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Original Research

Telehealth use and work stress among Chinese health care providers during the COVID-19 pandemic

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Abstract: Telehealth services in China rapidly expanded during the COVID-19 pandemic. The work stress of health care providers (HCPs) associated with providing telehealth care services in China has been less studied. Our study describes the telehealth services provided by hospitals in China and examines the relationships between telehealth use and work stress of HCPs in China during the COVID-19 pandemic. With a survey research design, HCPs aged 18 or older in China were electronically recruited from October 19 to November 10, 2021 (n = 1,073). After preprocessing, data from 1,036 HCPs were used for further analyses, which included descriptive statistics and multiple linear regression models. Results showed that 64.29% of Chinese hospitals reported virtual physician-to-physician consultations, and 59.94% of Chinese HCPs conducted online physician consultations. Lower levels of HCP work stress was associated with live video conferencing ($p = 0.04$), online physician consultations ($p = 0.00$), and higher levels of team collaboration ($p = 0.00$) and team trust ($p = 0.00$). Work stress was also positively correlated with COVID-19 stress ($p = 0.00$), working hours ($p = 0.00$), and the interaction between live video conferencing and COVID-19 stress ($p = 0.04$). HCPs' work stress decreased by using live video conferencing and online patient care. However, the positive effects of live video conferencing may decrease with the increase in COVID-19 stress for HCPs. Our findings encourage efforts to develop extensive coverage of telehealth service systems in China to promote HCPs' virtual communication and collaboration to relieve HCPs' work stress and support their well-being.

Keywords: Telehealth utilization, Work stress, COVID-19, Interprofessional collaboration

Introduction

The COVID-19 pandemic dramatically accelerated telehealth [1]. Recently, a study by the U.S. Department of Health and Human Services (HHS) showed a 63-fold increase in Medicare telehealth utilization during the pandemic [2]. According to an HHS report, telehealth visits increased to 52.7 million in 2020, up from approximate 840,000 in 2019 [3]. During the COVID-19 pandemic, telehealth in China also experienced a rapid

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growth, driven by both government support and technological innovation [4, 5]. The National Health Commission of China advocated for online services, promoting tech giants such as Alibaba and Tencent to expand their platforms, such as AliHealth and WeDoctor [6]. This expansion led to a staggering increase in users. For instance, Tencent's WeChat Health platform experienced a tenfold increase in daily active users at the pandemic's onset [6]. In February 2020, WeDoctor, backed by Tencent, recorded more than 100 million users and provided online consultations to over 3 million people in relation to the pandemic [7].

Telehealth, in its broadest sense, encompasses a range of virtual communication between physicians and patients that "can take place synchronously (telephone and video), asynchronously (patient portal messages, e-consults), and through virtual agents (chatbots) and wearable devices" [1]. The changes of telehealth practice affects health care providers' (HCPs) work in fundamental ways [8]. HCPs provide care and interact with interprofessional team members (e.g., nurses, social workers, and pharmacists) and patients use telehealth in new ways that potentially increase HCPs' stress while offering opportunities for in-time communication and innovation [9, 10]. Telehealth practice changes have significantly reshaped the landscape of healthcare provision for providers [11]. As highlighted by Smith et al. (2019) in the Journal of Telemedicine and Telecare, HCPs now experience enhanced work flexibility, yet face challenges with altered patient interactions due to the lack of physical contact. They have had to quickly adapt to new technological demands, grapple with complexities in electronic documentation, and navigate evolving licensing and reimbursement policies [11]. Moreover, while telehealth has expanded access to diverse patient demographics, HCPs are also facing the possibility of increased screen-induced fatigue and burnout [9].

During the COVID-19 pandemic, telehealth services in China experienced a rapid expansion to alleviate the shortage of medical resources and waste of medical supplies [9, 12]. COVID-19 promoted the use of online doctor-patient consultation, inter-hospital e-mentoring, electronic health records sharing, and telesurgery [13, 5]. Inter-hospital e-mentoring enables primary care providers and nurse practitioners to seek expert advice on a patient's care from senior HCPs at higher-level hospitals. During COVID-19, a big interest in telesurgery has also emerged in Chinese medical community [14]. The current telesurgery practice in China mainly includes perioperative care and telesurgery monitoring [15]. Although the pandemic has accelerated the development of telehealth in China, studies suggest that the readiness of HCPs in China remains low, and it varies according to HCPs' working positions and environment [4].

Telehealth adoption, especially during its introductory phases, has been observed to aggravate the stress of HCPs [11]. In the past, many HCPs have reported a variety of experiences, with some describing notable barriers to telehealth integration, including lack of familiarity with and training in its use, diminished face-to-face interactions with patients, and technical challenges [4, 16]. However, in the context of the COVID-19 pandemic, the distancing aspect of telehealth served as a double-edged sword. On the one hand, it offered HCPs a shield against direct exposure to the virus, and thus could reduce the associated stress [9]. On the other hand, the overarching anxiety associate with the pandemic could either amplify or mitigate the stress HCPs felt in relation to telehealth, depending on their personal experiences and the specific challenges they faced [10].

Despite the widespread use and potential benefits of telehealth, particularly during the COVID-19 pandemic, there remains few research focusing on the work stress experienced by healthcare providers (HCPs) in the context of virtual healthcare services in the Chinese healthcare sector. The nexus between HCPs' Well-being, resulting from their work-related stress, and the quality of patient care, including patient satisfaction, is well-established in the literature [17-20]. However, an understanding of how telehealth practices intersect with HCPs' well-being is notably lacking in China – a nation with a vast healthcare landscape and technological capabilities.

Our research endeavors to bridge this gap, offering a comprehensive analysis of the relationship between the provision of telehealth services and the work stress experienced by Chinese HCPs in this unique context. Furthermore, by exploring the modulating effect of pandemic-induced anxiety on this relationship, our research will yield insights that can shape strategic interventions to promote HCPs' well-being, subsequently enhance patient care and satisfaction. Thus, our study promises to make a valuable contribution to both the academic discourse and the practical domain, enabling stakeholders to foster a resilient, effective, and mentally healthy healthcare workforce in the digital age. The aims of this study were (1) to explore the relationship between telehealth use and work stress among HCPs in China during the COVID-19 pandemic, (2) to examine the moderating role of COVID-19 anxiety on the association between telehealth use and work stress among HCPs in China, and (3) to describe the rates of telehealth services provided by hospitals in China.

Methods

Sampling

Non-probability purposive sampling was used to recruit HCPs, including physicians, nurses, community health workers, pharmacists, and medical social workers, who were aged 18 or older in Henan Province, China. The survey data was collected by researchers at Dongbei University of Finance & Economics from October 19, 2021, to November 10, 2021. Dongbei University of Finance & Economics has a strong research background in public administration and public

health. Researchers in this institution build a close relationship with HCPs, whose communication is usually through WeChat. WeChat is a common Chinese social media that is widely used for sharing work information [21]. Furthermore, the ownership and usage rate of WeChat accounts in the Chinese population is as high as nearly 90% [21]; thus, collecting survey data through WeChat is an effective way to recruit HCP participants in China. Participants were recruited via an online invitation letter posted in working groups on WeChat. In the invitation letter, the researchers provided a brief introduction about this study so that the participants could self-select as participants by clicking on the link. After clicking on the link, participants were first presented with an informed consent form. Detailed information about this study was provided in the consent form, and the anonymity of the data was illustrated as well. The survey was open for 23 days in the middle of the pandemic. A total of 1,073 individuals participated in this study. While those participants with missing data were removed out of this study, thus the final sample size was 1,036. This study was approved by Dongbei University of Finance & Economics.

Measures

The survey included measures for HCPs' perceptions of work-related stress, telehealth use (e.g., type of telehealth service provided, area of practice, etc.), COVID-19-related stress, and HCPs' demographics (e.g., gender, age, and profession).

Dependent Variable

Work Stress. The dependent variable for the regression model was HCPs' perceptions of work-related stress under the organizational environment, which was treated as a continuous variable calculated by the total score of the Health and Safety Executive Management Standards Indicator Tool (HSE-MS IT) [22]. HSE-MS IT is a 35-item survey that assesses HCPs' perceptions of six organizational environment domains (demands, control, support, relationships, role, and change) using a 5-point Likert scale. The higher scores indicate heavier work stress. Previous research demonstrated overall scale validity with specific subscale sensitivity to assess unique domains [24]. HSE-MS IT has been widely applied in leading studies of work stress and has showed the specific sensitivity of its scales to assess different aspects of work-related distress. Previous studies reported moderate to strong correlation among the corresponding HSE-MS IT scales [23, 24].

Independent Variables

Telehealth Use. Regarding telehealth use, this study measured: a) frequency of using telehealth technologies to provide health care to patients (1 = daily, 2 = several times per week, 3 = weekly, 4 = monthly, and 5 = less than monthly), b) frequency of using telehealth technologies to collaborate with other professionals to provide health care (1 = daily, 2 = several times per week, 3 = weekly, 4 = monthly, and 5 = less than monthly), c) type of telehealth services (inter-hospital e-monitoring (yes/no), electronic health records sharing (yes/no), remote surgery monitoring (yes/no), online doctor consultation (yes/no), and live video conferencing (yes/no)).

COVID-19 Stress. The impact of COVID-19 on HCPs' work stress was measured by their anxiety toward COVID-19. COVID-19 stress was treated as a continuous variable calculated by total score on four three-point Likert (0 = disagree, 1 = neutral, and 2 = agree) COVID-19 stress-related questions, including: on a scale from "strong disagree" to "strong agree" *1) I do not feel safe from COVID-19; 2) I am nervous and afraid of getting infected with COVID-19; 3) I have difficulty in relaxing when I leave my house because of COVID-19; and 4) I worry that I may die from COVID-19.*

Covariates

Covariates of the regression models included self-reported age (1 = 18-33 years old, 2 = 34-49 years old, 3 = 50-65 years old, and 4 = over 66 years old), gender (1 = female and 2 = male), profession (1 = physician, 2 = nurse, 3 = pharmacist, 4 = community health worker, 5 = medical social worker, and 6 = others), the average number of working hours per week (1 = less than 40 hours, 2 = 41- 50 hours, and 3 = over 50 hours), years of work in healthcare industry (1 = less than 1 year, 2 = 1-3 years, 3 = 3-5 years, 4 = 5-10 years, 5 = 10-20 years, and 6 = over 20 years), education level (1 = primary school, 2 = middle school, 3 = high school, 4 = vocational school, 5 = community college, 6 = undergraduate school, and 7 = graduate school), residence location (1 = urban and 2 = rural), and COVID-19 vaccination status (yes/no). Additionally, we controlled interprofessional collaboration variables—team collaboration (1 = never, 2 = rarely, 3 = occasionally, 4 = most of the time, and 5 = always) and team trust (1 = never, 2 = rarely, 3 = occasionally, 4 = most of the time, and 5 = always)—in the analysis.

Analysis strategy

Descriptive statistics were conducted to elaborate on the sample characteristics. Multiple linear regression, embedding the ordinary least squares (OLS) method for coefficient estimation, was used to predict the dependent variable— work stress—based on the other variables [25]. Nominal categorical variables were coded as dummy variables prior to linear regression modelling. These variables were gender, occupation, residence location, COVID-19 vaccination status, and type of telehealth services. Statistical assumptions were checked during modeling. The random errors were independent. The initial model did not pass the Shapiro-Wilk test for normality, but the residual plot was highly symmetric and bell-shaped,

which indicates a sufficient use for our analytical purpose, that is, to examine the relationships among the variables rather than to provide confidence intervals for predictions. No multicollinearity was found, as indicated by variance inflation factors (VIFs) ranging from 1.07 to 2.29. All statistical analyses were conducted in R version 4.2.0.

Results

Descriptive statistics are shown in Table 1. Of the 1,036 HCP participants, 38.51% were physicians, 43.73% were nurses, 5.98% were community health workers, and 3.09% were medical social workers. The sample is evenly distributed between urban (47.88%) and rural healthcare settings (52.12%). The majority of participants were female (70.75%). Of the participants, 29.05% had worked in healthcare for 10-20 years, and 34.65% had worked for over 20 years. Most participants worked more than 40 hours per week (87.94%). The participants had team collaboration (mean = 4.58, out of 5) and team trust (mean = 4.68, out of 5) most of the time. Participants' average work-related stress score was 51.44 out of 140, which indicated the participants had moderate work stress, and their average stress level toward COVID-19 was medium.

Table 1. Descriptive Statistics

Variable	Mean/n,%	Std. Dev.	Min	Max
Gender				
Female	733, 70.75%			
Male	303, 29.25%			
Age				
18-33	436, 42.08%			
34-49	473, 45.66%			
50-65	126, 12.16%			
66+	1, 0.10%			
Profession				
Physician	399, 38.51%			
Nurse	453, 43.73%			
Pharmacist	33, 3.19%			
Community health worker	62, 5.98%			
Medical social worker	32, 3.09%			
Others	57, 5.50%			
Number of hours worked per week				
Less than 40 hours	125, 12.07%			
41-50 hours	427, 41.22%			
Over 50 hours	484, 46.72%			
Length of working in healthcare settings				
Less than one year	22, 2.12%			
1-3 years	94, 9.07%			
3-5 years	71, 6.85%			
5-10 years	189, 18.24%			
10-20 years	301, 29.05%			
Over 20 years	359, 34.65%			
Education level	5.23	0.89	1	7
Residence				
Urban	496, 47.88%			
Rural	540, 52.12%			
COVID-19 stress	4.72	2.73	0	8
COVID vaccination status				
Vaccinated	1021, 98.55%			
Unvaccinated	15, 1.45%			
Team collaboration	4.58	0.76	2	5
Team trust	4.68	0.66	1	5
Inter-hospital e-mentoring				
Yes	666, 64.29%			
No	370, 35.71%			

Variable	Mean/n,%	Std. Dev.	Min	Max
Electronic health records sharing				
Yes	462, 44.59%			
No	574, 55.41%			
Remote surgery monitoring				
Yes	264, 25.48%			
No	772, 74.52%			
Frequency of interprofessional collaboration in telehealth	3.48	1.27	1	5
Online doctor consultation				
Yes	621, 59.94%			
No	415, 40.06%			
Live video conferencing				
Yes	383, 36.97%			
No	653, 63.03%			
Frequency of providing telehealth services	3.66	1.25	1	5
Work stress (outcome)	51.44	16.01	5	101

Telehealth Utilization Rate

64.29% of Chinese hospitals could provide virtual physician-to-physician consultations, 44.59% provided electronic health records sharing, and 25.48% had remote surgery monitoring services. About 59.94% of Chinese HCPs practiced online doctor consultations, and 36.97% of Chinese HCPs practiced live video conferencing.

Telehealth Utilization and Work Stress

Table 2 elaborates results from the regression models. Having live video conferencing ($p = 0.04$) and providing online doctor consultations ($p = 0.00$) were negatively associated with work stress among Chinese HCPs. Additionally, COVID-19 stress ($p = 0.00$) was positively associated with work stress among Chinese HCPs. For one point increase in the anxiety of COVID-19, HCPs' work stress increased by 1.10 units. Higher levels of team collaboration ($p = 0.00$) and team trust ($p = 0.00$) were associated with lower levels of work stress. For one unit increase in team collaboration, HCPs' work stress was reduced by 2.15 units; and for one unit increase in team trust, HCPs' work stress was reduced by 7.24 units. The more working hours ($p = 0.00$) the HCPs had, the higher work stress they had.

