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Original Article

Acceptance of Telemedicine: A Perspective from The Doctors Working in the Tertiary Care Hospitals of Quetta

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ABSTRACT

The pandemic of COVID-19 forced the world to reduce the social interactions and push the world toward keeping destinations. During the pandemic, the need for online health services was profoundly felt also in Pakistan. Online health services saw a boost all around the country; however, there are still many challenges in the acceptance of the online services in Pakistan yet. **Objective:** To assess the acceptance and adaption of telemedicine services in three public sector hospitals of district Quetta during the pandemic of COVID-19. **Methods:** Questionnaire was designed and distributed among 385 physicians from Civil Hospital, Bolan Medical College and Fatima Jinnah Hospital and the results were interpreted with the help of the SPSS. **Results:** A total of 385 respondents were selected for the given purpose. 231 were male and 154 were female. 250 of the respondents said that only the urban areas were taking advantage of the telemedicine services while due to lack of internet facilities, the people from rural areas were devoid of the online services. The results also showed that 111 doctors had started telemedicine services since the pandemic. 235 of the respondents said that the youth were more inclined toward accepting telemedicine as compared to elderly. **Conclusions:** Telemedicine has not seen a large-scale acceptance and yet the people are relying on conventional methods of treatment and not switching to telemedicine as largely as they should have so had the doctors.

INTRODUCTION

Telemedicine is the online services provided to the patients about the usage and their relevant prescription of the medicines used for particular treatment and the growing dependency of the people on online services which is very suitable for the countries like Pakistan having the majority of population concentration in the rural areas [1]. The rapid boom in communication technology, the telemedicine services have been embraced worldwide and the developed countries have become fully acquainted with this terminology and people with much busy work schedule in the developed world often rely on telemedicine services for their treatment and regular checkups. Their importance has taken a new turn amid COVID-19 as physical contacts have been discouraged and online services have been officially encouraged around the world [2]. This innovative technology was aimed at overcoming the geographical barriers and financial constraints for the poor countries like Pakistan with profoundly unequal urban-rural population ratio [1]. The disproportionate doctor-patient ratio is the key to the heavy inclination of the masses toward the telemedicine and online healthcare services around the world in general and in Pakistan in specific. In Pakistan the disproportionate doctor-patient ratio stands at 6325 patients per doctor [3]. Some independent and partially funded telemedicine programs have been initiated in the major cities like Islamabad,

