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Viewpoint

Original Paper

Analysis of Twitter Users' Sharing of Official New York Storm Response Messages

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Abstract

Background: Twitter is a social network where users read, send, and share snippets of text ("tweets"). Tweets can be disseminated through multiple means; on desktop computers, laptops, and mobile devices, over ethernet, Wi-Fi or cellular networks. This redundancy positions Twitter as a useful tool for disseminating information to the public during emergencies or disasters. Previous research on dissemination of information using Twitter has mostly investigated the characteristics of tweets that are most effective in raising consumer awareness about a new product or event. In particular, they describe characteristics that increase the chance the messages will be shared ("retweeted") by users. In comparison, little has been published on how information from municipal or state government agencies spreads on Twitter during emergency situations. Retweeting these messages is a way to enhance public awareness of potentially important instructions from public officials in a disaster.

Objective: The aim of this study is to (1) describe the tweets of select New York State and New York City agencies by public officials surrounding two notable recent winter storms that required a large-scale emergency response, and (2) identify the characteristics of the tweets of public officials that were most disseminated (retweeted).

Methods: For one week surrounding Superstorm Sandy (October 2012) and the winter blizzard Nemo (February 2013), we collected (1) tweets from the official accounts for six New York governmental agencies, and (2) all tweets containing the hashtags #sandy (or #nemo) and #nyc. From these data we calculated how many times a tweet was retweeted, controlling for differences in baseline activity in each account. We observed how many hashtags and links each tweet contained. We also calculated the lexical diversity of each tweet, a measure of the range of vocabulary used.

Results: During the Sandy storm, 3242 shared (retweeted) messages from public officials were collected. The lexical diversity of official tweets was similar (2.25-2.49) and well below the average for non-official tweets mentioning #sandy and #nyc (3.82). Most official tweets were with substantial retweets including a link for further reading. Of the 448 tweets analyzed from six official city and state Twitter accounts from the Nemo blizzard, 271 were related to the storm, and 174 had actionable information for the public. Actionable storm messages were retweeted approximately 24x per message, compared to 31x per message for general storm information.

Conclusions: During two weather emergencies, New York public officials were able to convey storm-related information that was shared widely beyond existing follower bases, potentially improving situational awareness and disaster response. Official Sandy tweets, characterized by a lower lexical diversity score than other city- and Sandy-related tweets, were likely easier to understand, and often linked to further information and resources. Actionable information in the Nemo blizzard, such as specific instructions and cancellation notices, was not shared as often as more general warnings and "fun facts," suggesting agencies mix important instructions with more general news and trivia, as a way of reaching the broadest audience during a disaster.

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KEYWORDS

social media; disaster response; emergencies; public health; emergency management

Introduction

Social media platforms such as Twitter have proven useful for the rapid dissemination of information during and after disasters. Twitter, a service where users can share short messages of text with or without photos or links to websites, is resilient [1], available via cellular, Wi-Fi, or broadband connections on mobile or desktop computers. The messages have a global reach, but can be directed very locally.

Twitter has become a prominent way to rapidly disseminate information during and after disasters. In the aftermath of the 2010 Haiti earthquake [2] and 2011 Japan earthquake [3], local officials, survivors, and relief workers used Twitter to (1) communicate about available shelters and supplies, (2) co-ordinate search efforts to locate the missing, and (3) co-ordinate relief efforts such as raising money.

While governments and aid agencies have employed Twitter for constructive ends during emergencies, the first step in evaluating a public health intervention is assessing reach [4]. And yet, the characteristics of these Twitter messages during times of disaster remain unstudied.

Local health departments and public agencies routinely use Twitter to engage and educate the public [5]. Twitter could be useful in disasters, such as extreme weather events, when change communication management is imperative [6]. The coordination of messaging content amongst all response partners and affected individuals is a critical function in management of disasters. Public information officers representing response agencies coordinate via Joint Information Centers to ensure coordinated public messaging. Twitter could be an important means to disseminate information during a disaster because it leverages existing social networks. Tweets can easily propagate to a wider audience when users “retweet” them, share the tweet with an audience that follows the retweeter. The original source, in this case the public Twitter account, can choose to allow or disallow retweeting. Tweets can also be found if marked with “hashtags”, keywords preceded by “#”. Marking tweets up with hashtags organizes tweets around topics. Tweets marked with hashtags can easily be found with Twitter’s built-in search function.

Twitter users routinely use hashtags to expand the reach of their messages, whether for typical use or in times of emergency. The study of maximizing retweets has been left to marketers and advertising-focused firms [7]. The characteristics of messages that increase their chance of being retweeted during disasters remain unstudied.

This is regrettable for two reasons. First, from the perspective of the public official in a time of emergency, there is enormous potential benefit to crafting a pithy message that is widely shared and seen by millions, with comparatively little extra effort to learn what would make a compelling message, and no extra cost.

Second, the need for accurate information from public officials in times of disasters is acute. In fact, inaccurate unofficial messages have been noted to proliferate quickly in times of disaster, as was the case after the Boston Marathon bombings [8]. Some public officials in Haiti viewed Twitter with suspicion after the earthquake, citing the rapid spread of rumors through backchannels [2]. It would be unfortunate if this useful tool was neglected by distrustful officials, instead of studied to better enhance its utility.

Recently, the New York area has seen a major weather event, Superstorm Sandy, as well as a significant snowstorm (dubbed “Nemo” by a weather channel [9]). To observe how public officials used social media during extreme weather events, we collected tweets from several public officials’ and agencies’ accounts on Twitter before, during, and after the storms hit. It was our objective to determine characteristics that led to increased sharing among message recipients, with the goal of improving future messaging during disasters.

Methods

Inclusion criteria: for each event, we included tweets that (1) were pushed to Twitter in the week surrounding the event by selected official accounts, and (2) contained certain keywords. We collected data from six official Twitter accounts: @311NYC, @NotifyNYC, @NYCGov, @NYCMayorsOffice, @NYGovCuomo, and @MikeBloomberg. We collected tweets from these accounts for a one-week period surrounding each extreme weather event; October 27 to November 2, 2012 for Superstorm Sandy, and February 5-12, 2013 for blizzard Nemo.

Although the inclusion criteria were the same for both events, we used different but comparable methods to acquire data surrounding each event. For the Sandy storm we collected tweets using custom software. For the Nemo blizzard, we collected tweets using cached version of the search results page of Twitter.com. The main difference between the two methods is that the custom software also provided tweets from non-official sources, which provided a frame of reference.

For Superstorm Sandy, we collected tweets that contained “#Sandy” and “#NYC” using custom software written in Python to acquire tweets from Twitter’s ReST API v1.0. For Nemo, we scraped each of the six official accounts. Scraping refers to extracting parts of a webpage when the HTML code representing the webpage is viewed in a text editor.

Once the tweets were acquired, we identified which messages were related to the storm. We then identified which messages related to the storm had actionable information for the public. Retweets from various accounts were normalized to number of tweets and follower counts. Additionally, the most shared tweets were analyzed and compared to other public official tweets during the storm period.

The software is available at GitHub. Twitter’s terms of use prevents the redistribution of tweets, even for academic purposes. Those terms do allow the redistribution of identification numbers for each tweet, which we will provide on request.

Results

Superstorm Sandy

We collected 50,014 tweets from the six public official accounts during the specified data range. Of those, 3242 tweets were retweeted. On three occasions, New York city mayor Michael Bloomberg and staff, tweeting from @MikeBloomberg, had tweets retweeted over 100 times. New York governor Andrew Cuomo and staff, tweeting from @NYGovCuomo, had several tweets retweeted 22-52 times during the analyzed period (Figure 1). @MikeBloomberg had the most followers of all analyzed accounts at the time (approximately 394,000 followers).

The lexical diversity of these official tweets was similar (2.25-2.49) and well below the average for non-official tweets mentioning #sandy and #nyc (3.82). Ten of the 17 official tweets with more than 20 retweets including a URL for further reading.

Figure 1. The 17 most-shared official messages during the Sandy storm.

Most Retweeted Messages from @MikeBloomberg (394,000 followers) and @NYCGovCuomo (66,000 followers) October 27 - November 2, 2012	Retweet Count
RT @MikeBloomberg: #Sandy is a massive and dangerous storm. We expect major storm surge and high winds in #NYC through Tuesday http://t.co/KQp2f2vX	200
RT @MikeBloomberg: Please check on your neighbors and the elderly. Look out for one another: http://t.co/KQp2f2vX #Sandy #NYC	117
RT @MikeBloomberg: If you can't evacuate yourself and need assistance, please call 311 #NYC #Sandy	112
RT @MikeBloomberg: Remain in your homes while the storm is in progress. Stay away from windows: http://t.co/KQp2f2vX #Sandy #NYC	93
RT @MikeBloomberg: NYC Public Schools will remain closed on Tuesday 10/30: http://t.co/KQp2f2vX #Sandy #NYC	84
RT @MikeBloomberg: If you live in Zone A and you have not yet evacuated, it is critical you do so now #Sandy #NYC http://t.co/JTjkQN2X	71
RT @MikeBloomberg: #ZoneA includes: Coney Island, Manhattan Beach, and Red Hook and other areas along the East River in Brooklyn #Sandy #NYC	66
RT @MikeBloomberg: All Public Schools and after-school programs will be closed Monday #NYC #Sandy	65
RT @NYGovCuomo: Wow RT: @lisang: Photo: FDR Drive is under water. #Sandy still has not arrived, BTW. http://t.co/iT8O3R3v #NYC #FDR	52
RT @MikeBloomberg: Now you should concentrate on keeping yourselves and your families safe: http://t.co/KQp2f2vX #Sandy #NYC	42
RT @NYGovCuomo: Breaking: Early departure issued effective immediately for all non-essential State employees in #NYC & #LI #Sandy	40
RT @MikeBloomberg: As the storm approaches check on your neighbors and the elderly, help one another #Sandy #NYC http://t.co/KQp2f2vX	31
RT @MikeBloomberg: If you are not sure if you live in #ZoneA check this map: http://t.co/lSXmy0Py or call 311 #Sandy #NYC	29
RT @MikeBloomberg: #ZoneA includes: Almost all the coastline of Staten Island #Sandy #NYC	24
RT @MikeBloomberg: #ZoneA includes: City Island, a small patch of Throgs Neck, and another patch of the South Bronx in the Bronx #Sandy #NYC	24
RT @MikeBloomberg: #ZoneA includes: All of the Rockaways, and also Hamilton Beach and Broad Channel in Queens #Sandy #NYC	23
RT @NYGovCuomo: East river from 12:30 to 1:30, one hour later. #NYS #Sandy #NYC #NY http://t.co/EdhzkC6m	22

Nemo Blizzard

We collected 448 tweets from the official accounts. Of these, 271 were related to the storm and 174 had actionable information for the public, such as train and school cancellations, or instructions for managing power outages. Actionable storm messages were retweeted on average 24 times. Messages with general storm information were retweeted 31 times. Figure 2 describes the retweet rates for each official source.

Of the 10 most retweeted messages (an average of 255 retweets per tweet) for blizzard Nemo, 7 used hashtags, 5 had actionable information, and 4 had links or mentions to other official accounts for further reading (Figure 3).

For comparison, in the general population of retweets, 56% had hashtags, 64% contained actionable information, and 62% contained links for further reading. These most shared messages averaged 20.9 words per message, significantly more than the 17.2 words averaged other official tweets that week (student's *t* test, $P<.01$).

Figure 2. Retweet characteristics from six official accounts during the week of the Nemo blizzard.

Account	Followers	Tweets	RTs / Tweet / Follower	Avg Words/Tweet	# / Tweet	Storm Tweets	Actionable Storm Tweets	Actionable Storm RTs	Actionable Storm RTs/Tweet/Follower
@NYGovCuomo	75699	142	0.330	17.9	0.732	111	68	1829	0.355
@MikeBloomberg	444910	68	0.092	15.3	0.721	26	11	603	0.123
@311NYC	42249	55	0.149	13.8	0.345	30	27	208	0.182
@notifyNYC	60740	29	0.333	17.6	0	12	10	211	0.347
@NYCMayorsOffice	135388	58	0.499	19.2	0.586	44	26	881	0.250
@NYCgov	60783	96	0.487	18.1	0.500	48	32	485	0.249

Figure 3. Top ten shared original storm-related official messages during the week of the Nemo blizzard.

	Account	Most Retweeted Original Messages	Retweet Count	Retweets per 1000 followers
1	@NYCMayorsOffice	Fun fact: There are 6,300 street miles in New York City to be plowed and salted -- that's like going from NYC to LA and back. #Nemo	1182	8.730463557
2	@NYGovCuomo	BREAKING: Governor declares state of emergency in #NYS in response to storm #nemo	263	3.474286318
3	@NotifyNYC	Blizzard Warning for NYC from 6 AM Fri 2/8 to 1 PM Sat 2/9. Forecast: 10-14 inches of snow and strong winds. http://Www.weather.gov/nyc .	202	3.325650313
4	@NYCGov	Today is a @NYCParks Snow Day! Enjoy sledding, hot chocolate, and snow angel contests. bit.ly/NYCSnowDays pic.twitter.com/kgzdRoOy	135	2.221015745
5	@NYGovCuomo	NYers are urged to closely watch local news reports for weather updates & adjust their travel plans accordingly #blizzard	127	1.677697195
6	@NYCMayorsOffice	#Nemo is here. Be prepared, be safe and stay tuned to NYC.gov for updates. pic.twitter.com/7HP9MXSr	199	1.469849617
7	@NYGovCuomo	NYers are urged to stay inside, sunny weather can be deceptive -- it is dangerous to be on the roads | pls. RT to others #NYBlizzard	108	1.426703127
8	@NYCMayorsOffice	Mayor: If you see someone homeless on the streets or in a public place, call 311. This is not a night to be out in the elements. #Nemo	171	1.263036606
9	@NYGovCuomo	If you lose power, unplug appliances like televisions and computers to avoid damage from surges when power is restored #nemo	92	1.215339701
10	@NYCGov	Blizzard Warning for NYC from 6AM Fri 2/8 to 1PM Sat 2/9. Forecast: 10-14 inches of snow & strong winds weather.gov/nyc via @NotifyNYC	71	1.168089762

Discussion

Principal Findings

This paper provides the first description of how the spread of information from official sources during an emergency relates to the structure of those messages.

Our study provides evidence that during emergencies the tweets from official sources that reach the widest public audience are those that are simple and self-contained. The most retweeted official tweets had lower lexical diversity (simpler vocabulary), were longer than average, and contained no more hyperlinks than average.

Tweets from official sources to the general public may be more useful in establishing an official presence during an incident than in raising situational awareness or coordinating responses. The most retweeted tweets contained general tips or photos rather than actionable information.

Our data suggests that during emergencies official tweets reached a wider audience, which may have improved situational awareness and disaster response. The official tweets that were retweeted the most (had the widest reach) used simpler wording and were longer than average. This suggests that the most retweeted messages were those that were the simplest to understand.

Comparison With Prior Work

Earlier work on Twitter's retweeting suggested tweet is more likely to be retweeted if it originates from a user with a high number of followers, who also follows many other users and contains many URLs and hashtags [10]. A tweet is unlikely to be passed along (ie, a retweet of a retweet) more than 10 times [11]. A user's tweet is more likely to be retweeted if that user has had prior tweets retweeted [12]. Zhu et al [13] found that more than 50% of a tweet's retweets occur within the first hour after the original tweet is posted.

Other studies found that including a link increases the likelihood that a tweet will be retweeted [7]. Our study found that including links had no such effect.

Our study used retweets to quantify the degree of dissemination (spread) of information throughout a social network. We did not distinguish whether a tweet was a retweet or a retweet of a retweeted tweet, and so forth. Perhaps looking at the depth of retweets is a more accurate measure of the spread of information.

Limitations

Methodological

Our analyses may be incompatible because we collected the data for each extreme weather event with different methods. The most substantial difference of this limitation is the lack of a reference population for the tweets concerning Nemo.

It is possible that, because of power outages, fewer people were using Twitter on their computer or conserving battery on their laptop or phone or tablet. An analysis of social media during the Sandy storm suggested that social media was only an adjunct to traditional media [14]. Thus, the Twitter activity seen during storms may disproportionately represent activity outside the New York area, bystanders who were not the intended target of the messages. This may explain why general tips and "fun facts" were shared more often than actionable information. We did not control for the location of retweeters in this analysis.

Data Formatting

Our study focused on retweets. How Twitter indicates that a tweet is retweeted varies with different platforms. The official method, introduced in 2009, is clicking a "retweet" option on a Twitter client. An older method involves cutting and pasting a tweet into a new tweet and pre-pending "RT" to it. Both methods are in use to varying extents across personal computers and mobile devices. The data concerning superstorm Sandy recognized both methods. The data concerning the Nemo blizzard only recognized the newer method.

Conclusions

One reason for considering social media as part of an official emergency response plan is to rapidly disseminate accurate, up-to-date information to the public during what is typically a rapidly changing cycle of incident assessment and information dissemination to build presence and situational awareness. This study is an important first step in determining how municipal and state agencies can use social media to enhance emergency preparedness and response. Future studies can standardize the methods, control for additional variables such as location, and study a wider variety of disasters and emergency response systems.

Conflicts of Interest

None declared.

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Abbreviations

API: application programming interface
RE-AIM: Reach, Efficacy, Adoption, Implementation, Maintenance
REST: representational state transfer
RT: retweet

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Viewpoint

Transforming Patient Experience: Health Web Science Meets Medicine 2.0

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Abstract

Until recently, the Western biomedical paradigm has been effective in delivering health care, however this model is not positioned to tackle complex societal challenges or solve the current problems facing health care and delivery. The future of medicine requires a shift to a patient-centric model and in so doing the Internet has a significant role to play. The disciplines of Health Web Science and Medicine 2.0 are pivotal to this approach. This viewpoint paper argues that these disciplines, together with the field of design, can tackle these challenges. Drawing together ideas from design practice and research, complexity theory, and participatory action research we depict design as an approach that is fundamentally social and linked to concepts of person-centered care. We discuss the role of design, specifically co-design, in understanding the social, psychological, and behavioral dimensions of illness and the implications for the design of future care towards transforming the patient experience. This paper builds on the presentations and subsequent interdisciplinary dialogue that developed from the panel session "Transforming Patient Experience: Health Web Science Meets Web 2.0" at the 2013 Medicine 2.0 conference in London.