Interplay between COVID-19 Anxiety and Telehealth Utilization

The model 2 from Table 2 shows that the stress associate with COVID-19 is a significant moderator in the positive impact of live video conferencing on HCPs' work stress ($p = 0.04$). HCPs who used live video conferencing had lower work stress compared to their counterparts who did not use live video conferencing; however, this trend would reverse with elevated COVID-19 stress (Figure 1).

Discussion

This cross-sectional analysis of telehealth utilization among HCPs during the emergence of the COVID-19 pandemic in China (October - November 2021) provides the information on the relationships between telehealth use and work stress to policy makers and clinical practitioners. In China, telehealth was widely used during the COVID-19 outbreak, whereas telehealth technology was most often applied for inter-hospital mentoring and online doctor consultations. About 60% of HCPs have received inter-hospital e-mentoring and delivered online consultation services to patients in the midst of the pandemic. However, only a quarter of hospitals had monitoring programs for remote surgery, and less than half of hospitals offered electronic health records sharing services in China. This suggests that telehealth delivery is still generally underdeveloped in China. As a comparison, 92% of patients had telehealth visits and access to electronic health records from their homes in the U.S. during the COVID-19 pandemic [2]. Although the National Health and Wellness Commission of the People's Republic of China has issued a notice on the promotion of information technology development in medical services ("the National Health Commission of the People's Republic of China," n.d.) as early as 2018, the progress of telehealth technologies in Chinese medical institutions was still slow. The low rates of telehealth utilization in China suggesting that many factors (e.g., lack of technological support) hindered the successful implementation of telehealth in China [4].

During the COVID-19 pandemic, Chinese HCPs' self-reported work stress was moderate. Our findings indicated that Chinese HCPs' work stress was positively associated with their weekly working hours but negatively associated with HPCs' education level. Long working hours is one of the main triggers to work stress among Chinese HCPs [26]. It is worth noting that about 88% of Chinese HCPs worked

Table 2. Initial and Interaction Models

Variables	(1) Initial Model	(2) Interaction Model Anxiety of COVID-19
Gender		
Female		
Male	-0.78	-0.92
Age	-1.03	-1.03
Profession		
Physician		
Nurse	-5.01***	-4.87***
Pharmacist	2.44	2.50
Community health worker	-4.48*	-4.40*
Medical social worker	-0.18	-0.11
Others	-0.72	-0.59
Number of hours worked per week	4.25***	4.33***
Length of working in healthcare settings	0.24	0.31
Education level	-1.29*	-1.23*
Residence		
Urban		
Rural	-0.11	-0.02
COVID-19 stress	1.10***	0.58*
COVID-19 vaccination status		
Vaccinated		
Unvaccinated	7.26	5.08
Team collaboration	-2.15**	-2.08
Team trust	-7.24***	-7.29***
Inter-hospital e-mentoring (yes)	-1.32	-1.23
Electronic health records sharing (yes)	-1.50	-1.60
Remote surgery monitoring (yes)	-1.94	-1.90
Frequency of interprofessional collaboration in telehealth	0.26	0.24
Online doctor consultation (yes)	-2.39**	-5.01*
Live video conferencing (yes)	-1.89*	-5.90**
Frequency of providing telehealth services	-0.41	-0.38
Online doctor consultation × COVID-19 stress		0.43
Live video conferencing × COVID-19 stress		0.68*
Constant	93.42 ***	95.64***
Observations	1,036	1,036

*** p<0.001, ** p<0.01, * p<0.05

more than 40 hours per week as found out in our study. Long hours working in healthcare services increase the rate of burnout [27, 28]. Before the COVID-19 pandemic, Chinese HCPs struggled with heavy patient loads, occasionally tense doctor-patient relations, demanding bureaucratic systems, and the pressures of continuous learning in a rapidly evolving medical field [29]. The advent of the pandemic exacerbated these stressors, and triggered added pressures such as the constant risk of infection, increasing working load and hours, and the need to adapt promptly to ever-evolving treatment protocols and technologies [30]. The pandemic intensified the pre-existing challenges and layered on unique stressors specific to the crisis.

