Preferences toward digital and non-digital mental health treatment delivery formats:
A survey of Indian college students

Akash R. Wasila*, Tanvi Malhotra^b, Nandita Tuteja**^b, Nivedita Nandakumar**^b,
Laleh Pandole^a, Robert J. DeRubeis^a, Lorenzo Lorenzo-Luaces^c, John A. Naslund^d,
& Avantika Bhatia^b

^aDepartment of Psychology, University of Pennsylvania

^bDepartment of Psychology, Ashoka University

^cDepartment of Psychological and Brain Sciences, Indiana University

^dDepartment of Global Health and Social Medicine, Harvard Medical School

*Corresponding author:

Akash Wasil

Email: wasil@sas.upenn.edu

Address: 425 S University Avenue, Philadelphia, PA, 19104

**These authors contributed equally to the manuscript and share co third-authorship.

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Abstract

Digital mental health treatments have the potential to expand access to services in low- and middle-income countries (LMICs), but the uptake of interventions has been limited. Furthermore, the attitudes of those in LMICs toward intervention formats are rarely studied. In this study, Indian college students were asked to rate a variety of treatment delivery formats on three domains: a) perceived helpfulness, b) availability, and c) willingness to try. We found that 95% of individuals were willing to try one-on-one therapy with a professional, 56% were willing to try one-on-one therapy with a lay counselor, participants were less willing to try group interventions than one-on-one interventions, and <50% were willing to try digital self-help interventions. Additionally, there was a strong association between willingness to try and ratings of helpfulness ($r=0.61$). Ratings were not associated with gender, age, or depressive symptoms. Our findings suggest that one barrier limiting the uptake of digital interventions in LMICs is that individuals do not perceive them as helpful. Efforts to disseminate information about non-traditional intervention delivery formats and their benefits are warranted.

Keywords: digital mental health; global mental health; dissemination science; implementation science; evidence-based treatments; treatment formats

Introduction

Mental health problems are leading causes of disability among young people worldwide¹. However, only a small fraction of individuals with mental health problems receive treatment². The proportion of people receiving care is often even lower in low-and middle-income countries (LMICs). As an example, in India, a recent survey suggested that there were only 1.93 mental health workers per 100,000 people, compared with 71.7 per 100,000 in high-income countries³⁻⁴. According to the Global Burden of Diseases, Injuries, and Risk Factors Study, one in seven Indians were affected by mental disorders in 2017⁵. Additionally, according to the World Health Organization World Mental Health Survey Initiative, only 5 out of 100 individuals with common mental disorders received any treatment in the year prior to the survey⁶. In addition to a lack of trained mental health professionals, common barriers to services include high costs of treatment, transportation and scheduling difficulties, as well as stigma associated with professional help-seeking⁷⁻⁸.

Traditionally, mental health interventions (i.e., treatments and prevention programs) have involved face-to-face interventions delivered in-person by trained professionals. Although several empirically supported interventions have been developed and tested using this format, it alone will not be sufficient to reach the majority of those in need². To bypass the barriers associated with individual face-to-face psychotherapy, there have been many attempts to disseminate evidence-based mental health interventions using different delivery formats. Promising delivery formats include task sharing, which relies on non-specialist providers to deliver brief evidence-based psychological treatments⁹, and digital self-help interventions¹⁰⁻¹³. Interventions delivered by non-specialists, also referred to as lay counselors, have been shown to be effective for a variety of mental health problems in LMICs^{9,14} (Barbui et al., 2020; Singla et

al., 2017). Such interventions have been shown to be effective for depression and anxiety when delivered in groups¹⁵ or one-on-one¹⁶. Alternatively, digital self-help interventions, which can be guided (i.e., involving human support or coaching) or unguided (i.e., entirely self-administered), have also been shown to be effective for managing depression and anxiety¹⁷. This includes efforts in LMICs, such as a guided online behavioral activation intervention for adults in Indonesia¹⁸ and an unguided character strength intervention for adolescents in Kenya¹⁹. Digital interventions have several advantages: they are generally cheaper to disseminate than other delivery formats, offer greater flexibility, and may confer less stigma than face-to-face services²⁰. Digital interventions have become even more important during the COVID-19 pandemic, as access to in-person care has been limited. As a result, it is not only important but also especially timely to study attitudes toward digital mental health treatment formats.