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KEYWORDS

patient-centered medicine; co-creation; co-design; Health Web Science; Medicine 2.0; P4 medicine

Introduction

The Imperative of Change

There is a consensus that the current modes of health care delivery are unsustainable [1,2]. For more than a century, the successful and dominant model in controlling infectious diseases in Western medicine has been biomedical in nature and underpinned by controlled clinical trials [3]. This model has increasing limitations within its paradigm for the social, psychological, and behavioral dimensions of illness [4]. The predominance of the biomedical model is now being challenged. Infectious diseases, the challenge of the 19th and 20th centuries, have given way to the prevalence of chronic disease [1,5]. These chronic conditions are closely related to lifestyle choices that arguably account for 55% of deaths of people aged 15 to 64. This contrasts with statistics from a century ago, where 5% of deaths were attributable to personal decisions, while infectious diseases accounted for most of the deaths [6]. In response, medicine is beginning to embrace the biopsychosocial model, emphasizing patient-centered care delivered by interdisciplinary provider teams [7]. This biopsychosocial model is a call to change our way of understanding the patient and to expand the domain of medical knowledge to address the needs of each patient [8]. The future of health care in this era of chronic disease requires increasing effort directed towards improving personal choices regarding life risks [6] and requires the full

engagement of people in their own health care and lifestyle decisions [5,9,10].

This viewpoint paper argues for a new approach to understand behaviors and motivations, which involves individuals and their communities, and critically addresses the socioeconomic divisions that continue to underpin and determine lifestyle choices [11]. Design approaches can contribute to addressing the important complexities and challenges in the current health care model and in so doing develop innovative approaches in the application of digital, Web-enabled, and mobile technologies for future care.

The Role of Information and Communication Technologies

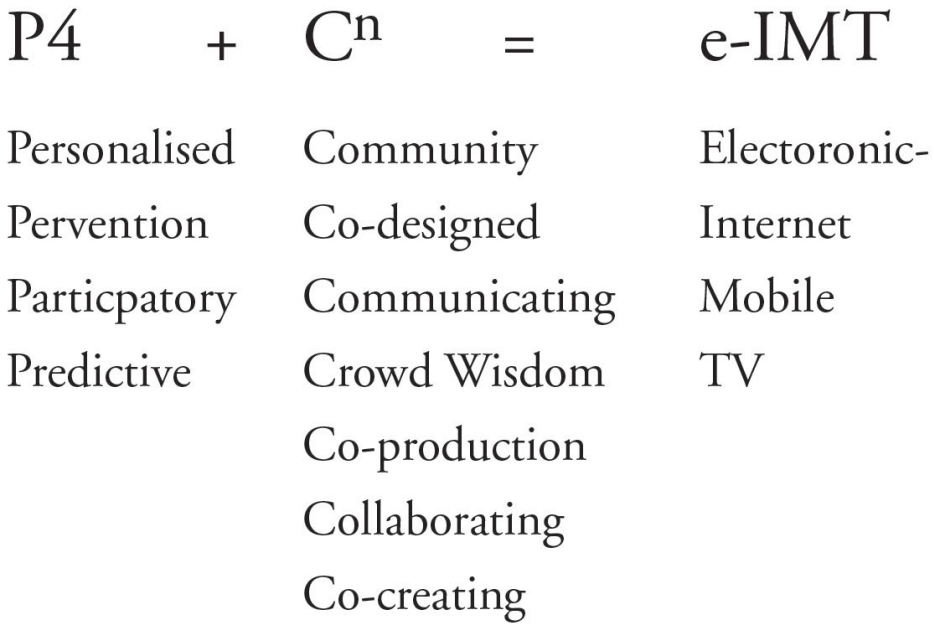
In the 1990s, health information and communication technologies (ICT) offered promise to mitigate the problems facing the delivery of health care [12]. However, it required the cultural shifts that social media and mobile devices have catalyzed in recent times to align with the recognition that many health care systems are now at a tipping point [1]. New approaches are thus required to galvanize communities working in ICT and health to integrate the Internet and related technologies in the delivery of person-centered health care [12]. Internet-delivered interventions have the potential to combine the tailored approach of individual or face-to-face interventions, while maintaining the scalability of public health interventions with low marginal costs per additional user. It is incumbent on those developing health technologies delivered via the Internet to embrace new methodologies in design and evaluation and recognize the limitations of those already utilized [13].

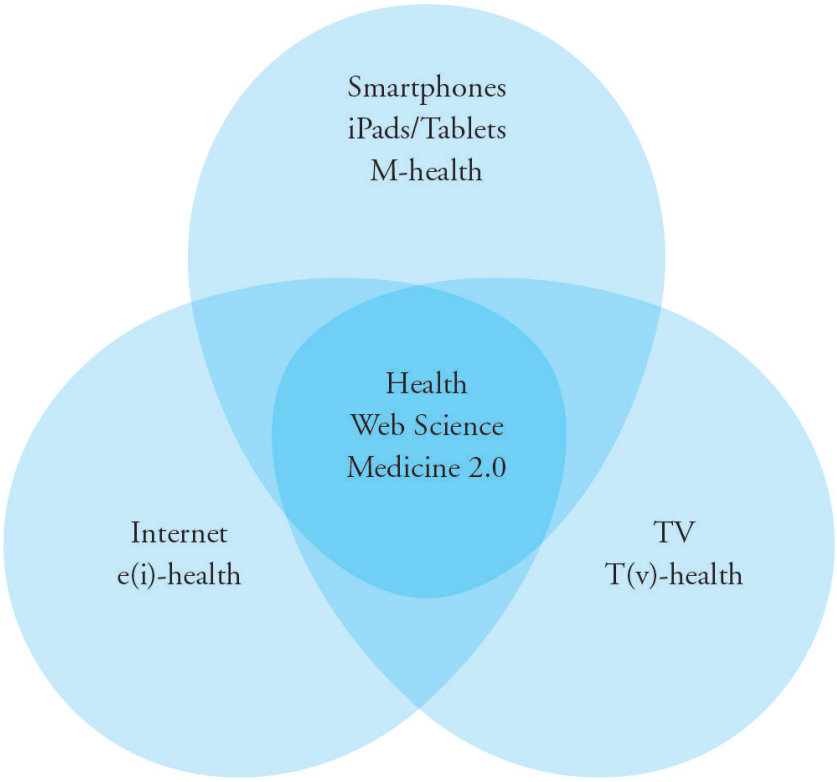
Digital Health Care, Personalized Medicine, and Digital P4 Medicine

The future of medicine is increasingly mediated through preventative, participatory, personalized, and predictive modes known as P4. Digital P4 Medicine broadly defines personalized medicine as a health care paradigm that uses a range of technologies from the fields of ICT, medical equipment, and pharmaceutical devices to deliver P4 medicine [14]. In 2003, Leroy Hood introduced the term P4, with the vision that it would transform the practice of medicine, moving it from a largely reactive discipline with an emphasis on sickness and treatment to a proactive one [15]. Under this model, patients are expected to benefit from better diagnoses leading to individually targeted and thus more effective treatments as a consequence of the new forms of active participation by patients in the collection of personal health data with the recognition that this approach requires a shift to a patient-centric model.

Figure 1 illustrates the digital health ecosystem that is being developed in the North of Scotland with its ethos on co-design and collaboration underpinned by the disciplines of Health Web Science (HWS) and Medicine 2.0 to mitigate against the development of fixed milestones and rigid methodologies of previous eHealth innovation [16].

Figure 1. The preventative, participatory, personalized, and predictive (P4) model.





Health Web Science and Medicine 2.0

Owing to current models of health care being unsustainable, new digital eHealth frameworks such as P4 + Cn= eIMT (Figure 1), are needed and new approaches informed by design, incentivization, and evaluation. HWS, a sub-discipline of Web Science [17,18], studies the interaction of health and the Web, and as such complements disciplines that come under the umbrella of Medicine 2.0. The focus of HWS requires an understanding of networks and is therefore more strongly aligned with non-medical stakeholders than Medicine 2.0 [19]. The disciplines of and related to HWS and Medicine 2.0 therefore have potential to provide frameworks and leadership in integrating eHealth into mainstream health care delivery. New approaches are therefore required to understand the complexities and enable design and co-design of innovative

approaches using digital and Web-enabled technologies in health care. Underpinning the paradigm shift from a treatment model to self-caring medicine relies on collaborative principles combined with an agile methodology across multiple platforms thus ensuring engagement with the target audience.

Design interventions provide a framework for the marriage of Health Web Science and Medicine 2.0, specifically investigating how technology can support digital health interventions. Design interventions present enormous opportunities underpinned by behavioral science [20], to leverage the potential of exponentially growing innovation into an integrated framework that provides personalized health care.

Design-Led Approaches for Person-Centered Care

Drawing together ideas from design practice and research, complexity theory, and participatory action research (PAR), we discuss design as an approach that underpins concepts of person-centered care. From complexity theory, we are interested in how modes of interaction and connection, combined with non-linear processes, can give rise to innovation, particularly in the digital domain. Participatory action research is increasingly being utilized as a methodology from a patient-centered perspective. In connecting these, we are aware that design-led approaches are fundamentally social and linked to concepts of person-centered care. Since the turn of the 21st century, health care researchers have begun to apply complexity theory [21], including the theory of complex adaptive systems. Complexity theory describes systems that are capable of spontaneously reconfiguring themselves through the repeated application of simple, order generating rules in a process known as self-organization [22-24]. Non-linearity, interconnectedness, and positive feedback loops are key concepts in understanding the nature of these self-organizing processes. While complexity theory has helped develop alternatives to mechanistic approaches and focuses on creativity, it could be argued that it provides little insight into the nature and role of individual and participatory action in the context of person-centered care.

Participatory action research has special resilience and value in this emerging field of inquiry. PAR is grounded in the participative, interdependent ecosystems of social life. It builds feedback loops into ongoing research and can be used for monitoring complex adaptive systems. PAR brings together action and reflection, theory, and practice, in the pursuit of solutions that link practice, ideas, and innovation towards the human flourishing of individuals and collectively as communities [21]. It is an orientation to inquiry that seeks to create participative communities of practice and communicative spaces around key focal issues. Typically, these communities are interdisciplinary, require multiple perspectives, and engage in a process of action and reflection whereby the cycles of action and reflection integrate multiple ways of knowing and doing.

PAR is rooted in participation; it has ushered in human interaction while focusing attention away from notions of a system in which research is done to people and towards a view of individual and collective participation. PAR is a methodology based on reflection, data collection, and action. It aims to improve health and reduce health inequities by involving the people who, in turn, will be motivated to take actions to improve their own health [25]. Cooperative inquiry comes under the umbrella of PAR [26]. The aim of cooperative inquiry is to research with rather than on people. It emphasizes that all active participants are fully involved in research decisions. These approaches lend themselves well to an agile methodology, whereby each iteration or cycle of development is evaluated and the lessons learned then fed into the next cycle.

Collaborative Design

Collaborative design is conducted in collaboration by a coalition of researchers and practitioners, community members, patients, health professionals, and other stakeholders. The research inquiry includes three elements: systematic inquiry, design practice and design interventions. Through drawing together ideas from design practice and research, complexity theory, and participatory action research, we are establishing a link between social processes and participation that underpin concepts of person-centered care.

The terms participatory design, co-production, co-creation, and user-centered design, amongst others, are used in design literature. Sanders and Stappers [27] referred to co-creation as any act of collective creativity; creativity that is shared by two or more people. Co-creation is a generic term with applications ranging from the physical to the metaphysical and from the material to the spiritual. Sanders and Stappers [27] defined collaborative design or co-design, as collective creativity applied across the whole span of the design process. Thus, co-design is a specific instance of co-creation. The term co-design refers to actants being actively involved in interdisciplinary networks and participatory action to foster unique partnerships, products, or processes. Design methodologies provide a flexible framework that, consistent with complexity theory, are cognizant of the indeterminate nature of the social situation and its inherent unpredictability. Design innovation is an inclusive and iterative process that utilizes design methods and collaborates with people to develop and prototype innovative ideas that lead to sustainable solutions and valuable outcomes. Design innovation as a collaborative approach views research as a set of experimental and emergent practices that can broaden the ways we understand social processes and behavior. It utilizes an agile, action-orientated methodology, and direct engagement with people and their experiences in relation to focal issues. The rich mix of personal, sociocultural, and contextual influences, provide the basis for documenting and producing visual schema as a means of communication. It is this precise relationship between participation, research and design that can reveal deep insights. Having outlined our theoretical position, the role of design innovation, and co-design, we now present a design research approach entitled “cube”.

The Cube Research Approach

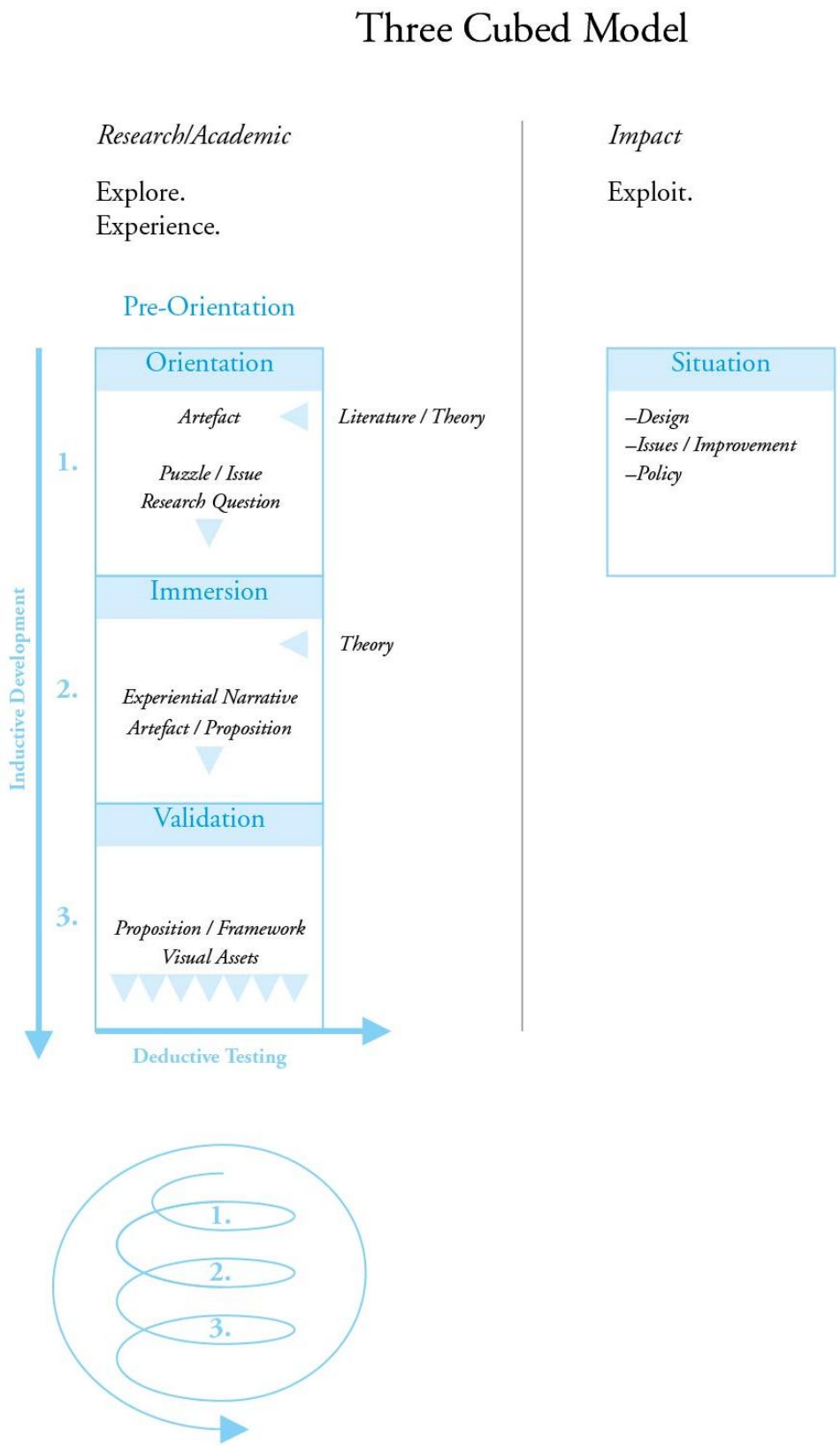
The cube research approach involves three people working together in stages of three days, for three times, that is, three cubed [28]. The cube is an agile method of design research within a thematic territory. A cube is an intervention that is designed to create trajectories or tangible outcomes around a focal issue, while allowing for an open approach to the research process. An interdisciplinary team of three people including a

design researcher, a design practitioner, and a subject specialist undertake a project within a defined research theme and work for nine days each, totaling 27 person-days, to deliver trajectories, propositions, or solutions. The rhythm of the work is self-organized by the cube participants along with the organization of the project, the roles and methods.

Figure 2, illustrates the two different types of cube contribution (ie, academic or impact) and the expected iteration of each. Following a pre-orientation phase where the team is focused on the thematic territory, the cubes will undergo up to three iterations of inductive development. In the first iteration—orientation—design tools or visual artifacts will be created to explore the thematic issue and the research team would define the research approach. In the second iteration—immersion—the researchers would immerse themselves within the context of the inquiry and seek to develop participatory and experiential narratives and if applicable, introduce or make artifacts to interweave these visual and verbal narratives. Finally, in the third iteration—validation—they would seek to validate earlier findings and produce high quality visual assets towards deductive testing.

The purpose of a cube is to address research themes with diverse teams of collaborators and expertise working together for short periods. The background knowledge of the researchers and participants is applied and developed quickly within a fast-paced collaborative space. The cube approach is designed to contribute to both academic debates and deliver impact at a wider societal level. The research approach is focused on the levels of collectivity required between the individual and the community aligned to specific focal issues and societal challenges. Design approaches have been developed to establish empathy between practitioners, researchers, collaborators, and participants in the context of health and care. This approach aims to develop designers' multi-sensory and non-verbal understandings of complex health, care, and wellbeing from an otherwise inaccessible perspective towards a richer comprehension of inclusive design for a diverse population. Design practice and multisensory comprehension suggests an aesthetic approach through which designers can build empathic, intuitive, and productive relationships with patients, participants, and collaborators.

Figure 2. The Three Cubed Model.



Health Ecosystem

This research approach requires the participation of all the parties involved in the delivery of the health care being studied. This grouping of parties can be described in terms of a health ecosystem or network. This investigation of networks prioritizes links between innovation and creative capital that in turn determine the ways in which apparently disparate resources—physical, social, and material—can be usefully

related to create communities within an ecology of social and cultural care.

Design approaches expand the vision of an ecology of social and cultural care with the ability to diffuse new approaches in the future of work and organizations, which are required to develop a healthy ecosystem that will in turn innovate future models of care. The organizations involved in health care delivery form a complex social ecosystem with demand being met from a variety of formal and informal sources. By nature these ecosystems are made up of diverse and varied groups that interact within the constraints set by the changing environment. In the current model, incorporation and implementation of new methods and innovations can take upwards of ten years [29] and are initiated and implemented by large health care providers in most instances. PAR lies within the quality of interaction and the way in which we work towards a view that enables health care providers to develop an ecosystem which also encompasses and includes those receiving care and the communities which support them. Design approaches facilitate the inclusion of these groups into the ecosystem through the development of new methods, new tools, and new partnerships.

These networks, partnerships, and collaborations extend to involving ministerial leadership, life sciences, enterprise, academia, health and social care, and co-designing involvement from the public towards developing personal ownership in behavioral change. These networks which may challenge conventional delivery models, enabled by digital technology, can then lead to the accelerated adoption of new ways of working for health care providers and innovative modes of self-care for citizens aligned to the advancing role of technology in personal care paradigms.

Discussion

The role of technology is critical as a conduit in the development of participatory platforms. Within a dynamic digital age, the understanding and implementation of design systems and innovative networks can create person-centered care experiences and services, which are relevant to target audiences and markets. Deep insights into the needs of people and the imagination of end-users are vital for creating new design-led digital solutions and experiences in understanding the social, psychological, and behavioral dimensions of illness and the implications of transformational change.

Our theoretical positioning, the role of design and the depiction of co-design as participatory action in Health Web Science and Medicine 2.0 contexts has led to a number of early impressions at this stage in our inquiry. Participatory action research is increasingly being utilized as a methodology from a patient-centered perspective. Indeed some have proposed that participative approaches and co-design are fundamental to the personalization and the digital transformation of all public services [30]. The aim being to make recommendations for good practice that will tackle a problem or enhance the performance of the organization and individuals through changes to the community within which they operate [31]. In particular we are concerned with designing participatory research approaches, which are emergent and experimental [21]. We are interested in the role of design research and practice and specifically co-design in understanding the social, psychological and behavioral dimensions of long term conditions and the implications for the design of future care. In so doing we are questioning some of the traditions of the Western biomedical paradigm geared towards known outcomes and engaging in designing innovative approaches towards sustainable solutions.

In some ways, we are working with the idea of design research and practice as a participatory framework of social-material interactions. We are proposing a contemporary approach to design research that has moved from the design of products to design which is embedded in the understanding of social processes through developing networks of extreme expertise and collaborations between design researchers and practitioners, health professionals, clinicians, patients, and other stakeholders around substantive issues that in turn will transform the patient experience.

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Conflicts of Interest

None declared.

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Abbreviations

HWS: Health Web Science
ICT: information and communication technologies
P4: predictive, personalized, participatory and preventative
PAR: participatory action research

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Original Paper

Employee and Family Assistance Video Counseling Program: A Post Launch Retrospective Comparison With In-Person Counseling Outcomes

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Abstract

Background: Access to technologically mediated information and services under the umbrella of mental and physical health has become increasingly available to clients via Internet modalities, according to a recent study. In May 2010, video counseling was added to the counseling services offered through the Employee and Family Assistance Program at Shepell·fgi as a pilot project with a full operational launch in September 2011.

Objective: The objective of this study was to conduct a retrospective post launch examination of the video counseling service through an analysis of the reported clinical outcomes of video and in-person counseling modalities.

Methods: A chronological sample of 68 video counseling (VC) cases and 68 in-person (IP) cases were collected from a pool of client clinical files closed in 2012. To minimize the variables impacting the study and maintain as much clinical continuity as possible, the IP and the VC clients must have attended clinical sessions with any one of six counselors who provided both the VC and the IP services. The study compared the two counseling modalities along the following data points (see glossary of terms): (1) client demographic profiles (eg, age, gender, whether the sessions involved individuals or conjoint sessions with couples or families, etc), (2) presenting issue, (3) average session hours, (4) client rating of session helpfulness, (5) rates of goal completion, (6) client withdrawal rates, (7) no show and late cancellation rates, and (8) pre/post client self-assessment. Specific to VC, we examined client geographic location.

Results: Data analysis demonstrates that the VC and the IP showed a similar representation of presenting issues with nearly identical outcomes for client ratings of session helpfulness, rates of goal completion, pre/post client self-assessment, average session duration, and client geographic location. There were no statistically significant differences in the rates of withdrawal from counseling, no shows, and late cancellations between the VC and the IP counseling. The statistical analysis of the data was done on SPSS statistical software using 2-sample and pairwise comparison *t* tests at a 95% level of significance.

Conclusions: Based on the study, VC and IP show similar outcomes in terms of client rating of session and goal attainment.

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KEYWORDS

EAP; EFAP; counseling; video counseling; technology; mental health; online counseling; therapy; online therapy

Introduction

Web-Based Mental Health Services

With continual technology advancements, and greater access, Web-based mental health services are increasingly being offered to a range of client populations [1-4]. Furthermore, there is growing interest in these advances with regard to improving client/patient accessibility to services (including assessment and treatment) [5]. Web-based self-help tools are also expected to increase in number and variety [3].

The importance of adapting Employee and Family Assistance Program (EFAP) counseling to technological innovations, to better serve client needs with new tools and services, is supported by meta-analysis of the effectiveness of Web-based therapeutic interventions [6].

Shepell·fgi offers a wide range of services to its organizational clients, their employees, and families. In response to changes in technology and client needs, Shepell·fgi developed several Web-based counseling platforms, clinical options, and self-directed tools for clients.

The asynchronous e-counseling service was introduced in 2000. Self-directed Web-based tools (such as stress reduction) are also available to individual and organizational clients. The MyEAP app was launched in May 2011. The same year, First Chat—a 24/7 synchronous live "chat" option for clients who want immediate clinical and/or intake support—was designed and offered to clients.

To further expand Web-based counseling options, and to offer a Web-based synchronous counseling modality for clients living in rural or remote areas, Shepell·fgi developed and launched their video counseling program as a pilot project in May 2011, offering video counseling (VC) to a limited number of organizational clients (and their employees). The EFAP VC program was subsequently launched as a core clinical service and made available to a broad range of eligible EFAP clients in September 2011, and, in 2012, 722 cases were opened.

Only modest technical abilities are required by clients in order to successfully participate in VC, making it accessible to most. The client and counselor communicate using a webcam, landline, and encrypted custom Internet software. Both parties can see and hear each other, and they can also share and create documents in real time. Clients can use their personal computers at home for this counseling.

Much anecdotal evidence suggests that Shepell·fgi VC EFAP clients find VC clinically helpful and a convenient and beneficial service. Completed satisfaction surveys, providing quantitative and qualitative feedback, indicate that clients are satisfied with the service received. To date, no formal or informal service complaints or client requests to change counseling modalities have been received.

Some of the advantages cited by clients are- time factors, reduced travel, and increased convenience with regard to child care and family responsibilities.

The purpose of this paper is twofold: (1) to examine specific data post VC launch, and determine if anecdotal evidence is supported by various outcome measures (eg, client session effectiveness rating, pre/post self-assessment, client goal attainment ratings, case withdrawal rates, and average session hours); and (2) to compare these clinical outcome factors with the same EFAP in-person counseling (IP) client outcome measures.

Data Collection

The data were collected from closed clinical files of VC (n=68) and IP (n=68) clients. The clients from both samples initiated counseling sessions within the same time range, VC from July 2011 to September 2012, and IP from June 2011 to October 2012. The IP and VC client demographic information was also examined and compared. The clinical files used for this study were drawn from the closed clinical records of six counselors who provided both VC and IP services.

With regard to client demographic information, the authors expected more women than men to be represented in both the IP and VC samples. Shepell·fgi's annual statistical analysis shows that more women access clinical services across multiple modalities including First Chat, self-directed/self-help resources, Web-based self-help resources, traditional IP, tele-counseling, and e-counseling.

Informed by previous research studies (discussed below), as well as EFAP VC counselor and client feedback, we hypothesized the following, the VC clinical outcomes (as defined in this paper) would be similar to the IP clinical outcomes; clients would report high satisfaction with the VC sessions; and no marked differences between VC and IP would be observed on the clinical measures examined in this study.

For the purposes of this paper, although VC is the term that is most often used when discussing the EFAP service, other terms (eg, tele-mental health, TMH; telehealth, TH; and teleconferencing) will also be referenced.

