


# The relationship between therapeutic alliance, frequency of consultation and uptake of telemedicine among patients seeking treatment for early psychosis: A moderated mediation model

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## Abstract

**Background:** Telehealth services ensure the delivery of healthcare services to a wider range of consumers through online platforms. Nonetheless, the acceptance and uptake of telehealth remain elusive. This study aims to understand the (a) uptake and (b) acceptability of telemedicine, (c) if therapeutic alliance mediates the relationship between the frequency of consultations with clinicians and the uptake of telemedicine in patients with early psychosis, and (d) role of education in moderating the relationship between therapeutic alliance and the uptake of telemedicine for their mental healthcare.

**Methods:** A convenience sample of outpatients ( $n=109$ ) seeking treatment for early psychosis and their care providers ( $n=106$ ) were recruited from a tertiary psychiatric care centre. Sociodemographic and clinical characteristics, therapeutic alliance (Working Alliance Inventory), and telemedicine use were captured through self-administered surveys. The moderated mediation analysis was performed using PROCESS macro 3.4.1 with therapeutic alliance and level of education as the mediating and moderating factors, respectively.

**Results:** The acceptance of telemedicine was high (possibly will use: 47.7%; definitely will use: 26.6%) whilst the uptake was low (11%). Therapeutic alliance mediated the relationship between the frequency of consultation and the uptake of telemedicine ( $\beta: 0.326$ ; CI: 0.042, 0.637). This effect was moderated by the level of education ( $\beta: -0.058$ ;  $p < 0.05$ ).

**Conclusion:** Therapeutic alliance mediates the relationship between the frequency of consultations and the uptake of telemedicine services with the level of education moderating this mediation. Focusing on the patients with lower education to improve their telemedicine knowledge and therapeutic alliance might increase the uptake.

## Keywords

Telemedicine, telehealth, telepsychiatry, therapeutic alliance

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## Introduction

Telehealth facilitates the delivery of healthcare services to a wider population through online platforms, overcoming several geographic and personal barriers.<sup>1</sup> This is particularly feasible in the current decade with the high internet penetration in societies and people getting accustomed to the use of the latest technology in their everyday life. The healthcare sector is leveraging these technologies to deliver care through videoconferencing (or through SMS

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or telephone) at the convenience of the patient's home without the need for travelling to crowded clinics. This will not only reduce the cost (of transportation) but also allow real-time communication and care to a wider population without requiring physical contact that may potentially risk infections, especially during disease outbreaks.<sup>2</sup>

Despite these advantages, telemedicine (including clinical services) and telehealth (clinical and non-clinical services) were underutilised until the coronavirus disease 2019 (COVID-19) pandemic. A report showed that only 2% of clinicians had used telemedicine services for consultations in 2009 in the United States.<sup>3</sup> Another study comprising approximately 217,000 patients from 2005 to 2017 showed a steady increase in the use of telemedicine during this period (0.2 per 1000 in 2005 vs 6.57 per 1000 in 2017). A stark change in the uptake of telehealth was noted during the COVID-19 pandemic that had caused major healthcare service disruptions when clinics started restricting the number of visits as a part of safe distancing measures. A systematic review of eight studies recommended that telemedicine is indeed an efficient alternative to face-to-face consultation in unprecedented times, especially during the pandemic that risks the lives of patients and staff, and thus, should be considered for non-emergency routine care.<sup>4</sup> Reviews have confirmed the comparable effectiveness of telepsychiatry (TP) to face-to-face sessions.<sup>5,6</sup> In a recent systematic review of 5 RCTs, TP was also noted to be as effective as conventional in-person sessions in treating anxiety and related conditions.<sup>7</sup> Nonetheless, the uptake varied across populations with some populations reluctant to accept the service.<sup>8</sup> It is unlikely that the utility of telemedicine or telehealth will dissipate after the current crisis and therefore, we need to understand the factors that contribute to the acceptance to prepare for the future by taking lessons from the current pandemic experiences.<sup>9</sup>

Despite the advantages and ease of implementation, TP is still not widely used in care delivery. This is reported to be due to the lack of user acceptance stemming from concerns regarding reliability, cost, quality, and privacy.<sup>10,11</sup> Choi et al.<sup>12</sup> revealed that there was a strong barrier to online sessions amongst older adults, with only 10%–20% of the participants providing consent for online sessions, although high satisfaction was recorded for those who attended. Another study conducted among a geriatric population in Singapore showed that the uptake of teleconsultations was high during the lockdown period, however, it went back to previous rates after the lockdown.<sup>13</sup> It was believed that face-to-face sessions are more effective in building better therapeutic sessions compared to online sessions.<sup>14,15</sup> However, Lingley-Pottie and McGrath<sup>16</sup> showed that therapeutic alliance (TA) equivalent to face-to-face sessions can exist in online sessions as well. Simpson<sup>17</sup> further clarified this observation by showing that TA is achievable over a period of time in online sessions. It is thus interesting

to understand the relationship of TA with telemedicine uptake and what are the moderators involved in this relationship.

Patients seeking treatment for early psychosis face multiple personal, system level and service-related barriers that often challenge their continuous engagement with the service.<sup>18</sup> TP is thus a promising alternative in this population. A study conducted in Canada evidenced that 49% of the patients were ready for TP. No such studies were conducted on the Asian population to understand their acceptance of TP.<sup>19</sup>

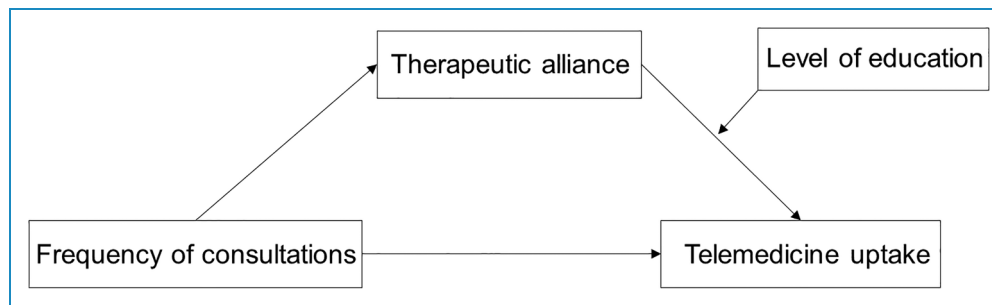
In Singapore, the internet penetration is 88.5%<sup>20</sup> and 96% of this population owns smart devices of which 96% are smartphones.<sup>21</sup> Thus, telehealth initiatives are feasible if planned in a patient-centric manner. While TP has been researched across the globe, the majority of the studies focused on major depression. There is a dearth of literature on patients with schizophrenia especially, those with early psychosis who are clinically high risk and require continued treatment engagement.<sup>22</sup> This information is crucial and will help healthcare providers to prepare for continued care delivery during unprecedented times ahead. The current study was conducted during the pandemic phase shortly after the COVID-19 lockdown period ended. During this period, patients were offered telehealth services including TP, prescription of medication, and educational/awareness sessions. The current study describes the (a) uptake of telemedicine, (b) acceptability, (c) if TA mediates the relationship between frequency of consultations and uptake of telemedicine in patients with early psychosis and (d) investigates the moderating role of education between TA and uptake of telemedicine.

We hypothesise that TA mediates the relationship between the frequency of consultations with the care team and telemedicine uptake and this is moderated by the level of education of the patient (Figure 1).

## Methods

### Participants

A convenient sample of outpatients ( $n = 109$ ) and their care providers (CPs;  $n = 106$ ) were recruited from the Early Psychosis Intervention Programme (EPIP) from January 2021 till November 2021. Eligible participants were referred by the attending clinicians (inclusion criteria: 18–40 years old, English speaking, have a diagnosis of schizophrenia spectrum and other psychotic disorder, have the mental capacity to give consent, as assessed by the clinician or study team member). The language restriction was applied as the majority of the patients attending the programme are young adults/adolescents who speak English. Those in the early phase (within 3 months of enrolment) of treatment, who were below 18 years, or minors whose



**Figure 1.** Moderated mediation model: Mediating role of TA on the effect of frequency of consultations on telemedicine uptake as a function of education level of the patient.

parents were unable to give consent were excluded. Written consent was taken from all participants (and a legally acceptable representative in the case of participants below 21 years old) and the survey was administered either face-to-face or through video conferencing. All the participants agreed to use their data for research purpose. All questionnaires were self-administered by the participants. The study methodology was approved by the institutional and Domain Specific Review Board (Ref: 2020/01112).

### Sample size

The current study is part of a larger project that looked at the treatment needs of patients with early psychosis. To estimate the needs of the patients with a desired confidence interval of 95% and precision of 1, a sample size of 53–87 was ideal. A total sample size of 104 was estimated after accounting for the 20% refusal to complete the questionnaires.<sup>23</sup>

## Measures

### Sociodemographic factors

Age, gender, ethnicity, marital status, income, employment and education were captured through self-report.

### Clinical variables

Treatment adherence (medication adherence: non-adherent (0%–49%); partial (50%–74%); adherent (above 75%)), scores for Positive and Negative Syndrome Scale (PANSS), treatment duration (first visit to date of interview) were captured from the clinical database of EPIP while the number of hospital admissions (in the past 12 months, “have you been admitted to the hospital for mental health issues?”) and psychiatric medications (past 12 months) were captured through self-report. Depressive symptoms were captured using Patient Health Questionnaire –9,<sup>24</sup> a well-validated scale. The scores were grouped as none to minimal (0–4), mild (5–9), moderate (10–14) and

moderately severe to severe (15–19). Anxiety was measured using the Generalised Anxiety Disorder scale<sup>25</sup> and regrouped as minimal (0–4), mild to moderate (5–14) and severe (above 15). Obsessive-Compulsive Inventory-Revised was used for obsessive-compulsive disorder. This 18-item scale has a cut-off score of 21 to identify 66% of cases and a score of 5 identified 99.5% of OCD cases.<sup>26</sup>

### Telehealth questionnaire

The acceptance of telemedicine was captured using the question ‘Would you seek treatment delivered through telemedicine for your mental health problem if offered?’. The responses were captured as ‘definitely would’, ‘possibly would’, ‘possibly wouldn’t’, ‘definitely wouldn’t’, or ‘not sure’. Reasons for non-acceptance were captured from those who said ‘possibly wouldn’t/definitely wouldn’t/not sure’ as open-text responses. Currently, telemedicine service is not routinely offered to patients under the EPIP. Selected patients who are stable, as assessed by the psychiatrist are offered telemedicine. Their current experience with telemedicine was captured using the question ‘Have you used the telemedicine services in IMH?’. Those who answered ‘yes’ were asked further questions using the Telemedicine Usability Questionnaire, a validated questionnaire that is specifically created to include the latest technologies.<sup>27</sup>

### Therapeutic alliance

TA was measured using the working alliance inventory (WAI, therapist and client versions), a 36-item questionnaire that measures the participant’s and therapist’s agreement on goals and tasks in the therapy and their therapeutic bond. Each item is scored from 1 to 7 (1 = never, 2 = rarely, 3 = occasionally, 4 = sometimes, 5 = often, 6 = very often and 7 = always), to give a maximum score of 252. The scale has adequate reliability and validity.<sup>28</sup> In the present study, the modified three-factor model of the WAI-C with 32 items was adopted for the

purpose of the analysis given that it has proven to be suitable for measuring TA between the CP and service user from the latter's perspective (for more details, refer to Chua and colleagues).<sup>29</sup>

### Analysis

Analyses were performed using SPSS 25.0 and SPSS PROCESS macro 3.4.1 software.<sup>30</sup> PROCESS macro was used to test mediation, moderation, and the moderated mediation hypotheses. All regression coefficients were tested by the bias-corrected percentile Bootstrap method. The theoretical model was tested by estimating the 95% confidence interval (CI) for mediation and moderating effects with 5000 sampled with repetition. In the present study, model 4 in PROCESS macro was selected to test the mediating effect between the frequency of consultations and telemedicine uptake, and model 14 was selected to test the moderated mediation as depicted in the conceptual diagram shown in Figure 1. The covariates included in both models were age, gender, employment, experience with telemedicine services at IMH, and clinical variables. All variables were standardised prior to formal data processing.

## Results

### Sociodemographic characteristics

The mean and median age of the participants were 27.1 ( $\pm 5.4$ ) and 27 years respectively (Table 1). The majority of the sample were males (54.1%), Chinese (65.1%), and had an education of tertiary and above (63%). Only 5.5% were married, while 94.5% were unmarried (single, separated, divorced or widowed). The majority of the participants were unemployed (students, unemployed, or housewives; 54.1%), with 45.9% being employed. The majority of participants were between 22 and 30 years of age (55.96%, Table 1), 27.52% were between 31 and 40 years, and 16.51% were 18–21 years of age. Approximately 57.8% reported an income of below S \$2000, 29.36% had an income above S\$2000, and 12.84% refused to declare their income. The demographic characteristics of the participants in our study closely resemble those of patients seeking treatment at EPIP during the recruitment year. This includes a notably higher representation of individuals aged 22–30 (43.1%), males (51.8%), Chinese ethnicity (67.5%), unmarried individuals (89.8%), and those with tertiary education or higher (45.2%). This shows that the sample is representative of the wider early psychosis patient population in Singapore, given that EPIP serves as the primary national tertiary CP and accepts referrals from both primary and other tertiary healthcare institutions.

### Clinical characteristics

The majority of patients were on medications (93.6%, Table 1), had no hospital admission for their condition in the past 12 months (54.1%), and were under treatment for more than a year (72.5%). Of the participants, 52.3% had no/minimal depression, 66.1% had minimal anxiety, and 87.2% were below the threshold for OCD. The median PANSS score was 36 while the mean scores for positive and negative symptoms were 8.7 ( $\pm 2.79$ ) and 9.7 ( $\pm 3.95$ ), respectively. The majority of patients had a diagnosis of schizophrenia spectrum (62.39%), followed by brief psychotic disorder (19.27%).

### Uptake and acceptance towards telemedicine

Nearly half of the participants endorsed that they will possibly use telemedicine services (47.7%) and 26.6% reported that they will definitely use the service. Around 13.8% reported that they definitely would not use the service compared to 11.9% who possibly would not use telemedicine. The top two reasons cited for the lack of likelihood of using telemedicine were a preference for face-to-face sessions and concerns over the credibility and quality of the service. The actual uptake of telemedicine was low with only 11% of the participants endorsing the use of the service before.

### Preliminary analyses

The means, standard deviations, and correlation matrix for all variables are displayed in the Supplemental file Table 1. The frequency of consultation was positively correlated with TA and level of education. Level of education was positively correlated with both telemedicine uptake and TA. The frequency of consultation and TA were positively correlated to telemedicine uptake.

### Mediation analysis

Model 4 in PROCESS macro developed by Hayes<sup>30</sup> was adopted to test the mediating effect of TA on the frequency of consultations and telemedicine uptake. The bias-corrected percentile Bootstrap test was used to extract 5000 repetitions to calculate the 95% CI. Table 2 and Table 3 presented that the frequency of consultations had a direct association on telemedicine uptake ( $\beta = 0.619$ ,  $t = 4.577$ ,  $p \leq 0.05$ ). TA had a positive association on telemedicine uptake ( $\beta = 0.449$ ,  $t = 2.498$ ,  $p \leq 0.05$ ), and frequency of consultations similarly had a positive association on telemedicine uptake ( $\beta = 0.326$ ,  $t = 1.689$ ,  $p \leq 0.05$ ). The frequency of consultations had a positive association with TA ( $\beta = 0.064$ ,  $t = 2.632$ ,  $p \leq 0.05$ ). Both the upper and lower limits of the Bootstrap 95% CI for the direct effects of frequency of

**Table 1.** Sociodemographic and clinical characteristics of the sample.

Variables	<i>n</i>	%
<i>Age</i>		
Mean (SD)	27.13 ( $\pm$ 5.40)	
Median	27.00	
<i>Age groups</i>		
18–21	18	16.51
22–30	61	55.96
31–40	30	27.52
<i>Gender</i>		
Male	59	54.13
Female	50	45.87
<i>Ethnicity</i>		
Chinese	71	65.14
Malay	23	21.1
Indian	8	7.34
Others	7	6.42
<i>Education</i>		
Secondary or below (Primary, Secondary, Pre-U/Junior College, Vocational Institute/ITE)	40	37.04
Tertiary or above (Diploma, Degree, professional certification, and above)	68	62.96
<i>Marital status</i>		
Married/cohabiting	6	5.50
Others (unmarried, separated, widowed, divorced)	103	94.50
<i>Employment</i>		
Employed	50	45.90
Others (economically inactive, unemployed)	59	54.10
<i>Monthly income</i>		
Below 2000	63	57.80
2000 and above	32	29.36

(continued)

Table 1. Continued.

Variables	<i>n</i>	%
Do not know or I don't wish to answer	14	12.84
<i>Hospital admission (12 months)</i>		
Yes	49	44.95
No	59	54.13
Missing	1	0.92
<i>Psychiatric medication (12 months)</i>		
Yes	102	93.58
No	7	6.42
<i>Diagnosis</i>		
Schizophrenia spectrum (Schizophrenia, Schizophreniform and schizoaffective)	68	62.39
Brief psychotic disorder	21	19.27
Psychosis (not otherwise specified)	10	9.17
Bipolar (with or without psychotic features)	4	3.67
Delusional disorder	3	2.75
Missing	3	2.75
<i>Positive and Negative Syndrome Scale (PANSS) score</i>		
PANSS positive (Mean (SD))	8.70 (2.79)	
PANSS negative (Mean (SD))	9.74 (3.95)	
PANSS total (Median)	36.00	
<i>Treatment duration</i>		
Less than 1 year	29	26.61
More than 1 year	79	72.48
Missing	1	0.92
<i>Depression</i>		
None or minimal	57	52.29
Mild	26	23.85
Moderate	13	11.93

(continued)

**Table 1.** Continued.

Variables	<i>n</i>	%
Moderately severe	10	9.17
Severe	3	2.75
<i>Anxiety</i>		
Minimal	72	66.06
Mild	18	16.51
Moderate	11	10.09
Severe	8	7.34
<i>OCD</i>		
Below clinical threshold	95	87.16
Above clinical threshold	14	12.84
<i>Treatment adherence</i>		
Adherent	54	49.50
Not or partial adherent	18	16.50
Not on medicine or unknown <sup>a</sup>	37	33.50

<sup>a</sup>Patients who are in treatment for less than a year.

**Table 2.** Mediating model test of TA of patients with schizophrenia spectrum and other psychotic disorders.

Regression equation	Goodness of fit	Coefficient significance			
Effect <sup>‡</sup> , outcome variable(s)	Process	<i>R</i> <sup>2</sup>	<i>F</i> value	<i>β</i> value	<i>t</i> value
Likelihood of telemedicine uptake	Frequency of consultations	0.1311	12.983*	0.619	4.577*
Therapeutic alliance	Frequency of consultations	0.2125	4.292*	0.064	2.632*
Likelihood of telemedicine uptake	Frequency of consultations	0.2011	3.556*	0.326	1.689*
	Therapeutic alliance			0.449	2.498*

Note: Standardised variables were substituted into the regression equation.

<sup>‡</sup>Adjusted for age, gender, employment, experience with telemedicine services at IMH and clinical variables.

\**p* < 0.05.

consultations on telemedicine uptake and the mediating effect of TA did not include 0 (Table 4), indicating that TA played a partial mediating effect. Accordingly, the direct effect (0.326) and the intermediate effect (0.293) accounted for 53% and 47% of the total effect (0.619), respectively.

### Moderated mediation effect analysis

Moderated mediation effect analysis was performed using model 14 in PROCESS macro.<sup>30</sup> The bias-corrected percentile Bootstrap test was used to extract 5000 times to calculate the 95% CI. After the level of education was included

in the model, the entire model was statistically significant ( $F=48.522$ ,  $p<0.05$ , Table 4), and the effect of the interaction term of TA and level of education on the likelihood of telemedicine uptake were statistically significant ( $\beta = -0.058$ ,  $t = -3.573$ ,  $p \leq 0.05$ ). This result indicated that the level of education regulated the relationship between TA and the likelihood of telemedicine uptake. Next, to present the interaction effect more clearly, Figure 2 provides a graphical depiction of the level of education's moderating the relationship between TA and the likelihood of telemedicine uptake. Further, to probe the interaction effect, results demonstrated that the conditional effects of both individuals with attained education level of secondary or below ( $\beta = 0.53$ , 95% CI: 0.42–0.97  $p < 0.05$ ) and tertiary or above ( $\beta = 0.20$ , 95% CI 0.13–0.48,  $p < 0.05$ ) were significant. The results demonstrated that for individuals with attained education level of secondary or below, stronger TA was linked to a greater likelihood of telemedicine uptake. Comparably, the link between TA and the likelihood of telemedicine uptake was slightly weaker for individuals with attained education level of tertiary or above. As depicted in Figure 2, the lower level of educational attainment, the more obvious the trend (larger the slope).

**Table 3.** Total effect (1), direct effect (2), and mediation effect (3).

Items	Effect size	SE	95% CI	Relative effect value
1	0.619	0.021	(0.126, 0.830)	
2	0.326	0.018	(0.042, 0.637)	53%
3	0.293	0.014	(0.074, 0.532)	47%

Note: Standardised variables were substituted into the regression equation. SE, standard error; 95% CI, 95% confidence interval.

**Table 4.** Mediating effect analysis with moderation.

Regression equation	Goodness of fit	Coefficient significance			
		$R^2$	F value	$\beta$ value	t value
Effect <sup>§</sup> , outcome variable(s)	Variables				
Likelihood of telemedicine uptake		0.236	48.522*		
	Frequency of consultations			0.579	6.772*
	Therapeutic alliance			0.448	4.993*
	Level of education			0.147	8.612*
	Therapeutic alliance $\times$ Level of education			-0.058	-3.573*

Note: Standardised variables were substituted into the regression equation.

<sup>§</sup>Adjusted for age, gender, employment, experience with telemedicine services at IMH and clinical variables.

\* $p < 0.05$ .

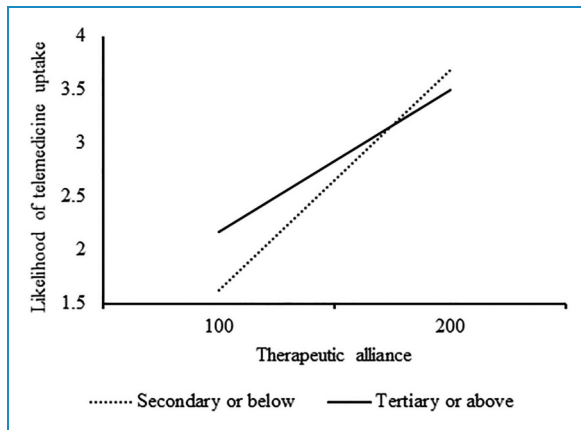
## Discussion

The current study recruited patients from the EPIP, which facilitates early detection and management of psychosis among those aged 12–40 years. The majority of patients included in the study (72.48%) had been receiving treatment for over a year. A minimal PANSS score was noted among the study population, with a median of 36 and mean scores of 8.7 and 9.7 for positive and negative symptoms, respectively. These low scores could be attributed to symptom remission during treatment, as demonstrated previously.<sup>31</sup> Moreover, the patients in the EPIP included those with affective psychosis who tend to recover faster.<sup>32</sup> Additionally, the patient in the programme has a low prevalence of comorbid substance use disorders,<sup>33</sup> which may have resulted in the low PANSS scores.