Although there has been considerable research on the effectiveness of digital mental health interventions, relatively little is known about consumers' attitudes towards these interventions. In order for these types of interventions to make a meaningful public health impact, they will not only need to be effective but also attract interest from consumers and appeal to people in diverse cultural contexts. However, existing digital interventions, especially those developed by academic researchers, often struggle to attract and retain users²¹⁻²². Another challenge is that digital mental health interventions are generally designed for individuals in western countries and adapted based on their feedback²³. As a result, there is a need to understand the preferences and attitudes of individuals in understudied non-western cultures. Previous research on this topic has often involved the administration of surveys designed to understand participants' preferences toward various kinds of treatments. Such studies have shown that individuals in Europe, Australia, and North America generally prefer face-to-face

interventions over digital interventions and prefer guided digital interventions over unguided interventions²⁴⁻²⁶. This research, while valuable, has several limitations. First, previous research has focused on samples in high-income countries. Given the growing interest of developing and testing digital interventions for young people in low-and middle-income countries²⁷⁻²⁸, there is a strong need to understand the attitude and preferences of people in LMICs toward digital interventions. Second, previous research has generally only compared digital interventions to one-on-one professional therapy, though this is only of the many treatment delivery formats available (other examples include interventions delivered by lay counselors, interventions delivered in groups, bibliotherapy). Additionally, comparing digital interventions to one-on-one professional therapy may have limited utility in contexts where one-on-one therapy is not sufficient to meet the mental health need². Instead, it may be especially important to compare digital interventions to other highly scalable mental health treatment options (e.g., interventions delivered by lay counselors). Third, previous research has generally asked participants which intervention options they “prefer.” Although gauging preferences is important, it may also be useful to examine attitudes on specific domains. As an example, it would be useful to know how *helpful* participants find certain intervention formats, how *available* these options are, and the extent to which they would be *willing to try* different types of interventions. Obtaining such information could inform efforts to improve the dissemination of digital interventions, including the development of marketing and awareness campaigns²⁹ and efforts to improve the cultural appropriateness of interventions for specific groups²⁷⁻²⁸.

We examined attitudes toward different treatment formats among college students in India, a lower-middle income country where access to treatment is especially limited. Previous research has shown that college students around the world are vulnerable to developing mental

health problems. For example, in a study of over 150,000 college students from 196 campuses, 25% of students screened positive for depression, yet only half accessed any form of treatment in the past year³⁰. Even in high-income countries, college students often fear stigma associated with traditional mental health services. For example, previous research has shown that college students fear being perceived as “crazy” or “messed up in the head” for seeking out mental health interventions³¹⁻³². Furthermore, college counseling centers often have long wait times that deter some students from seeking help³³. Given the high rate of mental health problems among college students and the barriers associated with traditional services, digital intervention formats may be especially helpful. Thus, we reasoned that it would be useful to understand how college students in India perceive digital interventions, and how they rate digital interventions relative to other intervention formats.

In this study, we surveyed students at a private liberal arts university in Sonipat, Haryana, India. We asked each participant to rate a variety of intervention formats on three criteria: a) perceived helpfulness, b) availability, and c) willingness to use. As a secondary objective, we examined if responses varied based on participants’ self-reported depressive symptoms.

Method

Recruitment

We recruited participants from a private liberal arts university in Sonipat, Haryana, India. Study procedures were approved by the Institutional Review Board of the institution. The university’s pedagogy is rooted in a liberal arts education, much like institutions in Western countries that give students the liberty to design their own undergraduate program in order to aid the discovery of their interests and passions. Students come from all over India and also from various countries across the world like Bangladesh, Kenya, Ethiopia, Bhutan, Nepal, UAE,

Afghanistan, and Kuwait. English is the primary language of instruction, and all study materials were presented in English.

Data were collected in the month of April, 2020. On April 6, a recruitment email was sent out to all undergraduate students using official student email lists. This recruitment method was used to increase the likelihood of obtaining a representative sample of students, as students from across all four years of the undergraduate program received the invitation to participate. The email included a short description about the study and a link that directed them to the Qualtrics survey. We also posted a recruitment message on the undergraduate student Facebook group. Students participated in this study and took the survey in the midst of the COVID-19 pandemic. The survey was released shortly after the university transitioned to online learning. As a result, students completed the survey in their own homes, rather than on campus. All participants provided written informed consent.

Procedure

Upon opening the Qualtrics link, participants were directed to a screen with information about the study's purpose and a consent form. After filling out the consent form, participants completed a brief validated measure of depressive symptoms. Then, participants read descriptions of seven distinct treatment formats: one-on-one therapy from a professional, group therapy from a professional, one-on-one therapy from a lay counselor, group therapy from a lay counselor, bibliotherapy, guided digital self-help, and unguided digital self-help (see Supplement 1 for details). We constructed this list of delivery formats based on up to date reviews^{9, 34-35} of the delivery of evidence-based psychotherapies. Such reviews typically differentiate between individual treatment, group treatment, guided self-help, and unguided self-help. Self-help broadly refers to materials that generally include a book or internet application. Thus, we

distinguished between bibliotherapy and guided or unguided use of an internet application. Finally, we included lay counselor interventions, as these interventions have shown promise as scalable and effective mental health treatments in LMICs¹⁵ including India¹⁶. Thus, taken together, we considered seven delivery formats (see Supplement 1 for details).

Participants rated each intervention format on three dimensions: perceived helpfulness, availability, and willingness to try (see Measures section). To reduce the bias introduced by ordering effects, the treatment formats were presented to each participant in a random order. After this, the participants were presented with a demographic questionnaire. Upon successful completion of the survey, participants were given an Amazon Gift card worth Rs. 250 (approximately \$3.30 USD) as compensation for their participation. Students from introductory psychology classes received course credit along the gift card as a reward for their participation.

Measures

Depressive Symptoms

The Patient Health Questionnaire-9 (PHQ-9) is a measure of depressive symptoms. In prior research, the PHQ-9 has demonstrated adequate reliability (Cronbach's alpha of .86-.89) and validity³⁶, and it has been used in studies of young adults in India³⁷⁻³⁸. The PHQ-9 queries nine symptoms of major depression, with example items including "little interest or pleasure in doing things" and "thoughts that you would be better off dead, or of hurting yourself." Participants are asked to rate the frequency of each item over the past two weeks. Items are scored from 0 ("Not at all") to 3 ("Nearly every day"), and total scores range from 0 to 27. In our sample, the PHQ-9 demonstrated adequate reliability (Cronbach's alpha = 0.85).

Treatment Format Questions

For each treatment format, participants provided three ratings: perceived helpfulness (“I believe this option could be helpful for students looking to improve their mental health or well-being”), availability (“I believe this option is available and accessible for students looking to improve their mental health or well-being”), and willingness to try (“If I were seeking support for my mental health or well-being, I would be willing to try this option”). Each of the three items was rated on a seven-point likert scale from 1 (“Strongly disagree”) to 7 (“Strongly agree”).

Analyses

All analyses were conducted using the R programming language. We performed hierarchical linear models to analyze our responses, which were nested within individuals (i.e., each individual responded to multiple treatments). For each of the three dependent variables (i.e., perceived helpfulness, availability, and willingness to try), we conducted a model with delivery format as the independent variable, gender, age, and depressive symptoms as covariates, and a random intercept for each participant. To examine associations between the three variables of interest, we calculated pairwise Pearson correlations.

We also report the percentage of participants who positively endorsed each question for each dependent variable (e.g., that they believe the treatment would be helpful for helpfulness, that they believe the treatment would be available for availability, etc). Endorsement was operationally defined as a positive response of 5 (“somewhat agree”), 6 (“agree”), or 7 (“strongly agree”).

Results

Sample Characteristics

See Table 1 for sample characteristics. The final sample consisted of 141 students between the ages of 18-23 ($M_{\text{age}} = 19.47$, $SD_{\text{age}}=1.21$, 65% female). On average, participants reported high levels of depressive symptoms on the PHQ-9, though there was substantial variability in scores ($Mean=11.32$, $SD = 6.00$, $Range = 0-26$).

Table 1
Sample Demographics

	<i>M (SD) or N (%)</i>
<i>N</i> (completers)	141 (100%)
PHQ-9	11.32 (5.99)
Age	19.47 (1.21)
Sex	
Female	91 (64.54%)
Male	48 (34.04%)
Do not wish to answer	2 (1.42%)
Sexual Orientation	
Heterosexual	98 (69.50%)
Bisexual	12 (8.51%)
Bisromantic	2 (1.42%)
Pansexual	2 (1.42%)
Demisexual	1 (0.70%)
Queer	11 (7.80%)
Rather not say	5 (3.55%)
Missing	10 (7.09%)
Nationality	
Indian	132 (93.62%)
American	5 (3.55%)
Senagalese	1 (0.71%)
British	1 (0.71%)
Bangaldeshi	1 (0.71%)
Missing	1 (0.71%)
Income (Annual)	
Below INR 10,000	3 (2.13%)
INR 10,000- INR 100,000	47 (33.33%)
INR 1,00,000- INR 1,000,000	13 (9.22%)
Above INR 1,000,000	76 (53.90%)
Missing	2 (1.42%)
Previously Diagnosed w/ Psychological Illness	
Yes	31 (21.98%)
No	97 (68.79%)
Rather not say	13 (9.22%)
Previously Experienced Psychological Illness	

Yes	85 (60.28%)
No	40 (28.37%)
Rather not say	16 (11.35%)
Currently Diagnosed	
Yes	21 (14.89%)
No	107 (75.89%)
Rather not say	13 (9.22%)
Taking Medication	
Yes	12 (8.51%)
No	83 (58.86%)
Rather not say	8 (5.67%)
Missing	38 (26.95%)
Receiving Therapy/Treatment	
Yes	29 (20.57%)
No	102 (72.34%)
Rather not say	10 (7.09%)

Correlation Between Helpfulness, Availability, and Willingness to Try

Table 2 shows correlations between participants' ratings of helpfulness, availability, and willingness to try. As shown, there was a strong association between helpfulness and willingness to try, but no evidence of an association between availability and either of the other variables.

Table 2
Means, standard deviations, and correlations with confidence intervals

Variable	<i>M</i>	<i>SD</i>	1	2
1. Helpfulness	4.74	1.63		
2. Availability	4.48	1.69	.05 [-.02, .11]	
3. Willingness to Try	4.31	1.98	.61** [.57, .64]	.05 [-.01, .11]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence

interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Perceived Helpfulness

Participants were asked to rate the perceived helpfulness of each treatment format. One-on-one therapy with a professional was rated as the most helpful (Figure 1). Compared to one-on-one therapy with a professional, each other treatment format received significantly lower helpfulness ratings: group therapy with a professional ($d = -1.01$), one-on-one therapy with a lay counselor ($d = -1.43$), guided self-help apps ($d = -1.73$), group therapy with a lay counselor ($d = -1.96$), bibliotherapy ($d = -2.03$), and unguided self-help apps ($d = -2.23$).

Table 3 shows the results of the hierarchical linear models. As shown in Table 3, there was no evidence for an effect of gender or depressive symptoms on ratings of helpfulness. Older students provided slightly lower ratings of helpfulness, although this relationship was not statistically significant (Table 3).

One-on-one therapy with a professional was most commonly endorsed (i.e., received a score >4) as helpful (96% of participants endorsed), followed by group therapy with a professional (79%), one-on-therapy with a lay counselor (71%), guided digital self-help programs (57%), group therapy with a lay counselor (54%), and unguided digital self-help programs (47%).

Figure 1

Attitudes of Indian College Students toward Mental Health Treatment Delivery Formats

Figure 1 shows the ratings of perceived helpfulness, availability, and willingness to try for each treatment format. Estimates were derived from the hierarchical linear models. Error bars represent ± 1 standard error.

