Secured Telepsychiatry for Geriatric Patients (TGP) in the Face of COVID-19 2nd Wave

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Abstract:

A second wave of COVID-19 has immensely affected the entire community. In the face of COVID-19 second wave scenario, geriatric patients with allied morbidities are most vulnerable under the COVID-19 threats. They suffer a lot from different mental complications. In this manuscript, secured telepsychiatry for geriatric patients (TGP) services are being highlighted with patients' data security. In most of the telepsychiatry systems, patients' data are under intruders' attacks that lead to different malpractices. The secret key that is used in telepsychiatry system should be robust and non-deciphered by the intruders during the public network transmission. More importantly, secured telepsychiatry services are the best option to serve the geriatric patients with patients' confidentiality. Thus, the COVID-19 attacks on such geriatric patients can be curtailed with efficacy.

Keywords: *COVID-19 2nd wave, Telepsychiatry, Geriatric patients, Secured data transmission*

1. Introduction

So far the number of affected COVID-19 people is quite in its exponential spike [1] during the second wave. The corona virus is more likely to affect the geriatric citizens above sixty years old.

However, geriatric patients sustaining with earlier morbidities are highly risked at the threshold of being COVID-19 attacks [2]. Such existing ranging morbidities are COPD, Diabetes (Type I, Type II), Chronic Kidney Disease, Oncology, HTN, etc. So the geriatric patients suffering from any of such morbid diseases are mostly prone to corona virus attacks. Their immunity power has been compromised.

In this COVID-19 IInd wave pandemic era, apart from physiological symptoms, psychiatric complications were also observed. The most common psychiatric problems are stress, anxiety, fear, acute depression, etc. Geriatric patients having earlier morbidities like COPD, CKD, Diabetes, etc need mental care and support from their home quarantines. At the present scenario, they are advised not to visit the hospitals, except in case of acute emergency, because they are mostly susceptible to this contagious corona virus. Prolonged delay in their conditions can lead to severe problems like Major Depressive Disorders (MDD). To address such geriatric patients, telepsychiatry support is the best mental support that can be given to them [3]. Geriatric patients can easily avail telepsychiatry services from their homes using smart phones, laptops, ipads, etc.

Telepsychiatry refers to the mental counseling and care using the digital communication links between the patients and psychiatrists [4]. The different forms of such telepsychiatry services are: Mobile Calls, Video Calls, Chats, Emails, etc. With the emerging latest technologies, telepsychiatry can address the mental challenges faced by the geriatric patients with allied morbidities. It is a replacement for physical counseling with the psychiatrists. Using a broadband internet connection, they can share and tell their psychological problems that came through this COVID-19 pandemic. Different levels of stress and anxiety, causing myriad mental illness to such geriatric patients. Psychiatrists can do sentiment analysis based on the responses, facial expression, and body language of the patients. Thus, telepsychiatry can fully curtail the noscomial infections and secondary infections caused during travel to the hospitals. It has the potential to resolve the psychological challenges like COVID panic, stress, business loss, financial loss, etc due to corona virus outburst.

1.1 Organization

The organization of the proposed paper can be stated as follows. The introductory contents has been itself cited in the present section. Need of telepsychiatry at this COVID-19 2nd wave has been represented in Section 2. Literature survey papers have been presented in the Section 3. Telepsychiatry support to address mental illness has been given in Section 4. An ideal telepsychiatry system has been given in Section 5. Conclusions were mentioned in Section 6. Limitations of telepsychiatry have been presented in Section 7. Statements of ethical compliances, Acknowledgement, and References have been added at the end.

2. Need of Telepsychiatry at this COVID-19 2nd Wave

With the wreaking of novel corona virus, there has been a forward stepping in the context of Telecare Health systems. In the same expansion of light, Telepsychiatry [5-6] has been the spotlight to provide mental care and support to the COVID-19 patients and allied persons during their critical quarantines. It contributes to a large extend to help the patients and giving the psychiatric needs from remote areas. Thus, the criteria of social distancing are fully met. Moreover, it is the best approach to reduce of overwhelming of hospitals to curtail the COVID-19 transmission. When the entire world is facing the COVID-19 challenge, Telecare Health systems have emerged to be more proactive weapon to treat the patients. It fills the the gap between the patients and the physicians [7-8]. And thus enabling symptomatic COVID -19 patients and allied peoples to address their mental states through virtual channels. By staying safe at their respective quarantine locations, they may avail the Telepsychiatry issues and complications for better wellbeing. In present scenario of longer extended national / state lockdown, patients are not able to visit the hospitals due to non availability of public transport. Even physicians, health care staffs, etc are also facing loads of difficulties to attend their hospitals. In the following figure 1, a snapshot has been taken where a psychiatrist is virtually treating a geriatric patient through online telepsychiatry.

Fig 1. Psychiatrist dealing with her patient through online Telepsychiatry

The great challenge for such telepsychiatric e-health system is the patients' private data security and authentication. In the same context, Mehul C. et al. had explained the transformation of global health with Artificial Intelligence [9]. But the patients' data security aspect has not been discussed by them. When a communication takes place over the public channel, then eavesdroppers are ready to seize those medical data for different malpractices. Patients' data corruption and fake insurance claims are common tasks carried by the intruders after data seizing. Symmetric key cryptography is the use of a key to lock a medical data, and to generate cipher text by the sender before

transmitting to the public channel. At the reverse end, the same key will be used to unlock the cipher text by the recipient. This is one of the best suited security protocols used can be used in the telepsychiatry systems. There are several classical algorithms in the market. But most of them need higher computation power to operate. They require higher degree of resources like processors, memory, Input/output devices, etc. Usually, they perform on heavily equipped nodes like desktops, laptops, etc. When most of the hospitals are moulding towards digital healthcare system, it should be taken into care that the telecare system software should run on the hand-held devices such as mobiles, tabs, smart phones, etc. It can be a light weight system that requires low computation power. Thus, in terms of energy consumption, the telepsychiatry software may perform to treat the geriatric patients well.

One more important aspect of this telepsychiatry system is the authentication phase. It should always ensure the invalid impersonation. Thus, whether the different users of the telepsychiatry are valid or not, is being determined by various techniques. In recent times, Inter of Things (IoT) based authentication protocols are implemented with efficacy. Different hash functions can also be used here. The novelty of any hash function is that it will generate the same hash string using the same inputs. Moreover, researchers are proposing a wide variety of authentication protocols in such e-health telecare systems on regular basis.

Another integral point to be noted in such telepsychiatry system is the secured payment interfaces. The reliable gateways having end-to-end encryption are to be added in such telepsychiatry software. Using their credit / debit / ATM / Net banking, they can make secured payments. Some common secured payment apps are GooglePay, Paytm, AmazonPay, etc. Thus, geriatric patients can easily make their digital payments to avail telemental care and supports.

3. Literature Survey

This part manages the literature study. It has been momentarily referenced as for our proposed telepsychiatry. Brien M. O. et al. have talked about the mechanical utilization in the treatment of COVID 19 mental patients through computerized stages. Specialized progressions have been a blast in this basic circumstance to manage distant patients. Telepschiatry treatment has been conceivable in this uncommon emergency by keeping away from the actual visits [10]. Antony B. et al. have contemplated numerous papers identified with COVID-19 telemedicine. Telemedicine and virtual consideration stages are another arising hotspot for clinical benefit suppliers. Through this online virtual consideration, patients observing, subsequent follow-ups, diagnosis, medicines, treatments, and so forth should be possible effectively in the period of COVID-19 [11]. Gautam M. et al. have investigated papers and discovered that COVID-19 warriors are more inclined to mental complications, particularly in females. They have referred to the more pertinence of telemedicine in treating such mental issues in this pandemic circumstance. Their examination was on the effect of Covid on the emotional well-being in USA [12]. Stoll J. et al. have examined

distinctive moral issues identified with the telepsychiatry in COVID-19. Therapists might be guided with the conventions of guidelines of mental consideration support in treating the weak COVID-19 patients [13]. Smith K. et al. [14] had created a complete rules rundown identified with the telepsychiatry to adapt up to COVID-19. It assists the therapists with taking security measures while doing on the web medicines. Advanced innovation is a significant segment in such telepsychiatry.