While several studies have been conducted to look at the uptake of telemedicine across various countries, to the best of our knowledge, no studies have examined the mediating and moderating factors associated with the uptake of telemedicine for mental healthcare (or TP). The majority of the sample were willing to consider the use of telemedicine for their mental healthcare (possibly use: 47.7%; definitely use: 26.6%) while only 11% of the sample had used the services before showing a very low uptake. Participants preferred face-to-face services or were concerned about the credibility/quality of the telemedicine. We also noted that the TA and frequency of consultation had a positive association on the uptake with the former showing a partial mediating effect on the uptake. The level of education of the participants moderated the relationship between TA and the uptake of telemedicine.

The unprecedented challenges during the COVID-19 pandemic created substantial psychological stress for the patients as well as the healthcare community who resorted to telemedicine services to ensure uninterrupted care for their patients. The pandemic has also resulted in the worsening





**Figure 2.** Moderating effect of the highest level of education on frequency of consultations – likelihood of telemedicine uptake.

of the mental health of the population<sup>34</sup> triggering the implementation of telemedicine services by CPs. Nonetheless, the uptake remained low in our study. A study conducted in Australia during the active pandemic phase among those with mental illness (MI) showed that in-person consultation dropped by 50% while uptake of telemedicine increased from March to May 2020, the active pandemic phase before declining in June.<sup>35</sup> The uptake varied across age groups with higher uptake among those below 45 years and lower uptake noted among those from the northern territory.<sup>35</sup> Zhu et al.<sup>36</sup> noted similar results where they observed that those with a diagnosis of schizophrenia had lower uptake of telemedicine services, which is in agreement with our results. The reasons for this observation are potential challenges they encounter with the services which include, patient-specific factors (not having a device or technical skills, low income, living alone, cognitive impairments, old age)<sup>36</sup> or organisational-level factors (lack of proper training or guidance, lack of sufficient resources, clinicians related factors).<sup>37</sup> The services provided by EPIP before the pandemic were mostly face-to-face with patients unlikely to have prior exposure to telemedicine which together with the inherent tendency of the specific diagnostic group to opt for face-to-face consultation<sup>36</sup> could explain the lower uptake observed in our case.

We have noted an association between TA and the uptake of telemedicine, and between the frequency of consultation and the uptake of telemedicine, with TA mediating the relationship between the frequency of consultation and the uptake. Previous studies have shown that TA is a decisive factor in the acceptance of telemedicine services.<sup>38,39</sup> There is an ongoing debate regarding the efficacy of telemedicine compared to face-to-face sessions with assumptions that TA is lower in the former mode.<sup>15</sup> However, recent evidence showed that telemedicine indeed builds rapport compared to face-to-face sessions and this is dependent on various factors such as cultural, sociodemographic characteristics of the

patients, clinician-specific (viz. attitude, proficiency with technology) and technology-related characteristics.<sup>40–42</sup> We have shown here that the frequency of consultation is also related to the uptake of telemedicine with TA mediating the relationship. There is limited research surrounding the frequency of consultation and TA. The preliminary evidence was suggestive that under various conditions the number of consultations could be related to TA which corroborates our finding.<sup>43</sup> A higher number of consultations or regular visits could improve the trust in the healthcare team that could facilitate higher uptake of telemedicine sessions. Likewise, a higher number of consultations could give more opportunities for both patients and clinicians to get to know patients' needs well and set therapeutic goals that are acceptable to both. In the absence of regular sessions, communication breaks down between the patient and the clinicians, leading to misunderstandings and adverse treatment outcomes.<sup>44</sup> Thus, regular visits could promote TA and allow the patients to overcome their trepidations regarding the lack of rapport, confidentiality and credibility of telemedicine and increase the uptake of telemedicine.