Current Research

Current research findings suggest that clients using VC report high levels of satisfaction, with similar satisfaction and clinical outcomes to clients accessing IP. Several extensive research literature reviews support this finding [2,3,7]. Some of the issues compared in the reviewed studies include clinical effectiveness, client satisfaction, modality equivalency, and/or efficacy. The reviewed research represents different mental health providers and professions, using a variety of clinical approaches (eg, cognitive behavioral therapy, CBT; psychiatric assessment and follow-up; different clinical models; etc). They also include a wide range of client populations, ages, and various clinical/mental health issues.

Also relevant is a systematic literature review [5] that focused on the therapeutic interventions delivered by videoconferencing for long-term and chronic mental and physical health issues. The reviewers identified certain methodology limitations in some of the studies, but also found high quality randomized controlled trials to examine. As an outcome of the review, they reported that the videoconferencing interventions produced

similar outcomes, patient satisfaction, and treatment results in regards to patients who received in-person interventions. No recent research in their scope of review suggested videoconferencing and face-to-face interventions were dissimilar [8].

In partial contrast, a 2010 systematic review, based on 11 articles published pre 2009 with defined study criteria, reported "there is insufficient scientific evidence regarding the effectiveness of telepsychiatry in the management of mental illness" [9]. At the same time, the authors reported that their findings support videoconferencing as "feasible and effective", and noted the high levels of satisfaction reported by patients. Furthermore, along with recommendations of further research, they highlighted the key role telepsychiatry can play going forward in providing high quality care to patients [9].

In reviewing the literature and developing their research, O'Reilly et al [10] brought specific attention to the importance of not assuming "equivalence" when studies show a lack of statistical differences in outcomes. In their randomized controlled equivalence trial comparing telepsychiatry with face-to-face sessions, they found both modality subjects shared equivalent clinical outcomes and reported similar satisfaction rates. At the same time, they remarked that the equivalence outcomes found in their study might not be replicable to other mental health services, such as psychotherapy [10]. Many researchers and literature reviewers noted similar limitations with regards to available research, and noted similar considerations and implications for future research. Mainly discussed was the need for larger sample groups, replicable interventions, study design limitations, and the lack of randomized clinical trials. The importance of developing a standard evaluation model and methodologies was also highlighted [11].

At the same time, the current literature reviews and analysis cited above suggest that on the whole, there were similar and comparable clinical outcomes and client satisfaction between clients/patients who received VC and IP.

More recent literature reviews and individual studies also seem to support the finding of similar patient outcomes and satisfaction levels between VC and IP clients.

Steel et al [8] conducted a substantive review of video interventions for the treatment of long-term and chronic mental and physical health. Their review included a number of high quality randomized controlled trial studies, and summarized that patients receiving videoconferencing interventions (for a variety of physical and mental conditions) demonstrated similar treatment outcomes and satisfaction levels to IP [8].

A compelling study [5] examined and compared TH and in-person treatment outcomes of US veterans diagnosed with post traumatic stress disorder (PTSD). There were 12 exposure therapy sessions that were delivered to the veteran patients by means of TH or in-person therapy. The researchers reported effective outcomes for the veterans from TH exposure therapy. When comparing the IP and TH samples, they also found exposure therapy via IP was more effective than when delivered via TH. The authors speak directly to this result and propose possible reasons, including an above average IP effect size (when compared to other published averages) observed for in-person exposure therapy and the lack of randomization. At the same time, they found and concluded "brief TH exposure therapy was effective in treating the symptoms of PTSD, depression, anxiety, and general impairment in veterans with PTSD," and no significant differences in outcome effects were found across demographic groups [5].

Of considerable interest is the groundbreaking 2012 study representing the largest scale assessment of TMH [12]. This study assessed clinical outcomes of 98,609 US Department of Veteran Affairs (VA) patients over four years (2006-2010). TMH services were provided to veterans at community-based outpatient clinics by a wide range of mental health practitioners (such as psychiatrists, psychologists, social workers, and registered nurses). The findings included that patients receiving TMH services not only had fewer days of hospitalization, but an average of 25% fewer hospitalizations [12]. Although there was no control group, they were able to identify "the overall VA population of mental health patients did not demonstrate similar decreases during this period." This includes VA patients receiving other forms of mental health services.

Although therapeutic alliance is outside the scope of this specific research, it is nevertheless a key clinical component and process variable. The authors explored research on therapeutic alliance, as it is relevant to VC/videoconferencing. Richardson et al [2] examined several studies that looked at alliance. These include Ruskin et al [13], who reported a robust development of therapeutic alliance; Cluver et al [14], who found patients rated the quality of alliance similarly in both in-person and videoconferencing services; and Grady and Melcer [15], who found no significant differences in therapeutic alliance ratings when analyzing in-person and TMH services delivered to military personnel.

The Web-based counseling literature review performed by Mallen et al [3] also discussed studies that found adult clients reported similar therapeutic alliance between videoconferencing and in-person services. Steel et al [8] discussed the possibility of developing a good therapeutic alliance through videoconferencing. Finally, Rees and Stone [16] summarized their findings of therapeutic alliance in videoconferencing versus in-person psychotherapy as, "the current literature indicates that therapeutic alliance is not compromised when videoconferencing is used." Interestingly, their research (a sample of 30 psychologists) found that psychologists conducting VC sessions rated therapeutic alliance lower than psychologists in face-to-face sessions. Other research also supported this, and found that psychologists who used this modality rated therapeutic alliance lower than their clients. Rees and Stone discussed possible reasons why psychologists might hold these negative beliefs, and proposed approaches to reduce them.

Accessibility and Underserved Populations

Improving accessibility to populations living in remote and underserved areas was a key factor in the EFAP's decision to develop VC services. Other researchers and practitioners investigating the potentials of VC echo these considerations.

Many articles discuss the intrinsic possibilities and benefits of mental health services via VC to different clinical populations. Identified potential populations who would benefit from VC include people living in remote areas, underserved populations (including multicultural minorities), marginalized populations, and differently-abled individuals [2,3,16]. The benefit of expanding TH services to better serve clients in need has also been highlighted [5].

In their review of current research, Steel et al [8] found a number of literature reviews that reported that the use of teleconferencing led to increased service access in the United Kingdom.

In particular, Myers and Turvey [17] noted how the use of technology could assist access to specialized services/providers. Moreover, in the article, "Use of standard webcam and internet equipment for telepsychiatry and treatment of depression among underserved Hispanics," Moreno et al [18] describe strong benefits from using lower cost, nonsophisticated, teleconferencing tools (via the Internet), making this modality accessible to many populations.

VC was made available to EFAP clients in urban, rural, and remote locations. This study may also provide useful information with regard to client populations with nonpsychiatric presenting issues who also may benefit from VC. Local clinics, universities, health centers, other EFAPs, and even private practitioners might treat a similar client base. Considering the range of client background and presenting issues, this research can add to the current literature for this promising area of study.

VC provides client access possibilities that are related to other factors as well. Some clients who might be disinclined to attend more traditional IP may view VC/TMH as a viable alternative. Some clients may be hesitant to access face-to-face services for many reasons, including perceived stigma [16]. Likewise, convenience and availability factors can play an important role in modality preference for some clients [3]. Technology services are also a viable option for the clients who do not like certain features of in-person support [19]. Of interest are the possible outcome effects of Web-based counseling, such as clients feeling less dependent on their counselor, and potentially experiencing "greater equality in the sessions" [3].

Methods

The Client Sample

The client sample was selected retrospectively, from closed clinical files, which do not contain identifiable information. At the onset of the first counseling session, clients are informed of and consent to the Statement of Understanding, which indicates nonidentifiable data may be used for research purposes.

For the purposes of this study, Shepell·fgi staff collected and examined a sample of 68 VC cases, opened in a 14 month period between July 2011 and September 2012, and 68 IP cases, opened between June 2011 and October 2012, for comparison. The compared cases were collected from a pool of both VC and IP cases closed in 2012. As clinical files were chosen chronologically, the clients represented a wide range of ages, geographic locations across Canada, and presenting issues. The clients were predominantly English speaking; however, there were French-speaking clients in both counseling modalities.

There were 6 EFAP counselors from Ontario, Quebec, British Columbia, and the Northwest Territories who provided both IP and VC counseling that were identified. The counselors were all Masters' level mental health professionals from across Canada with different professional backgrounds, including social work, psychology, and counseling, with five or more years of experience. All were trained in providing short-term counseling using CBT and solution focused skills. They also brought their individual experiences, clinical competencies, and aptitudes to their work.

Starting with files closed in January 2012, a similar number of VC and IP cases were pulled, in chronological order, for each counselor.

The following files were discounted from the selection of the complete list of cases assigned to these counselors: (1) files where the client did not materialize for the first or subsequent appointments, and consequently the file was closed; and (2) files that were recorded as closed, but clinical documentation had not yet been submitted.

Once those files were filtered out, the study sample of 68 VC and 68 IP files were pulled from this chronological list.

Statistical analysis of the data was done on SPSS statistical software using 2-sample and pairwise comparison *t* tests at a 95% level of significance.

