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ABSTRACT

Telemedicine has become widely used in today's Canadian health care system. The area of mental health has been known to adopt telemedicine strategies in order to address some of the issues currently facing the mental health care system in Canada, such as psychiatrist shortages or lack of services available in rural areas. This paper reports on the effectiveness that telemedicine has had on the mental health care system in Canada, based on a Canadian literature review with supporting literature from the United States.

This paper also includes recommendations for further improvement involving the use of telemedicine. The recommendations include: that closer collaboration amongst all levels of government take place when designing the mental health care framework, that telepsychiatry and telemental health services be built into policies, and that follow up studies take place on existing pilot studies and existing telemental health services in Canada.

INTRODUCTION

Across the world the definition of mental health has varied with syntax but has collectively demonstrated similar meaning. According to the Parliament of Canada[1], mental health is defined as "the capacity to feel, think and act in ways that enhance one's ability to enjoy life and deal with challenges". In addition, mental health problems have been defined as "diminished capacities – whether cognitive, emotional, attentional, interpersonal, motivational or behavioral – that interfere with a person's enjoyment of life or adversely affect interactions with society and the environment"[1]. No one is immune to mental health problems and on average it has affected one in five Canadians on an annual basis[2].

There are many methods and approaches to managing mental health patients in primary care. Care plans can become complex at a rapid pace and can often become overwhelming for patients to manage in conjunction with already possessing a mental health problem. One specific method of delivering care that has the potential to impact the management of mental health issues in primary care is telemedicine. Telemedicine has the capacity to reach patients regardless of their physical location. As a clinical tool it has the ability to reach and help those overwhelmed with their mental health problems by providing an interactive platform where they can communicate with mental health care workers.

As stated by the World Health Organization[3] telemedicine is "The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication 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 health care providers, all in the interests of advancing the health of individuals and their communities".

In 2013 Canada's Health Informatics Association published the Canadian Telehealth Report[4]. This report indicated that telehealth was the most commonly reported service for delivering mental health services (psychiatry & psychology) in Canada and was available in every province and territory[4]. Although this information demonstrates how readily available this service is, there was a lack of data and related publications that demonstrate the overall impact this service has had on mental health issues in Canada. Other countries such as the United States of America (USA) have published research readily available on the impact that telemedicine has had on some of their mental health issues[5-8].

The objective of this paper is to provide an in-depth review and critique on the impact of existing telemedicine mental health programs available in Canada. This will be accomplished by a literature review, and benefits will be highlighted and limitations will be explored with suggestions for improvement. This is so that inferences can be made to determine its economic value but most importantly, its value to the patient experience. In addition, an overview of some of the impacts of telemedicine on mental health in the USA will be presented. This will be done to demonstrate some of the successes and limitations these programs may have experienced in comparison to Canada. Based on these literature reviews, the remainder of the paper will include recommendations on how improvements using telemedicine can be made in order to improve the current state of the Canadian mental health care system.

Current State of the Canadian Mental Health Care System

Mental health care involves a variety of different professions and clinical designations that are involved in a patient's circle of care. The reason for involvement from different types of professions can be attributed to the complexities of treating mental illnesses, and how mental health really is rooted in an overall level of healthiness in a person's entirety, and not just one aspect of their life. There are social workers, psychiatrists, psychologists, counselors and a number of other professions that are available to patients either through referral from a family physician, or through individual outreach. The process of navigating the mental health care system and initiating contact from questioning, to recognition of possessing a mental illness, and to treatment and recovery has been a cumbersome and confusing course of action with a wide variance of time depending on the patient. The instability from our current mental health care system in Canada for patients suffering from mental illness poses a high risk for proper treatment and recovery which needs to be addressed. Otherwise, mental health issues, especially in their early stages, can progress to stages that ultimately might endanger the patient's well-being and life.

In addition to the confusing Canadian mental health care structure, a very important patient-specific barrier that has, in recent years, been overcome slowly, is the stigma associated with mental illness. Stigma refers to the negative beliefs and attitudes held about mental illness, which can lead to public prejudice, stereotyping, and discriminatory behavior[9]. In Canadian society, the focus of mental health in recent years has become more and more progressive. The emphasis on mental health has been to address stigma and recognize that there are a substantial number of people and programs for dealing with mental illness. Campaigns such as "Bell Let's Talk"[10], or the Canadian Mental Health Association's (CMHA) "Opening Minds" project[11], have seen huge success in encouraging national participation in a recognition of the burdens associated with mental health, and how citizens need to help one other. All mental illnesses have the capacity to affect day-to-day functioning in people, including work and time spent with family among other everyday activities. Mental health is not restricted to a specific region, nor is it limited to a specific population of people. The Canadian mental health care system can become overwhelming very quickly to patients as well as health care providers. Health care providers can become confused when trying to decide where to refer a patient due to the varying mental health intake procedures between available services[12]. For patients, according to the CMHA, an alarming rate of approximately 49% of those who suffered from depression or anxiety had never actually sought medical attention[13]. Though many factors may be responsible for the lack of utilization of services, some of the main factors that may be responsible for this can be attributed to the lack of outreach and integration, and the shortage of psychiatrists and other mental health workers in Canada[14].

Lack of Integration within the Canadian Health Care System
Members of the Mental Health Commission of Canada (MHCC) in 2009 developed a framework document, "Toward Recovery & Well-Being: A Framework for a Mental Health Strategy for Canada"[15] which identified some of the major issues with mental health services and delivery in Canada. One of the goals within the proposed framework states "People have equitable and timely access to appropriate and effective programs, treatments, services, and supports that are seamlessly integrated around their needs"[15]. This goal was supported with evidence that demonstrated how disconnected the mental health care structure is in Canada. Currently there are a number of programs, services, treatments and supports available to Canadians suffering from mental health

problems but only approximately one third of these Canadians are actually accessing these supports[15]. The cohesion between all types of mental health supports is severely lacking and this can be attributed to the lack of planning that goes into the integration of these services at the stage of conception. All these supports were developed in a disconnected manner at different times with different levels of government, departments based on a variety of political factors and with very little coordination[15].

With the push to adjust attitudes towards, and processes within mental health, it has become an optimal time to re-evaluate the programs offered to those suffering with mental illnesses as well as the policies and technologies in place that may be hindering or enabling access to mental health services.

The development of technology could be a foundational starting point for developing commonality between all the different types of mental health supports. This could ultimately lead to a more functional and streamlined system. The mental health system should never work as a deterrent to its patients. Therefore a vision like this with a common starting point that patients can reach out to may improve engagement and help with earlier identification of mental health issues, and ultimately contribute to better outcomes. As an example, one of the public participants in the MHCC framework development process gave a testimonial of her and her spouse's interactions when trying to reach into the Canadian health care system. This demonstrates how truly difficult it is to seek help while suffering from mental illness.

"The usually confident, hardworking and sociable man is overwhelmed with despair and is no longer able to hang on at work. He recognized the need for counseling and reached out. After a confusing string of voice mail instructions, he was instructed to leave a message. He hadn't heard back after a week and gave up. I followed up myself and found the process frustrating to navigate through. When I finally spoke with somebody, I was told that there weren't any available counselors and that I should contact another service. If small tasks can seem insurmountable to a depressed person, finding help must seem nearly impossible. I can't imagine how hopeless it must seem to the most isolated – those with little family support, disabilities, and/or poor literacy skills"[15].

Testimonials like this are not isolated incidents; these types of issues occur on a regular basis. This gives an accurate picture of what consumers suffering with mental illness may face when trying to find resources and help from our Canadian mental health care system.

All populations are impacted by the shortage of mental health workers in Canada but populations that suffer even more from the lack of mental health support are the rural and northern populations of Canada. It can quickly be identified that these populations actually are underserviced[15]. The lack of mental health services available to these population is an enormous issue on its own; statistics demonstrate how poorly these issues are being handled, with such high illiteracy rates and excessive rates of mental health issues (e.g. Inuit men have 50 times the national average suicide rate)[15]. This vulnerable population can definitely benefit from an integrated care system that utilizes technology reaching out to provide opportunities for better care.

With all the disparate needs amongst all the different people and clinical conditions in Canada it would be extremely difficult to create a single point of care model, but what can be created are multiple services integrated into one point of entry to access care[15].

Shortage of Psychiatrists and Other Mental Health Workers
The Canadian Medical Association conducted an in-depth review of the psychiatric profession in Canada through the National Physician survey. Their statistics show that as of January 2012 there were 4426 licensed psychiatrists in Canada[16]. The psychiatric profession also had a disproportionately large number of older physicians compared to other healthcare disciplines[16]; this may lead to further shortages once those physicians begin to retire. Another issue is the distribution of psychiatrists amongst Canadian provinces and territories (see Figure 1).
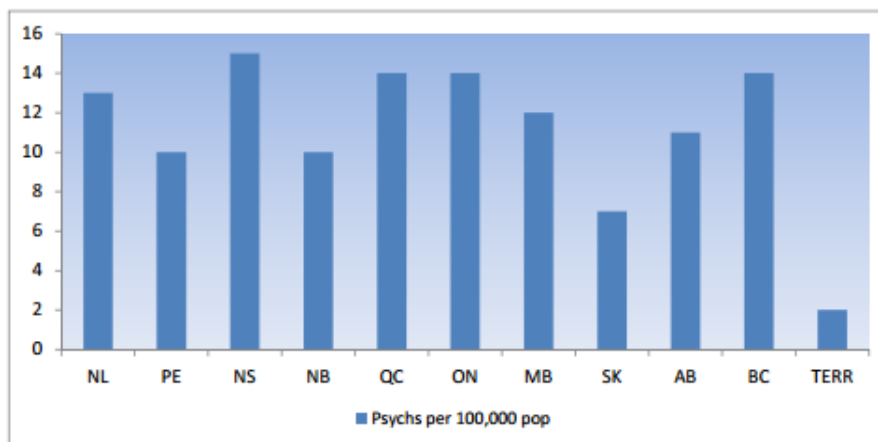

Figure 1. Number of psychiatrists per 100,000 population in Canada by province[10]

According to the Canadian Institute for Health Information (CIHI), Ontario has approximately 14 physicians per 100,000 Canadians and there are even lower numbers in the Canadian territories with approximately 2 psychiatrists per 100,000 patients[16]. The National Physician survey took this information one step further in their survey and asked whether or not psychiatrists found their services to be accessible on a scale of good, very good, excellent, fair or poor. The findings of the survey reported the following: 37% very good or excellent, 29% good, and 40% fair or poor[16]. Reported timeliness in seeing patients was also captured and the findings were also of concern, considering how quickly mental illness can progress in severity. Of the psychiatrist population only 16% could see urgent patients within a day and 55% could see them in a week but the average wait time for non-urgent cases was 11 weeks across Canada[16]. With these types of wait times, and a substantial number of psychiatrists recognizing their own poor accessibility for care, telemedicine has the opportunity to act as a tool to help bridge the gap between patients and psychiatrists. Telemedicine allows psychiatrists to be accessible to patients regardless of their geographic location. The ability for telemedicine to provide remote access for both patients and psychiatrists increases accessibility to psychiatric services. This increased accessibility can improve utilization of psychiatric services, lessening the burden of the shortage of psychiatrists currently being experienced in the Canadian health care system.

Across the country, other mental health workers are also in short supply[15]. This is a major cause of the long wait lists for the majority of mental health services being offered.

Adoption of Telemedicine in the Canadian Mental Health Care System
With the shortage of mental health specialists, combined with a lack of outreach and integration of such healthcare, one technological solution that has demonstrated the potential to improve the lives of many suffering from mental illness is telemedicine. Telemedicine that involves elements of mental health services can be referred to as telepsychiatry, telepsychology, or telemental health depending on the services being provided. Although the concept of telemental health is widely understood, some issues with adoption within Canada still exist. The Canadian Psychological Association conducted a literature review related to the barriers impeding adoption of telepsychiatry. Their findings include: ongoing costs associated with the technology, legal and ethical issues, negative expectations toward the use of technology for clinical applications, and lack of training[17]. These barriers to adoption could be better managed once more clinical evidence is gathered showing the effectiveness of telemedicine. Even if the satisfaction between the use of telemedicine and in-person mental health services turns out to be the same that still supports the idea that telemedicine is a feasible option for many patients, particularly those that live in rural and remote regions. The presence of telemedicine eliminates the hassle of having to travel, and acts as a source of encouragement and motivation for patients. This would help our mental health system to work as a source of empowerment for those suffering from mental illness.

Although the adoption of telemedicine is growing, what is more important is acknowledging the impact telemedicine has had on mental health in the primary care world. As a starting point, analyzing some of the successes and limitations in the United States can provide some insight onto how to improve the current state of telemental health in Canada.

Literature Review USA - The Effectiveness of Telemedicine in Mental Health
Canada lacks sufficient published literature in the area of assessing the impact of telemedicine on the mental health care system, and a lot of the literature tends to address economic value versus actual value to mental health patients in a clinical context. The US has a number of literature reviews and studies available on this topic. Some of that literature will help provide some insight into the successes and limitations identified in the US for the use and effectiveness of telemedicine in mental health care. By understanding this, these findings might be applied to the Canadian context to either see where improvements can be made, or what can be learned. Even though Canada and the US have different health care systems, the principles behind delivery of care and utilization of telemedicine can be realized in both environments.

One particularly enlightening study involved 11 different Veterans Affairs community-based outpatient clinics[5]. The main focus of the study was to treat patients with post traumatic stress disorder via the use of telemedicine teams and techniques. The measures taken were intended to capture the changes in those patients in comparison to patients who were receiving "usual care"(UC). There were 133 patients: the patients receiving Telemedicine Outreach for PTSD were referred to as TOP patients. The care teams involved for the TOP patients included telephone nurse managers, telephone pharmacists, telepsychologists, and telepsychiatrists[12]. These care teams delivered various therapies via interactive video over a span of 12 months. The TOP patients had access to the same clinical services the UC patients had access to, in addition to 11 other clinical services exclusively available for the TOP patients. After implementing telepsychiatry in the community outpatient clinics, benefits had been realized almost instantaneously: the introduction

of the service alone brought on 11 more clinical services that could be delivered remotely and on a consistent basis to a vulnerable population. The effectiveness of the new telepsychiatry service was measured using the Posttraumatic Diagnostic Scale that measured the severity of the patient's PTSD and depression. Figure 2 demonstrates that there were lower scores for the TOP group of patients for both the PTSD measure, and depression using the Hopkins Symptom Checklist[12]. Even if the patients in the TOP group had higher levels of PTSD and depression at the beginning of the project, at both the 6 month and 12 month check in the study, the TOP patients had a greater decrease in these clinical indicators than the patients from the UC group.
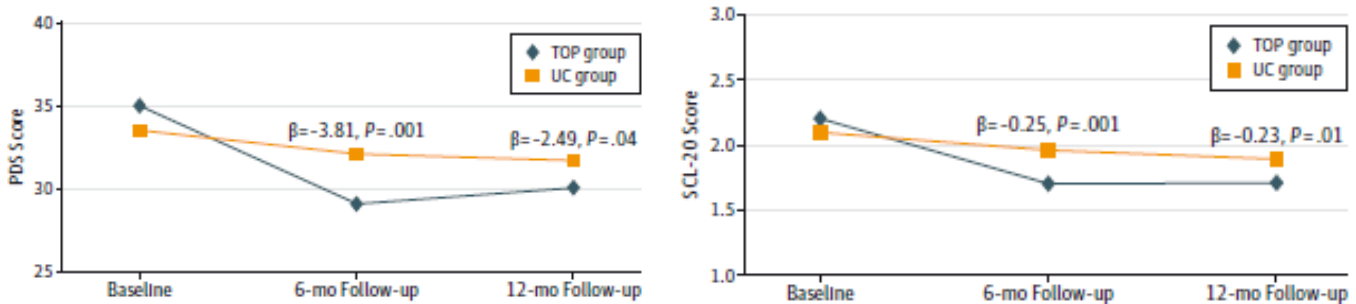

Figure 2. PDS scores and SCL-20 scores for both TOP and UC patients[5]

On a smaller scale, a different study took place in Georgia with the use of mental health telemedicine at a rural university[6]. The population was chosen due to mental health issues with post-secondary students and their limited access to mental health services in this rural setting. The college's counseling services (CC) had an existing partnership with the Medical College of Georgia (MCG)[6]. Their partnership required the psychiatry resident to commute to the college campus one day a week, which totaled approximately three hours a day of commuting. The stakeholders identified the limitations with this type of partnership and had implemented a model for delivering care via telemedicine. Any students referred from the college for a psychiatric consult had a referral form sent in that identified any background clinical information to the psychiatrists 24 hours prior to the scheduled consultation[6]. Figure 3 demonstrates the structure of how both the students and health care providers interacted through the telemedicine model.
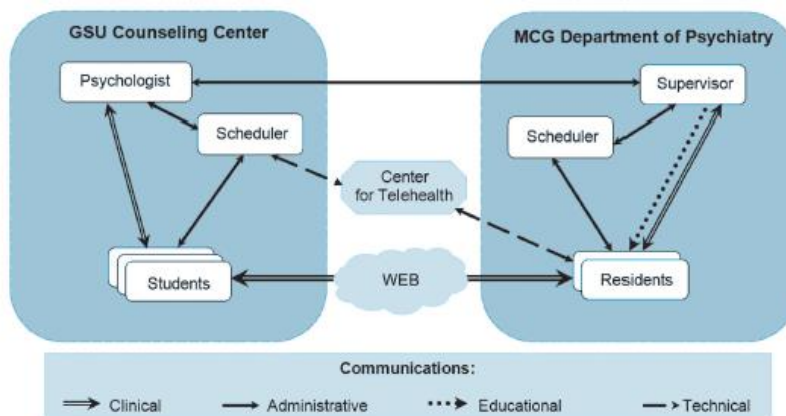

Figure 3. Telemedicine model implemented at GSU[6]

Likert-type scales were used on a questionnaire the students were required to fill out after interacting with the psychiatrist via tele-clinic (TC) in comparison to their non-teleclinic (NTC) experience. The results demonstrated that clients found the tele-clinic method of delivering psychiatric services to be beneficial with a mean score similar to that of the results from the non-tele-clinic survey[6]. By introducing the tele-clinic approach, psychiatrists were able to be contacted in real-time to make adjustments to a patient's psychotropic medications, and increase overall accessibility to psychiatric services[6]. This instantaneous access decreased the time it would have traditionally taken in the non-tele-clinic to adjust a patient's medication accordingly and address other mental health needs[6]. There was also an increase in the tele-clinic student's grade point averages (GPA) in comparison to the non-tele-clinic students[6]. The tele-clinic really embodied the concept of empowering mental health patients to use the mental health care system. With technology playing such a large role in post-secondary student's lives, the introduction of telepsychiatry to streamline mental health services seems like the most appropriate evolution for mental health care delivery.

These two studies are an example of how telemedicine has the capacity to address issues in the complexities of treatment in mental health care. Both the Fortney et al[5] and Khasanshina[6] study had two completely different sample groups but were still able to make an impact on patient care via the use of telemedicine.

From an economic perspective, telepsychiatry has demonstrated cost-savings associated with re-admissions into the emergency department for mental health purposes. Another study was conducted in North Carolina and Texas[7] that resulted in a significant economic benefit. Primary care telepsychiatry programs had increased and were being housed in 53 different hospitals. This North Carolina study was shortly adopted by Texas. Ultimately the decrease in mental health admissions in the emergency department saved as much as $7 million US in one year in North Carolina[14]. This is a significant amount of cost saving. Studies like this have yet to be seen in the Canadian context on such a large scale.

The implementation of these services involved psychiatrists being trained and certified in using the telepsychiatry service. An interesting element of the project that occurred in Texas was that psychiatrists involved were not limited to the state or country. The project reached out to psychiatrists world-wide and gave them the opportunity to become certified to provide their services in Texas hospitals.

By doing this, the project was able to offer emergency telepsychiatry on a 24/7 basis and reduce psychiatrist shortages. The model that was developed to deliver this care was free-standing mental health emergency centers (MHEC)[14]. These centers were staffed with a variety of psychiatric staff on a full time basis and were able to manage emergency encounters within 15 to 20 minutes. This study really embodied all the economic benefits that can come from early psychiatric interventions. Although economic efficiency is an important aspect to telemedicine as a whole, the primary focus should continue to be the quality of care and how it can impact the state of the mental health care system and its patients.

A comprehensive review was published by VA Medical Centre, Oregon Health and Science University in 2014 outlining the benefits for both patients and clinicians with the use of home-

based telemental health treatment[15]. This review showed the following benefits: increased treatment attendance and satisfaction, social support and connectedness, access to contextual information, patient and practitioner safety, and improved privacy and concerns about stigma associated with care seeking[15]. The authors were able to determine that the use of telemedicine had a positive effect on clinical outcomes. Specifically for patients suffering from social anxiety issues, telepsychiatry was able to eliminate the need for patients to feel forced into facing their anxiety-provoking stimuli before they were ready to do so[15]. Another advantage that was acknowledged with the use of telepsychiatry was the ability to more frequently contact patients who might be at high risk for suicide[15]. If a patient lives far away from psychiatric help, connecting via telepsychiatry eliminates the need for patients having to drive excessive distances to seek help.

The literature in the United States reveals that clinical benefits of telepsychiatry are recognized and that there are opportunities for significant economic gains if telemental health is implemented on a large scale. This literature indicates that the experiences that have occurred can also be useful for future development being considered in the Canadian telepsychiatry market. Although the health care systems in Canada and the US have very different models, the benefits realized with the use of telepsychiatry can be realized in a similar manner within Canada.

Literature Review Canada – The Effectiveness of Telemedicine in Mental Health
In Canada, telemedicine as a component of healthcare is financed and delivered at a provincial level, where each province is responsible for overseeing the structure and processes in place for this service. The COACH report showed that, as of 2013, all provinces had reported having telemental health, or telepsychiatry available as a method of delivery to mental health patients[4]. Online databases such as Pubmed, Web of Science and OVID show that the majority of the literature for telemedicine in Canada reviews the initial pilot project phase. Canadian literature on this topic lacks longitudinal studies that evaluate the effectiveness of telepsychiatry or telemental health on a long-term basis. The literature in Canada is also population specific; the majority of the activity for telepsychiatry focuses on rural and northern settings and further focuses on either adolescent/youth telepsychiatry, or the Inuit population. There is a high demand for mental health services in these rural and remote areas[4,15,18]. It is important to review the effectiveness of these technological tools in these communities since these communities are the ones that will benefit the most from the potential of telepsychiatry services.

In 2013 the Ontario Telemedicine Network published an article written by their Chief Medical Officer, Dr. Rob Williams. The claims made by Dr. Williams agreed with the statistics and other Canadian published research claiming that there aren't enough psychiatrists in Canada to meet the demands for one-to-one care[19]. Even though other mental health workers in Canada are making an effort to take on long-term mental health patients, psychiatrists are the only ones who are able to make medical diagnoses and prescribe medications[19]. With the use of telepsychiatry this puts all mental health providers on a common platform to collaborate more closely in patient care and treatment plan development. His article highlights how important the role of telepsychiatry has been in the success of addressing mental health concerns in Canada. The article then references an important study conducted by O'Reilly et al[18] that evaluated telepsychiatry equivalency to face-to-face psychiatry in Ontario.

The O'Reilly et al[18] study was conducted in Thunder Bay and it did not necessarily compare clinical outcomes of telepsychiatry with face-to-face encounters, but rather if telepsychiatry could accomplish equivalent clinical outcomes to face-to-face psychiatry. The study importantly suggests that many studies on telepsychiatry incorrectly identify "equivalence" between these two mental health delivery methods. The approach to the study used methods specifically designed to test the equivalence of both interventions, rather than identifying the lack of statistically significant differences in treatment outcomes[18]. The sample size was 495 patients from Thunder Bay Regional Hospital; the group was randomly assigned to either a telepsychiatry session, or a face-to-face psychiatry session after being referred for psychiatric consultation by their family physician[18]. The clinical services in this study were provided by four psychiatrists located in London, Ontario. These psychiatrists delivered clinical services for both the telepsychiatry patients from London, and flew to Thunder Bay to provide in-person services. The clinical services provided were similar and were modeled on the existing outpatient service in Thunder Bay.

After the psychiatrists conducted assessments they wrote out recommendations and sent that information to the family physician via fax within 48 hours. The scope of clinical services included: treatment recommendations, medication management, psycho-education, supportive counseling and triage to other services[18]. Three of the main assessments that were used to measure equivalency in patient's treatments were the Brief Symptom Inventory (BSI)[20]self-report, the Global Severity Index (GSI)[21], and the Client Satisfaction Questionnaire (CSQ-8)[22]. The scores were analyzed using equivalence methods determined by the team that carried out the study, to ensure that their results did not rely on low statistically significant differences to determine the presence of equivalence. The study was able to find that treatment via the use of telepsychiatry produced equivalent clinical outcomes of patients who were seen face-to-face when compared to patients who received their service via telepsychiatry.

One of the most important results of this study was the scores seen on the BSI and GSI scale for both methods of psychiatric delivery. The results from both of these scales demonstrated that patients felt less distress from their symptoms, and an overall improved mental health after clinical intervention from both methods of delivery[18]. Studies like this aid in making a case for wider implementation of telepsychiatry. Although it would be ideal to see improvements through the use of telepsychiatry versus face-to-face, it is just as important to acknowledge that the telemedicine methodology of delivering psychiatric service can produce equivalent outcomes.

An economic evaluation was also conducted in this study to measure the cost-effectiveness of the telepsychiatric services. Data on reimbursement of expenses the psychiatrists incurred for travel and accommodation to Thunder Bay were collected and compared to the costs associated with delivering telepsychiatry[18]. The telepsychiatric expenses were determined by the integrated services digital network (ISDN) line rental charges, telephone costs per minute, and capital cost of the videoconference equipment used over a five-year depreciation[18]. Conclusively, the costs of delivering telepsychiatry were lower than the costs associated with face-to-face delivery of mental health services. Table 1 illustrates the cost comparisons between both methods of delivery. Opportunity costs (the indirect costs of patients not serviced during the time that psychiatrists were in transit) are not included. If they were, this would make telepsychiatry an even more attractive alternative.

Table 1. Cost comparison of face-to-face psychiatry and telepsychiatry[18]

Variable	Face to face	Telepsychiatry
Payments to psychiatrists	$73,636	$45,580
Travel and accommodation for psychiatrists	$34,913	$0
Telephone connection costs for telepsychiatry	$0	$22,665
Equipment depreciation	$0	$10,036
Room rental cost for telepsychiatry in proximal site	$0	$10,030
Total costs	$108,549	$88,311
Number of patients	246	224
Number of visits	344	333
Average cost per patient	$439	$394
Average cost per visit	$315	$265

The demand for more research in telepsychiatry has been expressed in a number of published Canadian studies. For example, Doze et al[23,24] published two papers on telepsychiatry within a four year time-frame. The first paper was focused on satisfaction with a telepsychiatry pilot project deployed in Alberta, 1997. The second study published in 2001 looks at the successes of the initial pilot project and how it had developed into a routine service, also expressing the need for more longitudinal studies to take place. The studies by Doze et al also reported significant success in patient outcomes, and provider satisfaction with the utilization of telepsychiatry in Alberta. Limitations were expressed in regards to some of the technical issues they experienced, but it was not enough to hinder the success or continued use of telepsychiatry[24]. Patient perspectives were also examined. During the study they had established a target of 80% for patient satisfaction and were consistently attaining higher than their target each year[24]. This study was also able to identify, based on patient surveys and feedback, that the service patients received via telemedicine was as satisfactory as receiving face-to-face mental health treatment[24].

Another study focused on measuring equivalence of telepsychiatry to face-to-face mental health treatment was conducted in 2014 and specifically on adherence to a common mental health treatment known as cognitive behavioral therapy (CBT) (see Appendix for description of CBT). This study was conducted in Toronto and sought to find ways of improving access to CBT due to the prevalence of clinical depression[25]. Patients were receiving a 13 weekly intervention program via either video conferencing or face to face. Progress was measured using the Beck Depression Inventory Second Edition (BDI-II)[26] or both groups. Both groups had seen improvements in their BDI-II scores at a comparable rate between patients receiving CBT via videoconferencing and face-to-face treatment[25]. This study demonstrated again, that introducing telemedicine to deliver mental health services had patients feeling less stigmatized due their need to seek help and eliminated other barriers such as travel, other health concerns, and location[18,23-25].

Another source of statistical evidence that shows the feasibility and demand of telemedicine in mental health care comes from Ontario. The Ontario Telemedicine Network (OTN) publishes statistics every quarter for how frequently various therapeutic areas are delivered by OTN. For the past 10 quarters more than 50% of OTN use was due to mental health[27]. These data demonstrate that telemedicine has and will continue to be an effective way of delivering mental health services to the Canadian population. The demand to use this service is continuing to grow; and part of that

can be attributed to the fact that it is either equivalent to or better than typical standard delivery of mental health care.

Telemedicine Encourages Collaboration amongst Mental Health Workers in Canada
Studies in Canada have not only been conducted to measure patient satisfaction with the use of telepsychiatry and other telemental health services, but also to measure provider satisfaction with these types of services. Some of the common themes seen in these studies are: encouragement to go forward with telepsychiatry services, and to embrace the collaboration that can occur while connecting health care providers via telecommunications[28,29]. This theme of collaboration has the potential to address many issues with the current state of our current health care system in Canada. Due to the shortage of psychiatrists, collaborating with all types of mental health professionals on one case could open up potential for improving clinical best practice guidelines and ultimately patient outcomes. In addition, by involving other health care professionals and supportive roles, we are able to provide a holistic approach to a patient's mental health issues. Telemedicine has the potential and demonstrated ability to act as the conduit that will bring together all types of mental health workers, regardless of their physical placement.