We have also noted that the level of education was associated with the uptake of telemedicine, and it moderated the relationship between TA and uptake of telemedicine. This is in agreement with previous reports that showed that higher education is related to higher uptake and acceptance of telemedicine.<sup>45,46</sup> Those with higher education have higher e-health literacy<sup>47,48</sup> Studies have shown that those with better e-health literacy frequently access health information online and leverage e-platforms for help-seeking.<sup>49,50</sup> This group connects with their healthCPs well (higher TA) and actively engage in treatment-related decisions.<sup>51</sup> Compared to patients with higher education, those with lower levels of education spent more time with clinicians for physical examination, but significantly less time for general chatting, assessments of health knowledge and health promotion.<sup>52</sup> Thus, those with lower levels of education might not have sufficient knowledge about the telemedicine platforms and their advantages which could harbour concerns over the credibility/quality of service as observed in the current study. Such concerns could negatively affect the uptake of telemedicine and the treatment outcomes.<sup>53</sup> Nonetheless, given that the higher frequency of consultation could improve the uptake, measures to improve treatment adherence should be considered. In the clinical setting, clinicians can play a role in promoting awareness towards telehealth among those with lower levels of education, since majority already have access to devices.

The participants in the study are young adults (18–40 years of age) seeking treatment for their first episode of psychosis. The younger generation has been exposed to anti-stigma campaigns since childhood and thus might have reduced self-stigma compared to older adults, which might facilitate more open communication with clinicians. Additionally, younger adults are often better educated, which facilitates access to resources that improve their mental health awareness.<sup>54</sup> Education is a significant

predictor of treatment adherence,<sup>55,56</sup> and it could act as a cornerstone for better TA. Furthermore, younger individuals with schizophrenia tend to be more technologically adept and are more inclined to utilise digital platforms for their healthcare needs, which could influence their acceptance of telemedicine.<sup>57</sup> In contrast, older adults face challenges navigating digital technology due to inexperience with the system, a lack of awareness of telemedicine, stigma, and communication difficulties.<sup>58</sup> Similarly, studies have shown that the presence of chronic medical conditions deters older adults from accepting telemedicine.<sup>59</sup> Therefore, given the telemedicine readiness among younger adults, telemedicine should be offered to this group to enhance access, adherence, and favourable treatment outcomes.

The main limitation of the study includes the cross-sectional nature of the data that is not indicative of causality. Additionally, the frequency of consultation captured in the study is not specific to the CP who answered the WAI for TA, rather, it is a sum of all consultations with the healthcare team. The study captured the uptake of telemedicine by the patients. However, not all patients are offered this service which was not captured in the questionnaire. Telemedicine is not part of the routine care protocol in EPIP and is offered to a small subset of patients. It is possible that the patients who experienced the telemedicine service (11%) could express a positive attitude towards it. Future studies should focus on the causal role of these factors in the uptake of telemedicine and a qualitative study to gather in-depth information on the low uptake would be beneficial to allocate sufficient resources for the future.

## Conclusion

While telemedicine services were acceptable to the majority of the participants with early psychosis (possibly would: 47.7%; definitely would: 26.6%), the uptake of telemedicine during the pandemic phase was very low (11%). Singapore, as a country, is moving in the direction of a digital hub for embracing the latest technologies to transform healthcare and other sectors and thus, the low uptake of telemedicine is concerning. Frequency of consultation, TA, and level of education were associated with the uptake of telemedicine with TA mediating the relationship between the frequency of consultations and the uptake. The level of education moderates the relationship between TA and the uptake. Those with lower education attending the clinics should be given attention to improve their e-health literacy. Additional steps must be implemented to improve the frequency of consultation which could foster a strong relationship/trust with the clinician that can promote the uptake of telemedicine.

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## Summary box

### What is known?

Telepsychiatry is a useful platform that offers convenient and accessible care regardless of geographical boundaries or mobility issues during emergencies and pandemics. Nonetheless, the uptake remains low among patients.

### What is new?

Therapeutic alliance mediates the relationship between the frequency of consultations and the uptake of telemedicine services with level of education moderating this mediation.

### What is the impact?

A strong therapeutic alliance between patients with lower education attainment and care providers may facilitate the uptake and acceptance of telepsychiatry as a platform to accessible care.