The study compared the two modalities along the following data points (see Multimedia Appendix 1 for a glossary of terms): (1) client demographic profiles (eg, age, gender, whether the sessions involved individuals or conjoint sessions with couples or families, etc), (2) presenting issues, (3) average session hours, (4) client rating of session helpfulness, (5) rates of goal completion, (6) client withdrawal rates, (7) no shows/late cancellations, and (8) pre/post client self-assessment. Also, specific to VC, we examined client geographic location.

Location differences were examined, as improving client accessibility to clinical service was a key rationale in the development of VC.

As far as the differences between the two samples, all IP sample cases comprised clients residing in an urban setting who could access IP with less than 30 minutes of travel.

In comparison, of the 68 sample VC cases, 69% (n=47) were easy access (within 30 minutes of an IP EFAP counselor), 25% (n=17) were classified as moderate access (within an hour), and 6% (n=4) were limited/no access (more than an hour away.)

Inclusion/Exclusion Criteria

Inclusions and exclusions of clients for the sample were based on the referral process for the modalities. The clients, upon contacting the EFAP to request counseling support, were assigned to either the IP or VC modality based on two factors: (1) they specifically request one of the modalities; or (2) intake recommends IP or VC after assessing the client's preferences and needs. The factors that influence the recommendations are

explained in a multimedia file (see Multimedia Appendix 2). The decision to accept the referral recommendation for either service modality is made by the client.

The clients are assigned to the VC modality if: (1) their presenting issues are not high risk (eg, if a client reports that they are not at risk of harming themself or others; or has low addiction issues), (2) they meet the technological requirements as shown in a multimedia file (see Multimedia Appendix 3), and (3) they are over 18 years old.

The clients assigned to the IP modality do not need to meet the same exclusion criteria, as do those assigned to VC. However, for this study, the IP clients under the age of 18, and those presenting with high risk issues were excluded.

Once the sample files were identified, the research team obtained the clinical files from storage. Each file was then reviewed, and the data points used in the study were charted.

Results

Demographics of the Sample

Table 1 shows the breakdown of various demographics of the sample.

Both VC and IP had similar demographics in terms of client age and gender. Women accessed EFAP counseling more than men, and individuals accessed this counseling more often than couples/families.

All of the IP clients resided in regions with easy access to IP services. Of the VC clients, 69% (47/68) resided in regions with easy access to IP services, 27% (18/68) in hard to service locations, and 4% (3/68) resided in the hardest to serve locations.

The Presenting Issues

The presenting issues were divided into four main areas: (1) addiction, (2) couple/family relations, (3) personal/emotional adjustment, and (4) workplace issues. Both the VC and IP sample cases showed a similar distribution across these issues.

The cases ranged from one to seven hours. The average case duration was 3.91 hours for the VC and 4.07 hours for the IP (Table 2).

There was no statistical difference in the average rating of session helpfulness at a 95% level of significance between the VC and IP modalities. Not all sessions received a client rating. For the 68 VC cases, 117 out of 173 sessions received a client rating, and the average client rating for these sessions was 8.5 out of 10.0. For the 68 IP cases, 131 out of 184 sessions received a client rating, and the average was 8.6 out of 10.0 (Tables 2 and 3).

The differences in goal completion were also not statistically significant at a 95% confidence in rates of goal completion. VC cases had a goal completion percentage of 84% (57/68), and IP cases a goal completion percentage of 71% (48/68) (Table 4).

The rate of client withdrawal from counseling showed no significant difference at a 95% level of significance. The VC withdrawal rate was 16% (11/68), and the IP withdrawal rate was 28% (19/68). Modality redirects, (clients changing counseling modalities; eg, from VC to IP), only occurred once in the VC sample cases (Table 5).

There was a marked difference in the category of client no shows and/or late cancellations, in that the rate of client no shows and/or late cancellations was 11.6% (20/173) for the VC cases, and 19.0% (35/184) for the IP cases (Table 6). This difference was found to be statistically significant at a 95% level of significance.

Table 7 shows that pre/post assessment of client ratings of health and mental health showed similar results. The IP cases demonstrated a net improvement of 10% (3.14/5 to 3.45/5) on the health question, and a net increase of 22% (2.64/5 to 3.21/5) for the mental health rating. This difference was not statistically significant.

For the VC cases, there was a net improvement of 11% (3.03/5 to 3.36/5) on the health rating. There was also a net improvement of 11% (2.89/5 to 3.21/5) for the mental health rating.

Table 1. Summary of the characteristics of the study sample.

Characteristics	VC (n=68)	IP (n=68)
Demographics		
Age	39	38
Female %, (n)	66 (45)	58 (39)
Male %, (n)	34 (23)	42 (29)
Client location %, (n)		
Easy access	69 (47)	100 (68)
Moderate access	27 (18)	0 (0)
Limited/no access	4 (3)	0 (0)
Type %, (n)		
Individual	78 (53)	88 (60)
Conjoint	22 (15)	12 (8)
Presenting issue %, (n)		
Addiction	2 (1)	6 (4)
Couple/family	47 (32)	31 (21)
Personal/emotional	44 (30)	59 (40)
Work related	7 (5)	4 (3)

Table 2. Summary of case/session data.

Dimensions	VC	IP
Average case hours, range = 1-7	3.91	4.07
Client session rating, average out of 10.0	8.5	8.6
Goals attained/goals partially attained %, (n)	91 (52/57)	96 (48/50)
Withdrawal rate %, (n)	16 (11/68)	28 (19/68)
No show/late cancellation rate %, (n)	12 (20/173)	19 (35/184)

Table 3. Comparison of session helpfulness ratings.

Session helpfulness	n	Mean	SD	Standard error mean
IP	131	8.7328	1.23926	.10827
VC	117	8.5855	1.20038	.11098

Table 4. Comparison of goal completion.

Goal completion	n	Mean	SD	Standard error mean
IP	50	.9000	.24744	.03499
VC	57	.8684	.30657	.04061

Table 5. Comparison of withdrawal rates.

Withdrawal rates	n	Mean	SD	Standard error mean
IP	68	.28	.452	.055
VC	68	.16	.371	.045

Table 6. Comparison of no show and late cancellation rates.

No shows/late cancellations	Number of events X	Total number of samples N=357	Proportion of no shows *P*
IP	35	183	.19125
VC	20	174	.11494

Table 7. Summary of pre/post questionnaire results.

Cases	VC (n=30)	IP (n=35)
With improved health rating		
Pre health rating average out of 5.00, (n)	3.03 (8)	3.14 (11)
Post health rating average out of 5.00, (n)	3.36 (8)	3.45 (11)
With improved mental health rating		
Pre mental health rating average out of 5.00, (n)	2.89 (9)	2.64 (16)
Post mental health rating average out of 5.00, (n)	3.21 (9)	3.21 (16)

Discussion

Principal Findings

This study reviews the VC program one year post launch. It examines the data points to determine if the specific outcome measures support the anecdotal VC feedback that was received. It compared the VC client clinical outcome measures with those of the IP clients. The decision to conduct this preliminary research was made in order to evaluate the EFAP's VC clinical service, to gain a greater understanding of the client population, and to contribute to the current VC literature. The past decade has seen a significant technological evolution; making the use of VC/TMH/TH increasingly feasible and available to different providers and populations. The expansion of this modality, the possibilities for clients, and the growing breadth of research are exciting developments.

The clinical management became aware of the VC positive feedback from the video counselors during clinical supervision, and from the client satisfaction surveys they received. The clinical services are monitored for positive feedback and/or clinical indicators, as well as formal/informal negative client feedback or complaints. VC received neither informal/formal negative client feedback nor complaints.

Shepell·fgi recognized the opportunity to compare VC with IP, to research the clinical outcomes from the counselors who delivered both VC and IP services to the EFAP clients. Furthermore, both of these modalities use the same case management and case files.

It was determined that the VC and the IP clients would be compared according to the dimensions noted above. A primary measure of comparison was based on direct client session ratings. While not all of the sessions received a rating, the majority of them did. By this measure, there was no statistical difference in how clients rated the usefulness of the VC sessions as compared with the IP ones. Both of them received high client ratings, with an average of 8.5/10 for VC, and 8.6/10 for IP.

Goal attainment (attained, partly attained, or not attained) is a more subjective rating. However, the rates of VC (91%, 52/57) for goal attainment were on par with IP (96%, 48/50), and the difference was not statistically significant.

It appeared that there were differences in the area of withdrawal from counseling and clients not showing for scheduled appointments. The VC clients showed a lower rate of withdrawals and no shows. The withdrawal rate from VC was measured at 16% (11/68), and the IP withdrawal rate was measured at 28% (19/68). There was also a difference in the no show rate, 11.6% (20/173) for VC and 19.0% (35/184) for IP. The data analysis indicated that there was no statistical significance to the withdrawal rates between the modalities; however, there was evidence to support that the no show/late cancellations rates are statistically lower for VC cases than for IP cases.

Demographically, the two samples were similar in terms of age, with an average age of 39 for VC and 38 for IP. There were a slightly higher percentage of female users of VC (66%, 45/68; vs 57%, 39/68). This finding is congruent with EFAP gender findings as, averaged across modalities, women represented 70% of the 2012 EFAP cases.

