Lessons learned through piloting a community-based SMS referral system for common mental health disorders used by female community health volunteers in rural Nepal

Anvita Bhardwaj
Johns Hopkins University Bloomberg School of Public Health

Prasansa Subba (limbu.prasansa@gmail.com)
https://orcid.org/0000-0002-6930-7575

Sauharda Rai
Duke Global Health Institute

Chaya Bhat
Duke Global Health Institute

Renasha Ghimire
HealthNet TPO

Mark Jordans
King's College London

Eric Green
Duke Global Health Institute

Lavanya Vasudevan
Duke Global Health Institute

Brandon Kohrt
George Washington University

Research note

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Abstract

Objectives: The Community Informant Detection Tool (CIDT) is a paper-based proactive case detection strategy with evidence for improving help-seeking behavior by patients for mental health disorders. Key implementation barriers for the paper-based CIDT include delayed reporting of cases and lack of active follow up. We used mobile phones and structured short message system to improve timeliness of case reporting, follow up and case record keeping. Thirty-six lay health workers piloted this mobile CIDT (mCIDT) for three months in 2017 in rural Nepal.

Results: Eight cases were identified by lay health workers using mCIDT, but only two of these cases engaged with health services post-referral. Accuracy with the mCIDT was considerably lower compared to the paper-based CIDT. Higher education levels of lay health workers was associated with greater mCIDT accuracy. Qualitative findings revealed new implementation challenges among cases not following through on referrals due to perceived lack of staff at health facilities, assumptions among lay health workers that all earthquake-related mental health needs had been met, and lack of financial incentives for use of mCIDT. Based on study findings, we present recommendations for introducing a new technology in low resource health systems.

Introduction

Mobile health (mHealth) has prospects in improving health care quality for mental health in low- and middle-income countries, (LMICs) through increasing awareness and improving access to care [1–4]. The Community Informant Detection Tool (CIDT) was developed by Transcultural Psychosocial Organization Nepal (TPO Nepal), under the Programme for Improving Mental Health Care (PRIME) [5, 6] to facilitate detection of, and help-seeking for, mental health disorders (MHDs) at the community level. The validated tool is a paper-based form consisting of vignettes of common symptoms in local idioms and pictures used by lay health workers [7] [8]. The CIDT works by training the female community health volunteers (FCHVs) in the community to detect people in the community that match the vignettes and encourage them to seek care from facility-based health workers (HW) who are trained in delivering mental health services.

The communication gap between FCHVs and HW was observed as a limitation for implementing CIDT along with poorly maintained outpatient logs of CIDT referrals [7]. With technical assistance from Medic Mobile, two mHealth experts and four global mental health professionals, we designed a Short Messaging Service (SMS) referral system to complement the paper-based CIDT. This aimed to reduce the communication gap between the FCHVs and HWs at the health post, digitize the referral process and maintain online documentation. Our goals were to increase the rate of help-seeking, the number of people initiating care after referral, and facilitating active follow-up from FCHVs.

Methods

Setting

In Nepal, 2015 was marked by a 7.8 magnitude earthquake that claimed nearly 9,000 lives [9, 10]. Four Village Development Committees (VDC) in Sindhuli, an earthquake affected region, were selected as the study sites.

Development of mCIDT

Due to the widespread use of non-smartphone mobile phones, an SMS approach was selected for digitizing CIDT. An iterative process was used to develop and finalize the workflow for the SMS system. In the first phase of development, weekly discussions were held with the research team. The primary goals of the study were identified as increasing the number and timeliness of referrals for cases identified in the community. Digitization of the referral component of the CIDT was selected as the high value target to achieve this and a preliminary workflow was drafted. During the second phase, the preliminary workflow was shared with partners at Medic Mobile, who specialize in the use of structured SMS and their feedbacks were received. The TPO Nepal team conducted a brief usability assessment to evaluate the use of the structured SMS with end users (i.e. FCHVs). The workflow was finalized based on phase two activities and is shown in **Figure 1**. Because we only digitized the referral mechanism, the FCHVs continued using the paper based CIDT (pCIDT) for detection of people with potential MHDs. Based on our previous CIDT experience, we estimated that one week would be an appropriate time window to visit the health facility once referred by the FCHV. Hence, if the person visited the health facility, s/he was further registered in the system as a “complete case” whereas a reminder SMS was sent to the FCHV to follow up otherwise.

Project Implementation

A three-day training for the FCHVs and HWs was conducted in July 2017. The training included: review of the eight disorders that CIDT was validated for (depression, antenatal depression, postnatal depression, alcohol use disorder (AUD), psychosis, epilepsy, suicide and post-traumatic stress disorder (PTSD)), use of basic mobile phone functions, and role-playing using mCIDT. A codebook describing basic phone functions and the steps to refer using mCIDT was given to each FCHV for reference. Four focus group discussions (FGD) with 36 FCHVs, 8 key informant Interviews (KII) with HW (n=5), mental health experts (n=2) and mHealth expert (n=1) were conducted after the training.

At the conclusion of the training the mCIDT platform was implemented from August-October 2017. Supervision visits were completed twice at the health post at each VDC by the community clinical supervisor and a member from TPO Nepal. In response to the lower than expected referrals seen near the end of the third month, a simulation workshop was held to re-train the FCHVs. A written vignette describing a mock case was presented and read out loud to the FCHVs and were asked to diagnose the case using the CIDT. FCHVs were then asked to use the mCIDT platform to refer the mock case (See **Supplementary Figure 1, Additional File 1**). These steps were completed for a total of five vignettes which illustrated a provisional diagnosis for depression, postpartum depression, AUD, psychosis and epilepsy.

Results

Thirty-six FCHVs were trained on the mCIDT (See **Supplementary Table 1, Additional File 2**). Of these 36 FCHVs, only 8 successfully implemented mCIDT, defined as referring someone. Several error messages including typos, missing spaces, wrong disorder codes and incorrect sequencing were recorded in the system (See **Supplementary Table 2, Additional File 3**). Over three months of implementation, 8 FCHVs registered and referred 8 cases through mCIDT: 4 depression, 2 psychosis, 1 epilepsy and 1 antenatal depression. Of those 8 referred cases, 2 cases visited the health facility, 2 could not be contacted in the follow-up and other 4 refused visiting the health facility as they knew that no HW was assigned to that particular health facility at the time.

After piloting the technology for 3 months, a simulation exercise was held with the FCHVs (n=34) to determine their accuracy of using the technology (**Figure 2**). Fisher's exact test was used to compare differences of self-reported characteristics between FCHVs who correctly referred using mCIDT and those who did not (See **Supplementary Table 3a, Additional File 4**). Level of education was significantly higher for the FCHVs who were able to correctly use mCIDT in comparison to those who were not able to for all vignettes. Those who self-reported the ability to send an SMS and use the mCIDT Codebook were significantly more likely to be able to correctly use mCIDT across all disorders. T-tests with Wilcoxon test statistics were run to look at differences amongst age. For each disorder, the median age was significantly higher in FCHVs who incorrectly used the mCIDT.

Qualitative analysis of the key informant interviews, focus group discussions, field notes and observations by the research team elucidated the benefits of mCIDT, challenges faced by participants, and recommendations to improve the program.

Acceptability, Feasibility and Benefits of mCIDT

There was good agreement among the FCHVs, HWs and mental health experts familiar with the CIDT that the greatest benefit of mCIDT could be reducing the burden of work on FCHVs (See sample quotes in **Table 1**). