreed to meet in a predefined location such as a nursing home, a hospital, private clinic or even at the patient's home and physical contact is limited to a mere handshaking at the beginning or the end of the session.

Even duration is not predefined. The sessions could last for as long as the involved parties consider it helpful or efficient. Number of involved people is not standardized either. Group therapies have gained momentum especially when participants form a group sharing experiences and seeking guidance for dealing with issues ranging from substance abuse to mourning and providing care to the chronically ill.

Broadband internet has made video-conferencing through standard tools such as Windows Live Messenger (MSN), Skype etc available to all. Even if the patient cannot configure his or her environment to enable such a facility, social services could cater for such a need at a "care at home" level. Practically what video-conferencing offers is a simulation of the consultation session between the psychiatrist and the patient rendering location insignificant provided that broadband internet access is established in the concerned region. Multi-party sessions could also be supported simulating group therapeutic consultations

One of the numerous advantages of tele-psychiatry is that allows for immediate recordings that could be stored in relevant fields of the patient's electronic health record and reviewed later on by the same physician or sent to another colleague for second opinion and further evaluation. Medical research depends heavily on easy to process digitalized data and these recordings combined with coded history and diagnostics constitute a very promising combination for breakthrough results not only in the field of psychiatry but also in the adjacent field of neurology and its subspecialties, neurobiology and neurophysiology.

An important study by Steffens and others [5] has demonstrated the added value of the video recordings taken while demented subjects were participating in research interviews. The overall gestalt of the patient in the environment is a very important contributor to diagnostic assessment which is the basis for an adequate cum effective treatment of the subject's disorder.

Privacy and confidentiality are better addressed in the closed confines of the digital world. There are numerous techniques these days to prohibit eavesdropping on video conferencing and data storage from heterogeneous sources is safer than ever through the use of cryptography and smart cards throughout the health care network of professionals thus allowing access to data for only the authorized practitioners.

4 Pilot Assessment: The Key to global acceptance

Many mental care practitioners insist that tele-psychiatry is just another gimmick. They appear to be reluctant to use a technology considered unproven. Despite its long history, clinical studies establishing accuracy, reliability, ease of use and clinical utility are not that many though their number is fast increasing [6].

A recent study that took place in Greece evaluated the tele-psychiatric process used for assessing and preparing patients who could potentially leave the institution and transferred to boarding homes as part of the national deinstitutionalization program. The study used video-conferencing as the tool to connect University of Athens Psychiatric Clinic and Tripoli's (city of central Peloponnese) Psychiatric hospital [7]. The results of the study were very encouraging. The project has been evaluated through the use of questionnaires given to patients and mental health professionals to fill in. ADSL connection was used and the bandwidth exceeded a lot the sufficient bandwidth for examining and making decisions concerning most mental disorders according to the Telepsychiatry Project of the Consolidated Department of Psychiatry of Harvard medical School (128kbits/sec) [8].

The majority of the patients have accepted the new method of examination without problems and the level of satisfaction from the method appears to be high. The health practitioners' acceptance is at the same level and they also claim to have found the video conference system very easy to use and efficient in their everyday routine.

5 Financial Considerations: The Cretan Way

One of telemedicine's many promises in general is increased effectiveness i.e. provision of health services with better clinical results at the same or reduced cost when comparing them with existing practices. Effectiveness is always measured comparatively to other clinical interventions applied to treat the same condition as shown in Figure 1:

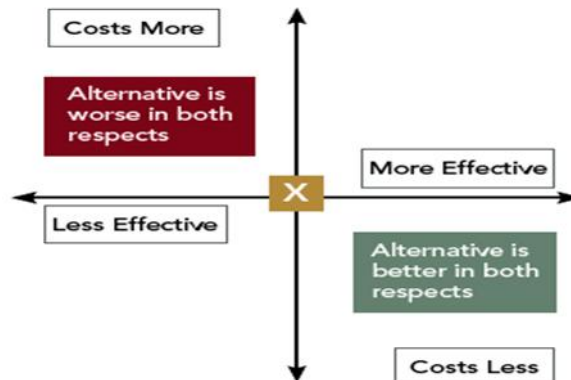


Figure 1: Comparing alternatives to a given health intervention [9]

The conventional means of providing psychiatric care in geographically isolated areas consist of a mobile unit staffed with at least one psychiatrist, one psychologist and a nurse. The visits of the unit are periodical of a fixed frequency; the routes they follow are predefined in order to reach patients who more than likely are recently deinstitutionalized hence are already diagnosed with a mental condition.

This scheme was followed for years by the Mental Health Centre of Chania in Crete, Greece till its management [10] decided to install a tele-psychiatry platform that

allows the Centre's treating psychiatrists to connect over the web with three rural surgeries in Vamos, Kasteli and Kandanos respectively in order to monitor the progress of their patients.



Figure 2: Map of Chania Prefecture showing the locations where the pilot is in operation

Taking into consideration the findings of other pilots such as the one described in the previous paragraph where the conclusion was that over the web consultations offer the same qualitative results as the conventional face to face sessions then the other parameter that is under scrutiny is the financial viability of the new service.