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Karachi and Lahore and some temporary programs were run during the earthquakes in the northern areas back in 2010-2011. However, the telemedicine has not seen its full potential in Pakistan. The population is poor and the doctors do not have the necessary training and equipment to convert this technology into full bloom [4]. For the first time, the world saw a global scale of lockdown and physical activities seized on the political, commercial and other levels. The world ushered into a new digitalized and online world of business, politics and even health was also operational online. Pakistan too saw a massive lockdown countrywide; the health department saw a significant setback and during this period, the online telemedicine services were profoundly crucial [5-7]. It is essential to know that despite having a very broad and complex structure and set up, health department is one of the most ignored sectors in the country. The ratio of doctors for the population is not up to the mark and the situation is even worse in the rural areas. There are only 2 doctors per 10, 000 people in Baluchistan [8, 9]. These disparities have grown over the years as the urban populations have swelled witnessing rapid development and expansion of facilities while the rural areas remain the same in the level of their development causing too much of the gap to widen that cannot be filled so easily [10]. Studies have shown that Pakistan's private sector healthcare system is outperforming the public sector healthcare system in terms of service quality and patient satisfaction, with 70% of the population being served by the private health sector leaving a big question mark on the government health sector [11]. In the developed world, the healthcare sector has seen significant boost and improvement. New medicines are manufactured every now and then and cures are discovered for those diseases that were previously regarded as 100 percent fatal with no cure. The medicine industry around the world has rapidly improved and the innovations have also elevated the standards of living in the developed countries. The system of national healthcare is the only strong as the secondary and primary healthcare levels that are in Pakistan contains the Basic Health Units BHU, rural health centers and the straight headquarters. The centers are lacking in the facilities of the medical and the manpower that enforces the large number of the rural patients to the tertiary hospitals care in the large cities which only signifies the need for telemedicine facilities even more. Where the patients remain illiterate and less inclined toward the digitalized forms of treatment, there the knowledge about the use of the telemedicine equipment and the practice for the doctors is necessary as well [6, 7]. In Pakistan the telemedicine has been present for more than two decades, however it has not been universal, and its adaptation has been quite murky. The reason why there is not much attention for its adaptation and acceptance in Pakistan now is because of the global pandemic of COVID-19 which has also affected Pakistan badly. With the spread of this pandemic, the traditional life of the people around the country has been seriously disturbed and switching back to the traditional means of healthcare services poses the threat of another wave of the pandemic. The online services from food delivery systems to online shopping and online meetings have register tremendous boost around the world in the wake of the COVID pandemic [12-15]. Since most of the world has shifted from traditional means of health services to telemedicine, Pakistan is one of the few countries struggling to see the transition through. This study is intended at assessing the importance of the telemedicine services and of the telemedicine services by the doctors that how the treatment methods and to what extent of practicality the doctors have shown in this regard. The given research explores the acceptance ratio of the people as well as the doctors that how and why the acceptance is not that much great if there is some reluctance. *The services of telemedicine are the becoming increasingly integral part of the system of healthcare of most of the countries around the world. Though, despite the emerging proliferation is the acceptance has not been popular strikingly in the clinical settings of the countries which are developing, where the practicing shortage of the medical professionals is predominant.* The telemedicine services, in other words, the online health services, were totally off the grid for the people of Pakistan before the COVID-19 who largely lacks the modern facilitates of getting online on regular basis [4]. For a country like Pakistan, online health services were like a remote dream as even in the ordinary services, the hospitals are not up to the mark and they do not by any means meet the modern health standards [16]. Since there is only 1 doctor per 6325 people in Pakistan, as the overcrowded hospitals already depict the reality, traditional ways are only to complicate the situation in the future and the treatment burdens will only rise. The best way appears to be the online services for treatment and other relevant purposes as the doctors can even from their homes do their work without any difficulty and the burden on the doctors will also be reduced [17, 18]. This research is opening a new debate for the need of telemedicine facilities in the other areas of Pakistan, especially, the rural areas where the people must travel hundreds of miles to access the local hospitals. The health deliveries systems of the country are compound as it includes healthcare subsystem by the federal as well as provincial government challenging with informal and formal private sectors. Healthcare is brought mainly over vertically coped disease-specific mechanism [4]. The aim of this study was to

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investigate the acceptance and adaption of the doctors of district Quetta, Pakistan regarding the services of telemedicine. Also, to analyze the telemedicine services acceptance during the COVID-19 and explore the prospects of acceptance of telemedicine soon amid rapid globalization in different hospital of Quetta.

METHODS

Three leading public sector hospitals of district Quetta were taken in this cross sectional study as case studies to explore the practice and acceptance of the telemedicine among the doctors and their point of views to gauge the public acceptance of the telemedicine in Quetta. Questionnaires were used to collect primary data from health care providers of hospitals of district Quetta, Pakistan including Bolan Medical College (BMC), Civil Hospital, and Fatima Jinnah Hospital. Simple Random sampling method was used for this research. The study duration and period of completion was six months. The sample size for the study was calculated using the formula mention below:

$$n = \frac{Z^2 X\hat{\rho}(1-\hat{\rho})}{\varepsilon^2}$$

$$n' = \frac{n}{1 + \frac{Z^2 X\hat{\rho}(1-\hat{\rho})}{\varepsilon^2 N}}$$

Z = is the Z score
ε = is the margin of error
N = is the population size
$\hat{\rho}$ = is the population proportion

The inclusion criteria for the study participants was all the medical officers with at least one-month practice or service of the telemedicine treatment, individuals with less than one month of experience were excluded from the study. The participants included in this study were from the pulmonology department, general medicine department, dermatology department, cardiology department, and primatology department. The questionnaire was pilot tested on 15 respondents before finally going for the 385 respondents included in the final analysis, to ensure the accuracy of the results (Table 1).

Table 1: List of potential study participants with their professional affiliations

Hospital Name	Total potential participants	Participants included in study
Bolan Medical College, Quetta	450	158
Civil Hospital, Quetta	658	161
Fatima Jinnah Hospital, Quetta	90	66
Total	1198	385

There was a total of 385 respondents selected randomly, among whom 5 professors, 35 assistant professors, 10 associate professors, 35 registrars, 150 medical officers and 150 postgraduate trainees having at least one-month practice or service were included (Figure 1).

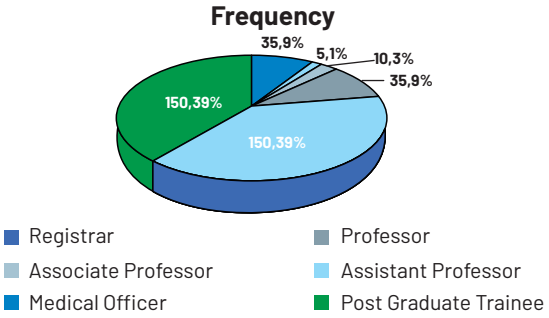

Figure 1: Professional specialization of study participants

The study was approved from institutional review board of National University of Medical Sciences, Rawalpindi, Pakistan. No information was obtained from the participants without informed consent and for that purpose, the aims and objectives of the given study were explicitly disclosed to the participants. The withdrawal option was open and no information without consent was obtained. Conflicts of Interest (if any) were disclosed, and confidentiality of the respondents was the paramount priority of the researcher with utmost responsibility. The data were analyzed using SPSS version 21.0. The data from the questionnaire were displayed using frequencies and percentages. The questionnaire was rated on a three-points Likert scale and the tables and graphs were explained thoroughly in consonance with their percentages and frequencies.

RESULTS

In total there were 385 participants, 231 male and 154 female participants. Among the respondents, the overwhelming majority said that they were aware of the term telemedicine, and they also said that they did know the pros and cons of the given term. The only thing was that some of them had not used it. 309 of them said yes while the rest (76) were not aware (Table 2). The greater portion of participants had faced problems operating the telemedicine and only 38 % (145) of the participants did not face problems while operating the telemedicine (Table 2). Majority (45%) of the study participants have never practiced daily medicine whereas 28.8 % of the participants have started using telemedicine during COVID-19. About the routine practice of telemedicine, 59 respondents were only using it daily while 35 of them were using it weekly. Only 18 of them were using it once in a month and 100 of them said that they used it only whenever it was needed and 173 of them said that they had never used telemedicine in their careers (Table 2).

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Table 2: Characteristics of study participants

Characteristics	Frequency (%)
Gender	
Male	231(60)
Female	154(40)
Familiarity with the pros and cons of telemedicine	
Yes	309(80)
No	76(20)
Problems faced in operating telemedicine	
Yes	240(62)
No	145(38)
Practice frequency of study participants	
Daily	59(15.3)
Weekly	35(9.1)
Monthly	18(4.7)
Sometimes when need to	100(26)
Never	173(44.9)
Practice of telemedicine by study participants	
Pre-COVID-19	101(26.2)
During COVID-19	111(28.8)
Never used at all	173(45)

We asked the respondents whether telemedicine is poised to become a mainstream alternative to the traditional in-person methods of care delivery, 247 respondents agreed in positive with the statement, 50 of them were neutral and 118 of them disagreed with the question (Figure 2).

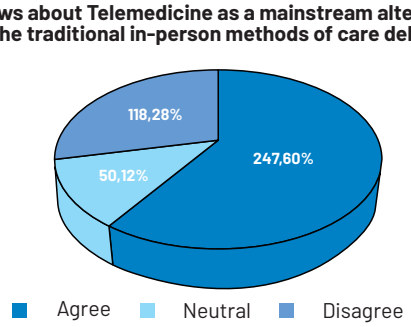

Figure 2: Views about telemedicine as a mainstream alternative to the traditional in-person methods of care delivery

Concerning the convenance and ease of telemedicine, we asked respondents "While driving for hours in the rural centers can be a real limiter to accessing health care that is why the acceptance ratio of online healthcare services is higher" among the participants who showed their agreement were 270 respondents. 50 of them stood neutral and 65 of them disagreed with the question (Figure 3).