A demonstration study conducted in Atlantic Canada[30] examined how telemedicine could affect mental health in training and support for interdisciplinary collaboration. 34 professionals, representing 11different disciplines participated in the study and underwent training and support from five urban mental health professionals via telemedicine[30]. The results demonstrated an overall high satisfaction with experience and expanded knowledge and an overall greater cohesion among professionals to collaborate on care[30]. Mental health workers have full case loads and see an endless variety of different conditions as every individual patient has a unique diagnosis and treatment plan to follow. This encouragement of healthcare providers to collaborate not only benefits the providers and expands their knowledge base, but it also creates an environment that sets up the patient to have a better experience and could contribute to overall better outcomes. The telemental health platform can be used by all mental health workers to further collaborate and guide clinical best practice guidelines for future innovations and care in the Canadian mental health care system.

Telemedicine and Mental Health for Youths in Canada
An area that has been benefiting from the use of collaboration via telepsychiatry is mental health in the youth demographic. Youth mental health has become more and more of a pressing issue in Canada. Rates have been climbing for youth mental health issues and suicide all over the country. In Ontario, a study was conducted on pediatric telepsychiatry and the effects it had on the caregiver and service provider. The study was designed to bring all types of health care providers to a collaborative platform via videoconferencing followed by an individual telepsychiatry consultation with participating youths. These consultations were followed up by telephone interviews and the data were collected in a qualitative manner[31]. Two of the overall themes that came out of this study included: enhanced capacity of service providers, and reduced burden on caregivers. Caregivers found that the use of telepsychiatry reduced costs associated with traveling, and missed time for work[31]. The enhanced capacity of service was a result of the health care provider participants feeling an increase in their confidence and ultimately their competence in assisting their patients[31]. Another pilot project specifically tailored to child and youth psychiatry was launched in Nunavut, which is known for having limited access to psychiatric services. The territory of Nunavut actually has a much younger population than the rest of Canada[28]. An alarming

statistic found in the study was that throughout 2004-2008 the suicide rate was 30 times higher in Inuit children and teens in comparison to all of Canada[28].This study was inclusive of all staff working with youth experiencing mental health and behavioral issues (e.g. education, social services, non-governmental agencies) [28]. This study once again demonstrates the benefits and importance of collaboration with all types of mental health workers for the benefit of the patients. The study wasn't focused on clinical outcomes, but rather barriers in place that may be contributing to the lack of accessibility for youth to appropriate telepsychiatric services. The following barriers to successful telepsychiatric services were identified: accessibility, culturally appropriate services, relevant continuing education and stable, confidential technology in place to enable these interactions[28]. Ultimately, both studies[28,31] identified the use of interactive videoconferencing technology as an effective way to deliver specialized mental health services. The studies also encouraged the need for more research to study its clinical effectiveness on the population as a whole. The studies also identified one of many vulnerable patient populations that can greatly benefit from the increased use of telemedicine in mental health.

The Journal of the Canadian Academy of Child and Adolescent Psychiatry conducted a large literature review[32] specifically on the topic of youth mental health and telepsychiatry as the method of delivering care. Their findings were that youth struggling with mental health are more likely to respond to alternate service delivery strategies including videoconferencing, or other Internet-based programs[32]. With the younger generations including technology as an integral part of their daily lives, telepsychiatry can pave the way for other innovations to be introduced for the delivery of mental health services.

Telemedicine and Mental Health for Geriatrics in Canada

On the other side of the vulnerable population spectrum, limited research has been conducted and published in Canada on the successes and limitations of telepsychiatry use on the geriatric population. In this context it is usually referred to as telepsychogeriatrics. One publication by Conn et al used a number of different methods to evaluate the effectiveness of telepsychiatry in six different communities from Northwest Ontario. They conducted a chart review, evaluated patient and staff satisfaction, reviewed surveys sent to physicians and also hosted three focus groups. Their findings revealed that across all methods there were high ratings of satisfaction for telepsychiatry from both the physicians and patients with scores averaging between 4.6 and 4.85 on a 5 point scale[34].

Methods of Telemental Health Delivery

The majority of the Canadian literature reviewed demonstrated the use of video-conferencing as the primary method of telemental health delivery, but there are ways for delivering telemental health other than video-conferencing. Based on the Hailey et al [35] systematic review, telephone intervention and Internet based programs were also found in Canadian telemental health programs[35]. All three methods of technology have varying administrative policies depending on the province, and how the program was designed and intended to be delivered.

Typically the use of telemental health or telepsychiatry involves video-conferencing and the patient is alone communicating with their specialist unless other arrangements have been made[33]. Video-conferencing allows the patient and health care provider to obtain a level of interaction that could be seen as comparable to traditional face-to-face sessions.

In Ontario, using OTN for mental health appointments can be done by using personal computer equipment. The patient uses videoconferencing software and the Internet to connect to a doctor or specialist, where they will see and speak with each other[33]. The appointment would proceed like a regular face-to-face appointment. If the patient does not have the appropriate technology available to book this appointment, they are able to use their closest OTN enabled physician's office or hospital[33]. For example, Ontario Shores offers telemental health for patients.

Telephone based telemental health delivery has also been seen as an effective means of delivery of health services[35]. This is typically done by the patient contacting the service by appointment unless the program was designed to intervene at an immediate time. For example patients with panic disorders could contact a health care provider using a phone service to manage a panic attack happening at the time the phone call is placed[35].

Hailey et al also explored Internet-based programs for delivery of telemental health[35]. The findings demonstrate these programs can improve a range of mental-health conditions but there are limitations based on the merit of the internet-based programs. Some of the Internet-based programs lack credibility in comparison to actual therapy taking place via the use of videoconferencing[35]. The internet-based programs are more focused towards self-help methods of therapy, providing forums and guides for patients to participate in and follow. More research is needed in this specific area of telemental health delivery to determine its advantages and limitations[35].