4. Telepsychiatry Support to Address Mental Illness

The most safety measure in this unprecedented crisis is to stay safe at homes. Moreover, if we need to go outside, we must follow the social-distancing protocol. It means to keep at least one meter distance between any two persons. Telepsychiatry is a better technique to treat the psychological problems of the COVID-19 patients and their family members. It minimizes the mental trauma and guides them for their wellbeing in the quarantine cells / home quarantines / isolates. With the help of digital platforms like Video Call, Phone Call, Online Chat, Email, etc, the COVID-19 affected patients may cope up with the psychological aspects during this extended lockdown period of second wave [15-16]. In this section a brief of telepsychiatry support has been mentioned in order to boost the mental states of the COVID-19 and allied peoples.

Case **1**: *Essential commodities access*
1. *Put on face mask always when outing home.*
2. *Do not touch eyes, nose, and mouth with hands.*
3. *Sanitize your hand frequently, rather than avoiding handkerchief.*
4. *Maintain social – distancing from others including shopkeepers.*
5. *Pay through digital modes, keeping the secure transactions.*
6. *Avoid eating outside cooked foods.*
7. *Wash your clothes, shoes, outside belongings, etc after returning home.*
8. *Avoid public transport system.*

Case **2**: *Visiting Hospitals in case of Emergency*
1. *Put gloves inside the hospital campus.*
2. *Keep safe distance from other patients.*
3. *Avoid lifts at the hospital buildings.*
4. *Pay hospital bills through your mobile apps .*

Case **3**: *Related to food items*
1. *Disinfect the fruits and vegetables at home with lukewarm water and baking soda.*
2. *Packaged milks are to be washed with water before pouring into utensils.*
3. *Grocery item packets like rice, pulses, sugar, biscuits, etc are to be disinfected too.*
4. *Fish, chicken, mutton, are to be dipped in the water for minimum 20 minutes, and avoid partial boiling or baking.*

Case **4**: *Symptoms Gathering*

If the psychiatrist observes through online mode that the patient has anxiety, stress, fear, depression, then he / she may prescribe the following as per treatment procedures;

1. *Yoga*
2. *Exercise*
3. *Meditation.*
4. *Music.*
5. *Walking (inside own house / campus).*
6. *Frequent counseling with psychiatrist (online mode).*
7. *Anti depressant Medicines(if needed, only prescribed by psychiatrists).*
8. *Adequate Sleep.*
9. *Proper balanced diet including immune boost stuffs.*
10. *Exclude alcohol and smoking.*

Ideal Telepsychiatry System

An ideal Telepsychiatry system should have constant EEG and ECG monitoring on the COVID - 19 patients. Sensors will be placed on the scalp of the patients to record different waves generated by their brain. ECG sensors to be placed on the chest area to record the cardiac activities of the patients. In case of any abnormality signal noted, an emergency message / call can be forwarded to the treating psychiatrist / physician. Alpha, beta, delta, gamma, theta waves will be read automatically by the image processing algorithms. Similarly P, QRS, and T segments to be understood by the computer programs.

From the patients' security perspectives, there should be a dedicated channel for each and every COVID-19 patients. This would ideally best to protect their sensitive data. With rapid escalation in the COVID-19 transmission, telepsychiatry has gained much more efficiency.

Conclusion

In this way, we have stated different positive aspects of the telepsychiatry systems which would be helpful to geriatric patients with allied morbidities in this current pandemic of corona virus 2nd wave. The possibility of social- withdrawal can be reduced by such telepsychiatry treatments. Geriatric patients are not allowed to leave their homes and they can access different mental care from remote locations. The security perspectives were also stated in the above section in a very lucid way. By keeping the social-distancing and taking preventive measures on patients' medical data, it is good to take mental care of geriatric patients having other morbidities such as COPD, CKD, Diabetes, HTN, etc. The chances of corona virus attacks to such geriatrics will be reduced and in addition their mental illness would be sorted out by this telepsychiatry approach [17].

5. Limitation of Telepsychiatry

However, one of the lagging statements in our country is that most of the parts are covered under rural areas with limited resources like smart phones, internet, computers, laptops, cyber café, etc. It is an important challenge in the transformation process of telepsychiarty. And in rural areas there are maximum percentages of geriatric patients with earlier morbidities.

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