Additionally, we found that nurses reported lower levels of work stress compared to physicians. This observation might be linked to the specific challenges caused by the pandemic. Physicians, often at the forefront of diagnosis and treatment, had to respond rapidly to changing guidelines, make critical decisions with limited information, and often communicate grim prognoses with families [31]. These

responsibilities might have augmented their stress. While, nurses faced intense physical and emotional challenges, especially undertaken a role of hands-on patient care, they were not typically burdened with the direct decision-making pressures that physicians encountered [31].

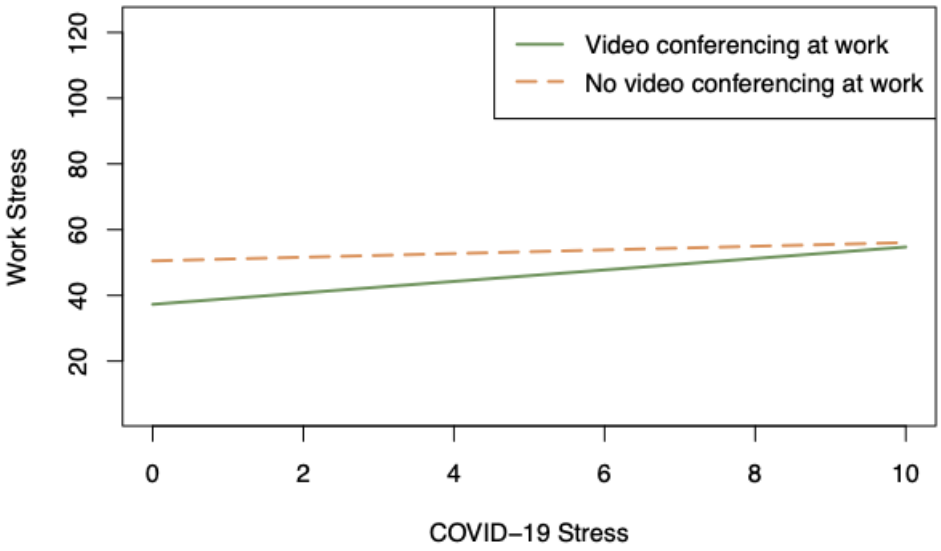

Figure 1. Live video conferencing × COVID-19 stress

Our study suggested that using telehealth technologies may play a positive role in reducing HCPs' work stress. Chinese HCPs who had online doctor consultations and live video conferencing reported lower levels of work stress. Beneficial effects in terms of reducing time costs for an individual patient and avoiding physical contact when using telehealth in the delivery of health care can explain the findings [16]. First, meeting co-workers and patients online can significantly make patient-care arrangements more flexible. It is especially true in the culture of Chinese hospitals that HCPs tend to continuously be consulted by patients with limited breaks when meeting in person [9, 32, 33]. Considering Chinese HCPs' heavy workload and extra-long working hours, online doctor consultation provides more flexibilityand can reduce the time cost of being consulted by each patient. In addition, less interpersonal interactions in virtual meetings may potentially reduce HCPs' anxiety about COVID-19 exposure and COVID-19 infection, thereby reducing their work stress. A comprehensive review at the results gives us a clear picture. We have found that COVID-19 stress is significantly associated with higher levels of work stress of Chinese HCPs, and moreover, the stress related with COVID-19 can be significantly impacted by having live video conferencing [11].