The Effectiveness of Telemental Health on Various Mental Illnesses
A systematic review in 2008[35] reviewed 72 publications on the topic of telemental health (TMH) and its overall clinical effectiveness (not limited to Canada). An extensive review process was put in place and after collecting 1028 different abstracts on the topic of telepsychiatry or telemental health, 72 of them were selected for further analysis[35]. The findings of this literature revealed that telemental health was successful in clinical use in 55% of the studies. Concerning quality and completeness of the research, 18% of the studies were of good enough status that they did not require further research, and 62% of the studies needed further follow up research to provide solid evidence of benefit[35]. The remaining 20% required further work to be completed before making any claims[35]. Common themes that were identified throughout the literature review for telemental health to be considered effective it must be: "technically reliable and robust, well accepted by both clients and health care professionals, and able to produce equivalent quality services to face-to-face consultations with undue disruption to practice patterns"[34].

Various mental illnesses have been treated with the use of telemedicine. The review by Hailey et al[35] recognized the following areas had evidence of success with the telemedicine platform: child psychiatry, depression, dementia, schizophrenia, suicide prevention, posttraumatic stress, panic disorders, substance abuse, eating disorders and smoking prevention[35]. These mental illnesses showed promising results in using telemedicine for intervention and continuous care. Studies specifically conducted on child psychiatry, depression, eating disorders and panic disorders found that the use of video-conferencing produced similar results to that of face to face delivery[35]. In the case of child psychiatry and schizophrenia the telemedicine approach actually produced better clinical outcomes than face-to-face intervention based on standard clinical tests. [35].

The areas of dementia, schizophrenia, panic disorders, substance abuse and smoking prevention demonstrated that the use of telephone intervention was more effective than usual care[35]. Schizophrenia treatment over the phone lowered readmission rates, administering tests for dementia was faster and easier over the phone, and the telephone approach to panic disorders improved a number of anxiety symptoms and improved the overall quality of life for some patients[35].

Internet based methods of care were found to be effective in depression, schizophrenia, post-traumatic stress disorder, and general panic disorders[35]. Studies suggested that follow-up should be conducted on depression and panic disorders, but the results for schizophrenia and general panic disorders showed statistically significant improvements in patient outcomes using internet-based approaches[35].

Some mental illnesses that did not see any improvements, or telemedicine as a feasible approach to treatment were substance abuse, eating disorders, epilepsy with psychosocial difficulty, and obsessive compulsive disorder (OCD)[35]. Substance abuse treatment was unsuccessful over the phone unless the patient had already been stabilized first by face-to-face treatment[35]. Treatments for eating disorders and OCD over the telephone were also unsuccessful, with face-to-face treatment providing better results for patients[35].

Limitations of Current Research and Adoption
The main limitations identified in the publications reviewed from both Canada and the US have expressed a need for more longitudinal studies in telepsychiatry. These would give a better sense of confirming whether or not this is a feasible method of delivering mental health care, and whether or not the results of receiving telepsychiatry are just as good, if not better than receiving face-to-face mental health treatment. Another limitation to be wary of is the attitudes towards using telepsychiatric services from the provider's perspective. Like any technology being implemented, it requires proper training, education and change management approaches to ensure successful and optimal use of telepsychiatry. If providers have a negative attitude before going into the process of training in telepsychiatric services, they may be less likely to continue to try to use the program and may have a lower level of acceptance if they experience any technical difficulties.

Another limitation to keep in mind is how providers would be able to mitigate risks with high-risk patients. As an example, if during a telepsychiatric consultation a patient is considered at high-risk for committing suicide, how can physical intervention take place if they begin to pose a harm to themselves during a telemedicine session? The legalities and policy framework related to this limitation have yet to be solidified and explored in Canada, especially due to the de-centralized telepsychiatry delivery structure taking place at a provincial level.

The authors of the large literature review[34] published a 2008 paper on the limitations in the routine use of telepsychiatry based on their findings from their original research. They indicated that the absence of local champions encouraging the routine use of telepsychiatry has contributed to its limited up-take for routine use, in addition to the uncertainty for professionals and how the referral process could change[34].

Recommendations
The research that has been conducted and published so far in Canada has identified some of the main strengths and effectiveness of telepsychiatry, and has been able to identify its limitations. The foundational knowledge of telepsychiatry and telemental health is evident, and the technology used for telepsychiatry has been around for such a long period of time that there are subject matter experts available in Canada that are able to research and innovate in this topic. Especially with the growth of health informatics programs across Canada, more professionals are becoming aware of the benefits technology can bring to the health care industry.

Based on the literature reviewed, and the limitations identified, certain significant recommendations can be made.

Recommendation 1:
One of the largest gaps that acts as a deterrent to all aspects of patient care in the mental health care setting is the lack of a structured health care system that works for its patients to begin with. If telepsychiatry is to grow in adoption and longitudinal use, the foundational needs of the Canadian mental health care system need to be addressed. In 2012 CMHA published on its website statements to the effect that the provincial First Ministers identified improving access to mental health services as a high priority area that needed change[36]. The whole structure needs to be re-evaluated and new policies need to be developed to ensure timely and safe access to patients suffering from mental illness. Since there are financial and legal issues that act as barriers for the current provincial models of mental health to move towards a common health care structure, we can start by having provinces collaborate with each other in developing policies and procedures. It is understandable why the provinces would need to design their mental health system frameworks on a provincial level. Each province and territory has its own special population needs and the policies in place need to be able to work optimally for each population.

Currently the federal government has set five criteria that all provinces and territories must comply with: public administration, comprehensiveness, universality, portability and accessibility[1]. The federal government also determines and provides the funding for each province or territory[1]. Under the Canada Health Act, all territories and provinces are free to determine their delivery of mental health services[1].

This collaborative platform would allow the provinces to learn from one another. In addition to helping each other to address the more complex areas of mental health access and delivery, they could also work towards designing a framework for change. For example, in the Territories due to the scarcity of resources – involving the provinces in planning the framework would open up opportunities for mental health worker shortages to be decreased; if other provinces would be willing to somehow offer their human resources to such a high needs population in the Territories.