Table 3
Results of mixed linear models

<i>Predictors</i>	Perceived Helpfulness			Availability			Willingness to Try		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
(Intercept)	6.52	0.13	<0.001***	4.39	0.15	<0.001***	6.39	0.16	<0.001**
Group Therapy	-1.09	0.15	<0.001***	-0.73	0.18	<0.001***	-1.78	0.20	<0.001**
Lay Counselor_one-on-one	-1.67	0.15	<0.001***	0.19	0.18	0.28	-2.03	0.20	<0.001**
Lay Counselor_group	-2.20	0.15	<0.001***	-0.29	0.18	0.10	-2.94	0.20	<0.001**
App_Guided	-2.01	0.15	<0.001***	0.47	0.18	0.007**	-2.38	0.20	<0.001**
App_Unguided	-2.74	0.13	<0.001***	0.61	0.18	<0.001***	-2.79	0.20	<0.001**
Bibliotherapy	-2.33	0.15	<0.001***	0.70	0.18	<0.001***	-2.68	0.20	<0.001**
Depressive symptoms	-0.01	0.01	0.56	-0.02	0.01	0.13	-0.01	0.01	0.59
Gender_Male	-0.15	0.14	0.29	-0.05	0.17	0.75	0.03	0.17	0.84
Age	-0.10	0.05	0.053	-0.13	0.06	0.047*	-0.06	0.06	0.37

Note. All treatment formats are contrasted against one-on-one therapy with a professional. Beta values represent differences compared to one-on-

one therapy with a professional. * $p < .05$; ** $p < .01$; *** $p < 0.001$

Availability

Participants were asked to rate the availability and accessibility of each treatment format. Bibliotherapy was rated as the most available, followed by unguided self-help apps and guided self-help apps (Figure 1). Compared to one-on-one therapy with a professional, group therapy with a professional rated as significantly less available ($d = -0.43$), whereas three formats were rated as significantly more available: guided self-help apps ($d = 0.29$), unguided self-help apps ($d = 0.36$), and bibliotherapy ($d = 0.42$). As shown in Table 3, there was no evidence for an effect of gender or depressive symptoms on ratings of helpfulness. Older students provided slightly lower ratings of availability (Table 3).

Bibliotherapy with a professional was most commonly endorsed as available (72% of participants endorsed), followed by unguided digital self-help (68%), guided self-help (61%), one-on-one therapy with a lay counselor (57%), group therapy with a lay counselor (48%), one-on-one therapy with a professional (47%), and group therapy with a professional (30%).

Willingness to Try

Participants were asked to rate how willing they would be to try each treatment format if they were seeking support for their mental health or well-being. One-on-one therapy with a professional received the highest willingness to try rating (Figure 1). One-on-one therapy with a professional received the highest rating, with each other modality receiving substantially lower scores: group therapy with a professional ($d = -1.29$), one-on-one therapy with a lay counselor ($d = -1.51$), guided self-help apps ($d = -1.72$), bibliotherapy ($d = -1.86$), unguided self-help apps ($d = -1.96$), and group therapy with a lay counselor ($d = -2.18$). As shown in Table 3, there was no evidence of an effect of gender, age, or depressive symptoms on ratings of willing to try the treatment formats.

One-on-one therapy with a professional was more commonly endorsed (95%), followed by group therapy with a professional (60%), one-on-one therapy with a lay counselor (56%), guided digital self-help (48%), bibliotherapy (38%), unguided digital self-help (35%), and group therapy with a lay counselor (32%).

Discussion

We administered a survey to assess the attitudes of Indian college students toward digital and non-digital mental health treatment formats. Our results suggest that participants perceived differences in helpfulness according to the presence of a specialist (vs. a lay counselor), as well as individualized attention (vs. group therapy), and the presence of human support (vs. the use of self-help materials). One-on-one psychotherapy was seen as the most helpful treatment format. Although one-on-one therapy has the most evidence and the longest history, recent meta-analytic results have shown relatively similar outcomes for individual, group, and guided self-help either via bibliotherapy or internet-based options³⁴. Importantly, we also observed a strong association between helpfulness and willingness to try, which may suggest more willingness to try alternative delivery formats if individuals had more information on the efficacy of group therapy and guided self-help options.