The dedicated study targeting the Chania case reached the conclusion that one mobile unit was approximately 5.000 € more expensive to run on a yearly basis than the tele-psychiatry web platform. Only in Chania Prefecture, the mobile units are 3 while Crete has a total of 14 units in operation. A simple multiplication yields a yearly profit for the National Health System of approximately 70.000€ that could be reinvested in other facilities to improve the characteristics of health provisioning in deprived areas.

6 Assessment methodology for the Chania tele-psychiatry platform effectiveness

The first step for assessing the effectiveness of any given clinical intervention is identifying the costs involved. The complete assessment framework consists of the following:

- 1) What we compare: In this case is psychiatric treatment over the web (tele-psychiatry) with the conventional face to face sessions with the use of a mobile unit staffed with adequate health professionals
- 2) Cost Categories: Usually we are discussing direct costs corresponding to the value of resources available for the health service provisioning. The metric used is the Annual Mean Cost (AMC) and what is important in the assessment is the definition of Delta – Difference (Δ) between the AMCs of the two clinical interventions.
- 3) Time schedule that the evaluation will take into consideration

- 4) Perspective: Costs are perceived differently from various actors e.g. society, the physicians, the patients or the National Health System all have their own views when assessing a practice. The NHS perspective was used in the Chania case as the costs involved are easily identifiable.
- 5) Discount Interest Rate: It is connected to the time schedule of the evaluation as the money costs change every year and the clinical implementations have a time schedule of more than 3 years.

The cost categories for installing the tele-psychiatry application between two points (the Mental Health Centre and the rural surgery of Kandanos) are tabulated below:

Table 1: Tele-psychiatry Direct Costs

	Cost Category	Value
1	Equipment Costs (2 LCD 20" monitors, 2 PCs one to be used as file server, 2 Web Cameras, 2 Laser Printers, 1 Router) with a life span of 4 years	3.500 €
2	Connection fees for 2 IP lines at 20 € each per month for a year with a life span of 4 years	480 €
3	Technical support and maintenance fees (software) 300 € per month for a year with a life span of 4 years	3.600 €
4	Web application development costs with a life span of 10 years	25.000 €

After calculating the surcharges of the discount interest rates applied according to the application's life span we have reached the calculation of the Annual Mean Cost (AMC) for tele-psychiatry tabulated below:

Table 2: Tele-psychiatry AMC

Cost Category	Annual Mean Cost (AMC) for tele-psychiatry (in €)
1	984,82
2	0
3	517,09
4	3.878,22
5	3.359,79
	TOTAL AMC : 8.739,92 €

The cost categories for the set up of a mobile unit commuting between the Mental Health Centre of Chania and the rural surgery of Kandanos are tabulated below:

Table 3: Mobile Unit Direct Costs

	Cost Category	Value
1	Car purchase with a life span of 10 years	15.000 €
2	Car maintenance fees at 7% of the purchase cost per year and for 10 years	1.050 €
3	Fuels costs for twice per week covering a distance of 140 klm (both ways) for 50 weeks and for a life span of 10 years (1.1 € gasoline per liter consumption of 8 € per 100 klm)	1.352 €
4	Driver's salary	7.020 €
5	Relocation Expenses for 4 people (psychiatrist, social worker, nurse, driver), 10 € per visit (4 people x 10 € x 50 weeks)	2.000 €

Following the same methodology as for the tele-psychiatry the AMC for the mobile unit has been calculated and it is presented below:

Table 4: Mobile Unit AMC

Cost Category	Annual Mean Cost for the mobile unit (in €)
1	2.015,87
2	1.098,70
3	1.414,71
4	7.345,64
5	2.092,776
	TOTAL AMC : 13.967,70 €

Finally, the comparison will result in the following formula:

$$\Delta (\text{AMC mu} - \text{AMC tp}) = 13.967,7 \text{ €} - 8.739,92 \text{ €} = \mathbf{5.227,78 \text{ €}}$$

hence proving that tele-psychiatry is more effective than the traditional means of mental health care provisioning to remote areas with the use of a mobile unit.

7 Conclusions

Currently, video-conferencing offered at ADSL connection speed is the main enabler of tele-psychiatry. This technique used in conjunction with a patient's

electronic health record can successfully simulate and substitute the in vivo consultation and deliver to the mentally ill the same quality of service regardless of their location.

The burden of dealing with treatment-resisting patients will be lifted from the shoulders of primary health care practitioners since they can afford to electronically refer the patients to a specialized psychiatrist.

The trauma of moving the patients away from their families and familiar surroundings can be avoided and their recovery can take place in an environment in which they feel safe and well adjusted.

Last but not least there are substantial evidences that the increased effectiveness of telepsychiatry in comparison to conventional methods of treatment will be of paramount importance for the decision makers when dealing with the implementation of mental health services in clinically underserved areas.

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