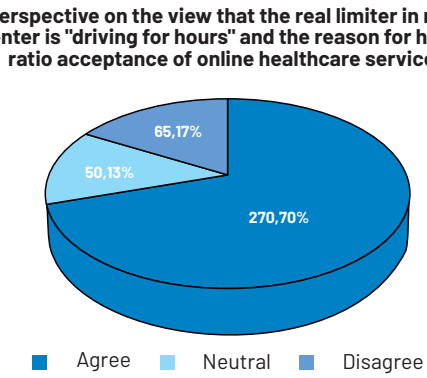

Figure 3: Perspective on the view that the real limiter in rural center is "driving for hours" and the reason for higher ratio acceptance of online healthcare services

Similarly, we asked respondents about their opinion of other telemedicine practice related questions and their responses in three points Likert scale are reported in Table 3. According to these results, long distances from the rural areas to the hospitals are encouraging the people to adapt the telemedicine services. Large scale perception that even the people are accepting the telemedicine services to some extent; still, it will take decades for its universal adaptation. Also, the familiarity ratio of the doctors about telemedicine is very high, but their experience of its usage is low. The findings also show that the urban areas are more inclined toward the acceptance of telemedicine as compared to the rural areas. However, technical issues are quite grave in the hospitals of Quetta (Table 3).

Table 3: Perspectives (in question form) of study participants about present and future use of telemedicine services

Perspectives Questions	Three points Likert scale responses		
	Agree N(%)	Neutral N(%)	Disagree N(%)
Tele-health apps have bolstered the youth confidence in accepting these services more than visiting hospitals.	235(61)	48,(12)	102,(27)
Views on future acceptance of telemedicine services in Pakistan.	114(30)	63(16)	208(54)
Perspective on view that Neurologic / psychiatric disorder or HIV; may prompt patients to go online for keeping their treatment secret from public notice.	295(77)	10(2)	80(21)
Patients feel more comfortable with telemedicine than in-person visits once they try it.	190(49)	44(12)	151(39)
Apprehensions of confidentiality and privacy discourage the acceptance of telemedicine services among the patients.	280(73)	35(9)	70(18)
Patients are more likely to show up to appointments.	90(23)	47(12)	248(65)
Not all physicians are professionally trained for operating telemedicine, especially, during COVID-19 discouraging their acceptance of the online healthcare services.	276(72)	30(8)	79(20)
Areas where patients have to travel long distances for short visits that don't	220(57)	47(12)	118(31)

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require being face to face stand to benefit the most from online services, thus, preventing long distance travel.			
The fee transaction process is discouraging people to accept online services for treatment which causes reluctance for acceptance of telemedicine.	232(60)	57(15)	96(25)
Only the patients in the urbanized centers take advantage of the telemedicine services that is why doctors do not accept it.	250(65)	8(2)	127(33)
Lack of technicality is seriously jeopardizing the acceptance of telemedicine and online healthcare services at large.	319(83)	20(5)	46(12)