In the context of pandemic, our results suggested that stress associated with COVID-19 played a significant role in moderating the impact of live video conferencing on HCPs' work-related stress. Interestingly, HCPs who utilized live video conferencing as a medium for consultation or interaction reported lower levels of work stress compared to those who didn't use this technological modality. This could potentially be attributed to the reduction in direct exposure risk associated with in-person interactions during the pandemic, combined with the convenience and flexibility that video conferencing affords [8]. However, an essential nuance emerges when factoring in the COVID-19 related stress. The positive effect of live video conferencing diminishes, and in fact, it may reverse as the stress levels related to the pandemic rise. This suggests that under high levels of pandemic-induced stress, even the protective and stress-reducing benefits of live video conferencing can be overshadowed. This reversal in trend may be influenced by a myriad of factors such as concerns about technological glitches during critical patient consultations, the impersonal nature of virtual interactions, or the constant reminder of the pandemic's gravity every time they have to opt for a virtual meeting rather than face-to-face interactions [8, 9, 11].

Massive studies have provided evidence of the negative impact of COVID-19 on the mental health of HCPs [34, 35]. The duration of the COVID-19 crisis, the risk of infection with COVID-19, and the prolonged overload caused by COVID-19 lead to an elevated risk of burnout for worldwide healthcare providers [36]. The intensive work during the COVID-19 outbreak drained Chinese HCPs physically and emotionally [35]. However, our results suggested that effective team collaborations may reduce HCPs' work stress. A previous study found that HCPs reported less anxiety if they felt smooth in communication and cooperation with co-workers between different professions [37]. Therefore, using live video conferencing technologies to communicate with co-workers is an

effective way to reduce HCPs' work stress during the COVID-19 pandemic.

Limitations

We acknowledge there are several limitations of this study. The cross-sectional analysis limits our ability to make causal conclusions. This study did not explore other factors that may impact HCPs' work stress other than telehealth-related aspects. Furthermore, our sample was not completely randomized as it was limited to those who use WeChat work groups. Recruiting participants through WeChat may have potentially excluded some HCPs who do not use WeChat. Another notable limitation of our study is that the participants from the same province. Telehealth's development and adoption can differ across China's regions due to economic variations, technological readiness, and pandemic severity. Given this, future research should consider cross-regional comparisons, particularly between areas with diverse economic standings and COVID-19 impacts. Under China's dynamic zeroing policy on COVID-19 control, the experiences of HCPs during the COVID-19 pandemic may differ from those HCPs from other countries. Therefore, our findings may not be able to be generalized to HCPs who live and work in countries other than China. We encourage future work to further examine the impacts of telehealth use on work stress across healthcare professions in different countries.

Conclusion

Our study provides a comprehensive insight into the telehealth utilization landscape among Chinese hospitals and healthcare professionals (HCPs) under the unique pressures of the pandemic. The majority of hospitals and HCPs adopted online consultations, demonstrating an adaptation to the times. However, services such as electronic health record sharing and remote surgery monitoring are not as widely adopted, indicating areas for potential growth and development in telehealth utilization. In the context of work stress, our findings elucidate the protective role of telehealth modalities, with live video conferencing and online doctor consultations significantly decreasing work stress among Chinese HCPs. Simultaneously, the shadow of the pandemic looms large, with COVID-19 stress directly amplifying work stress. Intriguingly, as the stress related to COVID-19 intensifies, the positive effects of live video conferencing begin to fade, eventually reversing the trend. Furthermore, two critical factors emerged in the dynamics of work stress: team collaboration and team trust. Both elements showed a powerful inverse relationship with work stress, emphasizing the importance of fostering a cohesive, trust-filled teamwork environment in healthcare industry.

The results underscore the multifaceted implications of telehealth and its interactions with a broader context of the pandemic, team dynamics, and working conditions. As the healthcare sector faces the evolving challenges of this era, an integrated understanding of these dimensions will be paramount in optimizing telehealth strategies and ensuring the well-being of healthcare professionals.

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Declaration of interest

The authors declare that they have no known competing financial interests or personal relationships that could influence the work reported in this article.

Data availability

The data generated and analyzed in this study are not publicly available, but can be provided by the authors upon request.

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Not Applicable

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