As expected, the geographical distribution of the two samples was different. The clients in the IP group were in regions with easy access to IP services, and it was expected that the VC clients would predominantly be from hard to serve regions. It is interesting to note that 69% (47/68) of the VC services were provided to clients located in regions with easy to access IP. This indicates that clients chose VC even when IP was readily available. Further research outside the scope of this study is needed to clarify these findings.

The pre/post questionnaire results showed some differences between VC and IP. The sample size for this measure was reduced, as only questionnaires completed both pre and post counseling were used. For VC, 30 of 68 questionnaires met the criteria, and for IP, 35 of 68 were fully completed.

In terms of the health response, both IP and VC showed improvement in the post counseling health measure. There were 8 out of 30 VC and 11 out of 35 IP cases that noted improvement in health. The average health score increased by 11% (3.03/5 to 3.36) for VC and 10% (3.14/5 to 3.45/5) for IP. These results were acceptable given that most of the clients do not access EFAP counseling to manage physical health issues.

For the mental health response, both IP and VC also showed modest improvement in this post counseling health measure. Only 9 out of 30 (30%) VC cases and 16 out of 35 IP cases (46%) noted improvement in mental health. The average mental health score increased by 11% (2.89/5 to 3.21/5) for VC clients and 22% (2.64/5 to 3.21/5) for IP clients. A possible reason for these rates is that not all clients access EFAP services for mental health concerns (eg, workplace issues, marital issues, family concerns, etc). If the clients did not rate mental health as a concern at the case outset, improvement in this area is moot.

Within the group of cases with completed pre/post questionnaires, it was found that, of the VC sample (30 cases), 8 individual cases rated their precounseling mental health as only poor or fair and, of these cases, 6 (75%) reported improvement. Similarly, of the 35 completed IP pre/post questionnaires, 14 individuals rated their mental health as only fair or poor in the preevaluation, and, of these, 11 individuals (79%) reported improvement. While this subset makes for a small sample, these findings are consistent with the hypothesis that VC would show similar clinical outcomes to IP.

An area of surprise was the difference in the rate of conjoint counseling for the two modalities. Initially, a higher rate of conjoint counseling for IP versus VC was expected. However, the research did not support this. To the contrary, 22% (15/68) of the VC cases were for conjoint counseling, while only 12% (8/68) of the IP cases were conjoint. It can be hypothesized that the ease of access to VC in terms of location and times makes it easier for conjoint counseling. The IP clients are constrained in terms of travel time, and they must operate in the same time zone as the counselors, thus restricting the availability of evening appointments. For the VC clients who live in an eastern time zone, there is greater availability for evening appointments with western VC counselors (eg, a client from Toronto may have a 9:00 p.m. Eastern Standard Time appointment with a Vancouver counselor who is working at 6:00 p.m. Pacific Standard Time).

In addition, as VC typically takes place in the client's home, barriers are reduced with regard to coordinating conjoint clients' schedules and child care arrangements.

There was virtually no difference in the average number of sessions (3.91 sessions for VC vs 4.07 for IP, where each case ranges from 1-7 sessions).

The presenting issues referred to the types of problems that clients presented at intake. As the relatively high rate of conjoint counseling for the VC sample would indicate, couple/family issues were greater in the VC sample (47%, 32/68) than for the IP sample (31%, 21/68). The work related and addiction categories only accounted for six cases in the VC group, and seven cases in the IP sample.

The above highlights the finding of similar clinical outcomes between VC and IP adult EFAP clients. It also highlights the differences with regards to higher IP pre/post mental health results, and the higher rate of couples/families presenting issues in VC.

This appears to support the existing literature that suggests similar clinical outcomes between VC and IP, and/or a high rate of VC client satisfaction.

Other Research: Current Areas of Exploration

The research reviewed previously in this paper reflects the different methodologies used, the client/patient populations, the presenting issues/diagnoses, the mental health professions, and the clinical models (eg, CBT; psychiatric assessment and follow-up).

There are studies that used manualized treatment provided by mental health practitioners from different theoretical orientations (eg, CBT; exposure therapy), and research where one mental health orientation was represented using various interventions (eg, psychiatrists offering service to rural clients) [5,10].

Some methodologies included mental health providers who serviced both VC and IP clients; others provided service to only VC or IP clients; and some used single and multi-modality providers [5,10]. The research featured some clients who were mostly "seen" (via TMH) in offices or clinics, as well as other clients attending sessions from their homes [5,8,12,18]. The studies tested for TMH equivalence or similar outcomes to face-to-face interventions, effectiveness, and therapeutic alliance, as well client satisfaction ratings [6,16].

Prior studies' methodology included using randomly assigned client samples and nonrandomly assigned VTH samples [5,10,18]. The study models included psychiatric evaluation and brief follow-up, as well as mental health professionals providing clinical therapy over multiple sessions [5,18]. The studies included data when client post scales were not completed by the total sample, and when a percentage of clients did not complete the actual treatment.

Some studies focused on one particular cultural group and presenting issue or diagnosis; while others studied patients with a general diagnosis that could encompass multiple issues such as chronic conditions, depression, anxiety, and general impairment related to PTSD [5,8,18]. Taken together, the studies encompass a rich variety of clients, issues, mental health professionals, and methodological approaches.

In their exposure therapy study for veterans with PTSD, Gros et al [5] noted how using a "standard clinical practice, rather than a highly controlled research setting, (emphasized) the potential for widespread dissemination and implementation of TH treatments." This paper's authors agree that more widespread implementation of video intervention could be beneficial.

Study Limitations

The authors are aware of several limitations of the "EFAP Video Counseling: A Post Launch Retrospective and Comparison With In-Person Counseling Outcomes" study.

Although the research used a larger sample size than many studies, it remains modest with regard to offering statistically significant data. Using larger sample sizes in future studies would be consistent with other VC research being currently conducted, provide more insight, and offer interesting outcomes.

Lack of a control group and nonrandom sample selection are other limitations. Due to the nature of the EFAP service, this is unlikely to change in future research. The EFAP offers services to its clients relating to stated client preference, described lifestyle, and/or recommendations based on the client's stated issue. A control group or random modality assignment would not reflect the best possible clinical service for a client, which remains a priority.

Another limitation in the study was using subjective rating tools. The pre /post assessment and session rating helpfulness scale are completed by the client in the presence of the counselor (and the latter administered only when deemed clinically appropriate by the counselor), which may affect the client's response. At the same time, it is important to note that counselors are trained to present the scales as a helpful tool for the client and the counselor, an indicator to see if they are moving in the preferred direction, or if a different approach would be helpful. The clients are encouraged to actively cocreate session direction and focus.

The client sample includes self-referred people from various sociocultural and economic backgrounds who live across Canada in isolated, rural, and urban communities, English and French speakers, individuals, and couples who present with a wide range of concerns and clinical goals. Although the diverse population and clinical issues may be perceived as a study limitation (it does not compare the same populations), it can also be seen as a study strength. It reflects a rich diversity within the EFAP client population and communities across the country.

Future Research

This study provides useful information for exploring other client populations with nonpsychiatric presenting issues who may also benefit from VC. Local clinics, universities, health centers, other EFAPs, and even private practitioners might provide VC as an addition to IP services. Future research using larger sample sizes would be consistent with other VC research currently being conducted, provide more insight, and offer interesting outcomes. Furthermore, client populations with more specific presenting issues (eg, clients identified with depression or anxiety) can provide additional data for this promising area of study.

While most of the research studies cited in this paper reflect video and Web-based services provided to individuals, the future study of VC with couples and families to ascertain its helpfulness (as compared to IP) could prove an interesting area of inquiry.

While recognizing the limitations in methodology, the findings remain interesting and suggest future research possibilities. The technology used is accessible to many Canadians at low cost, and enables clients to participate in counseling sessions in their own home.

Conclusions

The EFAP, through its capacity to offer multi-modal clinical services to thousands of clients a year across client demographics, locales, and presenting issues, is in a unique position to add to the current literature in this area of study. For many working people in Canada, the EFAP is the easiest and most effective way to access timely, confidential, and no-cost counseling.

Moreover, as the majority of the client base accesses the EFAP with nonpsychiatric presenting issues, the EFAP clients are an important and underrepresented population in the current research. Their presenting issues include relationships, grief, depression, and stress. These areas of concern correspond with many other clients who seek short-term counseling.

The findings of this study demonstrate similar VC and IP clinical outcomes as demonstrated by client attendance, rate of session helpfulness, pre/post self-assessment, and rates of goal completion.

Conflicts of Interest

The authors of this paper are employees of Shepell·fgi, a provider of integrated health and productivity solutions to EFAP-eligible clients located globally and domestically.

Multimedia Appendix 1

Glossary of terms.

[PDF File (Adobe PDF File), 128KB - med20_v3i1e3_app1.pdf]

Multimedia Appendix 2

Clinical intake screening process.

[PDF File (Adobe PDF File), 5KB - med20_v3i1e3_app2.pdf]

Multimedia Appendix 3

Technological requirements for video counseling.

[PDF File (Adobe PDF File), 2KB - med20_v3i1e3_app3.pdf]

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Abbreviations

CBT: Cognitive behavioral therapy
EFAP: employee and family assistance program
IP: in-person counseling
PTSD: post traumatic stress disorder
TH: Telehealth
TMH: tele-mental health
VA: Veteran Affairs
VC: video counseling

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