DISCUSSION

In this study, three leading hospitals of Quetta were taken as case studies to explore the practice and acceptance of the telemedicine among the doctors and their point of views to gauge the public acceptance of the telemedicine in Quetta. The results show that the overwhelming majority knew about telemedicine, however, there were some respondents who did not know the usage of telemedicine. Majority of the respondents had faced problems while operating the telemedicine as many of them were not trained at all for operating the given tools and equipment. The results concerning the technical issues in use of telemedicine were in in line with the study results of Hollander and Carr. The researcher asked for the opinion of the respondents that whether technical issues were hampering the adaption and acceptance of telemedicine in Quetta and other parts of the province as well as the country and most of them were affirmative that technicality was indeed one of the major problems which had impeded the acceptance of the telemedicine in the country [17]. The researcher also sought the opinion of the respondents that whether only the people from the urban areas were taking benefits of the telemedicine or people from other areas were also accessing the facilities. The results showed that only the patients in the urbanized centers take advantage of the telemedicine services that is why doctors do not accept it. Our study results were supported by the study results of Langabeer. According to study reported by Langabeer *et al.*, either the patients prefer telemedicine due to long distances of the old and traditional way treatment or not. Zones where patient must travel long distance for small visit that do not requires for face to face stands to value the most from online services, thus, preventing long distance travel. It is indeed one of the major concerns in the way of acceptance of telemedicine in Quetta and other parts of the country [18]. It is true that most doctor in the modern era did not learn providing digital care in medical schools, so acceptance of giving best care by the physicians take some thoughts. In fact, it was not known then that a global pandemic will eventually shift the healthcare services far from the traditional means to online. The doctors of the present day were not provided with the proper training to use the equipment and tools of telemedicine. The results also showed that it is not necessary that patients are more likely to show up to appointments when they are virtual. The actual problem lies in the fact that not all physicians are professionally trained for operating telemedicine, especially, during COVID-19 discouraging their acceptance of the online healthcare services even after the COVID-19 the entire world has shifted toward online healthcare services, however doctors in Quetta due to lack of training are reluctant to adapt it. Unlike the results of our study, telemedicine worldwide has seen a boost during the pandemic COVID-19. The study results reported by Kazi *et al.*, clinics have understood marvelous revenues loss from the shelter-in-place order that have brushed through the country forcing them to move to online services and it is one of the reasons pushing the doctors to adapt the telemedicine services. In fact, the lockdowns have significantly boosted the telemedicine activities in the past some months since the outbreak of the pandemic [19]. Asking for the opinion of the respondents that do really people like the old ways of treatment and do not like the virtual kinds of treatment; it was revealed that the youth took more interest in the telemedicine services while the people with older age preferred the older ways. Our study results were supported by Bardy. According to Bardy *et al.*, younger group of individuals were more interested in adopting telemedicine in comparison to aged people. This interest is also evident in use of technology also [20]. Apprehensions of confidentiality and privacy discourage the acceptance of telemedicine services among the patients. The patients fear for their privacy or if privacy is one of the major reasons for their reluctance in acceptance of telemedicine. However, there were also respondents who said that certain patients feel relax by going virtual, patients were pleased to keep their identity confidential along their diseases and problems. As the study results suggest, it is obvious that Pakistan is still supposed to go a long way before getting a revolution of its kind in the health sector. The boom of information technology in the other parts of the world has been fast and swift, but it has not been that much strong and widespread in this country. It is yet to gain the trust of the people and the digital revolution is yet to take place [21]. Also, developing countries are not an exclusive deployment field for telemedicine projects. Developed countries feature a much greater gross domestic product (GDP) with respect to the GDP of developing countries. Public expenditure on health, measured as percentage of the GDP devoted to health care, differs even more between developed and developing