Recommendation 2:
Within the provincial framework, it would be ideal to see a single point of entry into the mental health care system. This single-point of entry would eliminate the confusion that is currently being felt by both providers and patients who seek mental health treatment. From this single point of entry into the mental health care system, there should be centralized intake workers who can readily determine what resources a patient or provider needs and can triage them appropriately into the right direction. This approach would allow for better tracking of mental health care workload and demand (for example, we would be able to better depict how many patients need the services from a social worker vs. the services of a psychiatrist) and based on this tracking, there would be a more systematic approach in place for human resource and budget planning.

Recommendation 3:
One of the foundational pieces that should be included in the triaging process for the proposed mental health care system is the option of telemental health and telepsychiatry. Each province already has some type of telepsychiatric or telemental health structure and technology in place; it should now be built into existing policies and procedures. From a centralized model the referral information would ideally contain demographic information on the patient as well as the principle reason for seeking mental health care. Based on this information, our mental health care system could take it one step further and determine whether or not telepsychiatry or telemental health services need to be offered. The following scenario demonstrates how this process would work: Patient A is living in a rural area with access to one hospital that was staffed with limited mental health resources, and therefore has long wait lists. Patient A is considered high-risk and has spoken to his/her primary care provider about mental health issues he/she is struggling with. Their primary care provider would provide this information to the centralized point of entry in the mental health care system, where a central intake worker would recognize the urgency and distance issues the patient faces. If the hospital closest to the patient had an extremely long wait time, this is where the central intake worker would be able to determine that a telepsychiatric consult was available in a different jurisdiction and could coordinate this in a timely manner. Ideally, this process would decrease the amount of time the patient would have to wait to receive treatment and an improved outcome, while ensuring optimal use of resources within the mental health care system.

Recommendation 4:
This new model could be built in collaboration with the Canadian Institute for Health Information (CIHI). The reason for this collaboration would be to better track statistics in utilization and effectiveness of telepsychiatry and telemental health services on a national level. The data collected would contribute to academic studies and could further contribute to policy changes and framework revisions for each provincial mental health care system.

Recommendation 5:
Another recommendation would be to conduct follow up studies on existing pilot studies within Canada. The publications reviewed in this paper demonstrated a common need for follow-up and longitudinal studies to better depict the benefits and limitations of the use of telemedicine in mental health care. At this stage, enough time has passed since some of these studies were undertaken that conducting follow-ups would be beneficial to see how each health care facility has approached its issues and whether or not they continued to use telemedicine in their mental health care delivery models and the reasons why or why they did not. Gathering this evidence and research could also

act as a tool to assist in change management and buy-in for mental health care workers who are resistant to adopting telemedicine technologies in delivering care.

Recommendation 6:
In addition to the academic aspect of these recommendations, the future of the follow-up studies should be more patient-centric. Quantitative data is great for demonstrating improvements, but a lot of value can be deduced from qualitative data that these patients can offer. By doing this, we are further able to develop an appropriate framework that works best for the ultimate stakeholder, our mental health patients. They would be able to offer valuable insights on how telepsychiatry and telemental health can be better delivered and used on a routine basis. From a training and education perspective, the use of telemedicine in delivering mental health care treatment should start to become part of a medical professional's curriculum. The concept of eHealth should be delivered to all professionals interested in the medical field. By making medical professionals aware of the technologies in place and how they can be used to benefit patients, we are able to address buy-in issues from earlier stages. Building education about telemedicine for mental health support into the curriculum would also promote innovation and provide an opportunity for people who are passionate about these issues to build new ideas and make recommendations for improvement.

CONCLUSIONS

Even though some of the research to date is limited in demonstrating the overall clinical effectiveness of telepsychiatry and telemental health in Canada, the majority of the studies have supported the idea that this technology is able to effectively facilitate this new method for delivering mental health services. The pilot studies have also demonstrated enough evidence to encourage follow-up on past research conducted on telepsychiatry and telemental health in Canada. Studies have demonstrated its capacity to produce similar outcomes to that of face-to-face psychiatric treatment, to be a platform for collaboration amongst different mental health professionals, and its ability to reach out to all types of vulnerable populations. The amount of time it is taking for Canadians to receive access to the mental health care system needs to be reduced, and wide-spread promotion and regulatory use of telepsychiatry and telemedicine has the potential to play a pivotal role in facilitating this. The benefits of implementing telepsychiatry and telemental health outweigh its limitations.   By further implementing these systems we are providing ourselves with greater opportunity for change and development within our mental health care system. With proper support from the government, proper engagement with the right stakeholders in designing our mental health care system's framework, and embracing technology in our health care industry, small steps can be taken to begin contributing to the big-picture change our mental health care system needs.

Glossary

Mental Health: The capacity to feel, think and act in ways that enhance one's ability to enjoy life and deal with challenges[1].

Mental Health Problems: Diminished capacities – whether cognitive, emotional, attentional, interpersonal, motivational or behavioral – that interfere with a person's enjoyment of life or adversely affect interactions with society and the environment[1].

Telemedicine: The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication 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 health care providers, all in the interests of advancing the health of individuals and their communities[3].

Telepsychiatry; A form of video conferencing that can provide psychiatric services to patients living in remote locations or otherwise underserved areas. It can connect patients, psychiatrists, physicians, and other healthcare professionals through the use of television cameras and microphones[37].

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APPENDIX

Cognitive Behavioral Therapy (CBT)
"CBT is a psychological treatment that addresses the interactions between how we think, feel and behave. It is usually time-limited (approximately 10-20 sessions), focuses on current problems and follows a structured style of intervention. Evidence supports the effectiveness of CBT for many common mental disorders. For some disorders, carefully designed research has led international expert consensus panels to identify CBT as the current "treatment of choice".

CBT is less like a single intervention and more like a family of treatments and practices. Practitioners of CBT may emphasize different aspects of treatment (cognitive, emotional, or behavioral) based on the training of the practitioner."[38]

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