Only 48% of participants indicated that they would be willing to try guided digital interventions to improve their well-being, and only 35% indicated that they would be willing to try unguided self-help. These digital treatments were rated less favorably than therapy with a professional or with a lay counselor. These findings illustrate a potential mechanism that explains the limited uptake of digital mental health interventions in real-world settings^{22,39}. Specifically, participants who do not perceive digital interventions as useful may be unlikely to try them. Consequently, one strategy to potentially improve the uptake of digital interventions

would involve spreading awareness about the efficacy of these kinds of interventions. Numerous systematic reviews and meta-analyses have shown that digital mental health interventions can be effective for common mental health problems^{35,40-44}, and publicly available digital interventions often include evidence-based content^{13, 45}. Raising awareness about this research could be one important way to improve consumers' attitudes toward digital interventions and increase their uptake. Such efforts could be informed by research on direct-to-consumer marketing of mental health interventions²⁹. Future research could investigate which kinds of interventions are most effective at changing participants' attitudes toward digital mental health interventions, particularly their perceptions about the utility and helpfulness of these interventions. Of course, such efforts should not overstate the benefits of digital products⁴⁶⁻⁴⁷, especially commercial products that may have limited peer-reviewed evidence⁴⁸. At the same time, the fact that the majority of our sample was unwilling to try *any* digital self-help intervention suggests that people may underestimate the potential benefit of digital interventions as a whole. Thus, psychoeducational campaigns about digital mental health interventions-- which summarize existing evidence accurately and transparently-- may be useful in improving consumer attitudes toward digital mental health interventions.

Similar strategies could also be applied to promote awareness about group interventions and lay counselor interventions. Global mental health research has shown that interventions can be successfully and effectively delivered by non-specialist lay counselors⁹. Furthermore, several studies have shown that interventions delivered by lay counselors can be effective in one-on-one formats¹⁶ and group formats⁴⁹. In our sample, about 70% of participants perceived one-on-one lay counselor interventions as helpful. However, only 56% of participants indicated that they would be willing to try one-on-one treatment with a lay counselor, and 32% indicated

that they would be willing to try group treatment with a lay counselor. Finally, our findings suggest that digital treatments and bibliotherapy are considered most widely available. Raising awareness about the efficacy of these “non-traditional” interventions may be important, especially in settings where access to mental health care is low.

Our findings should be interpreted in light of certain limitations. First, our sample consists of Indian college students at a private university. Further research is needed to determine if these findings replicate among young adults in other universities as well as those who do not attend university. Second, we focused on a general sample of students. In some ways, this is a strength, because it allows us to generalize our findings to the student body as a whole. However, future research could focus specifically on young adults in clinical settings and treatment-seeking samples. Third, we did not measure participants’ experiences with specific forms of mental health treatment. It may be interesting to examine how participants’ experiences with certain treatment formats affects their attitudes. As an example, individuals with experience using digital interventions may view these interventions more favorably-- or less favorably-- than those who do not.

Our findings and our methodology offer several avenues for future research. For instance, our findings could be replicated in other populations (e.g., young adults who do not attend college, college students in the United States, adolescents in low-and middle-income countries). Such a body of research could influence efforts to personalize treatments based on individuals’ characteristics and preferences⁵⁰. Additionally, interventions that are designed to improve mental health literacy could be useful. In addition to general education about evidence-based treatments, we recommend that such interventions include research on “non-traditional” treatment formats-- especially those that are widely available, and that hold potential for being scaled up in settings

with limited access to evidence-based mental health services. For example, such interventions could include information about the efficacy of digital interventions, group interventions, and interventions delivered by lay counselors. Such research could also involve testing various different strategies (e.g., psychoeducation, patient testimonials, interactive activities) and measuring how each strategy changes perceptions of mental health treatments and participants' willingness to try different kinds of treatments. Finally, our methodology could be applied to understand attitudes toward different intervention packages (e.g., cognitive-behavioral therapy, interpersonal therapy, acceptance and commitment therapy) or specific treatment elements (e.g., behavioral activation, mindfulness, sleep wellness).

Ultimately, we believe it will be essential to understand the preferences of individuals toward different kinds of treatments. The past several decades of research on mental health interventions has afforded us a great deal of knowledge about evidence-based interventions. More recently, scholars have discovered ways to disseminate these interventions in less costly and more accessible ways. However, in order to reduce the mental health treatment gap, we will not only need to make treatments more accessible but also improve demand for mental health services. Toward this goal, it will be important to understand consumers' preferences towards different kinds of interventions, prioritizing the dissemination of those that people are willing to engage. Such a body of research will be especially important in low- and middle-income countries, where the burden of mental health problems is greatest and access to treatments is most limited.

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