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countries, ranging from a ratio between 5.5 and 7.0 for the richest countries to a ratio between 0.6 and 1.7 for the poorest countries [22]. The adoption of telemedicine may have significantly more headroom in some countries. However, according to our study results, usage of telemedicine in Quetta, Pakistan is almost negligible. Similarly, the study by Abdul *et al.,* has reported that, in general, in Pakistan, the progress is at slower side, however at least progressing. On the other hand, in contrast to our study results, telemedicine use in Asian countries i.e., Malaysia, Thailand, and the Philippines is fast growing. However, the adoption is considerably in lags usage in Singapore, India, and Indonesia. Digital-native organizations struggle to lead the telemedicine market in Asian countries, where provider-owned apps have recently started gaining their due share [19, 23]. The results of our study are well supported by reports from African continent. In African countries i.e., in one of the poorest provinces of South Africa, telemedicine system has been set up in to improve health care services. Even though valuable investments have been made, only a third of the province's telemedicine sites have been functional and the uptake of telemedicine remains exceptionally low. Technological issues, such as low bandwidth internet service and unreliable supply of electricity have been the major obstacles to the fruitful and successful implementation of telemedicine technology [23, 24]. The reports from European countries are interesting. In Europe, health care system has seen digitalization and has maintained good standards. In Germany, a nationwide technology project was built to provide a secure infrastructure for the dissemination of telemedicine to enable innovations in the field of medicine and health care. Most German physicians and health care providers recognize the potential benefits of telemedicine; however, the implementation of this project was delayed by more than half decade due to the non-acceptance of this technology by German physicians and health care providers. Non-acceptance and resistance from health care providers and physicians is common when added information systems are implemented within a healthcare facility. Some health care providers and doctors may perceive the technology of telemedicine as a potential threat to their expertise and may be reluctant to adopt it [23, 25]. As the technology is entering in the business mainstream and the culture life, there a big awareness of the social and economic tools and along with it, the new political and social pressure to the re-frame of the ICT as the good public to be making it available and accessible to everyone. This has had the significant ramification in the international level and in the country. As the people are not responsive to this, the government has not been responsive on this as well. The digital divide stands tall as the barrier that pushes the people and the doctors out of this practice. Doctors too knowing the fact that the people are out of the range of digital revolution do not take the telemedicine practices as seriously as they should have [26]. It is one of the primary factors that keep this practice too lethargic. The urban and the rural areas have their own divisions. Literacy rate on the other hand is also discouraging to see. So, there are many factors involved in it [27]. There was the last portion of the questionnaire where the remarks of the respondents were gathered. They remarked that it is not a matter of months as Pakistan is very much backward in telemedicine services. There is going to be a period of transition of decades for greater acceptance of these services in Pakistan. Telemedicine is going to take much time to deepen its roots in Quetta and Pakistan. However, there are still doctors who have the expertise in it and they are also fulfilling their duties in the far-flung areas of the province where they operate the telemedicine services, train their juniors, and impart awareness among the people. The research also judged the familiarity ratio of the respondents with the term of telemedicine and shows that whether they know about the pros and cons of the given service. Among the respondents of 385, most of them said that they were aware of the term telemedicine, and they also said that they did know the pros and cons of the given term. The only thing was that some of them had not used it [28]. The telemedicine can play a huge part in the facilitation of the activities. Also, there can be imagined the circumstances if every hospital in the rich county is being linked up in the formal basis along with the small hospital groups or the centers of healthcare in the underdeveloped countries. Through the mutual learnings and the collaborations in the provision of the health services, these partnerships of the health can also change the delivery of healthcare in the national level, which might also change that how the industrialized nation might be perceiving the world. The information technology and telemedicine can be important in the maximization of the potential of the partnerships of healthcare [28]. It has been in within the past few years that the measures which are meaningful measure of the digit divides which are being developed. The potential choices of the indicators are huge and the evolution which is continuing technology shortens the lifespan which is useful of the reputable indicators which creates the needs for the general revision [29]. According to our study results, low socioeconomic income and lack of technology were one of the barriers in use of telemedicine services. Our study results were also supported by the study results from Shaikh. The gap between the low-income countries as well as the high-income countries has also kept the IT divisions along with it. Those countries that have a low-income ratio are also

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poor in their dealings with the healthcare sector and the case is totally otherwise in the opposite side. These divisions have also swept across Pakistan. That is why it is not on the good record when it comes to health [12]. If the hospitals are devoid of the facilities, how can the doctors come in used to the telemedicine and how possibly can the public take advantage of these facilities if they are not even present. As the results and findings of the given research show that one of the primary reasons behind the reluctance of the masses in acceptance of the telemedicine is the lack of facilities; especially, when the rural areas are kept in consideration. Beside the lack of facilities, the lack of public awareness is another factor of avoiding telemedicine. Even the educated class is not fully aware of the advantages and services of the telemedicine. Despite all these impediments, online services have registered significant boost during the pandemic of COVID-19. Mostly, people do not accept it because they do not know it [26].

CONCLUSIONS

An exhaustive and detailed analysis of the given research proves telemedicine has not seen large scale acceptance in Quetta and the doctors also need more knowledge with regards to the operating of the online services and the public also needs more awareness campaigns as but they do not have sufficient knowledge to run the online services. This lack of expertise of the doctors shows the low graph of public acceptance as even the doctors are not fully into it. Lack of proper training of the doctors is one of the key reasons behind the lack of acceptance along with the problems in the rural areas that further discourage this practice.

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Authors Contribution

Conceptualization: AA, SM
Methodology: AA, SM
Formal analysis: AA, JK
Writing-review and editing: AA, SM, JK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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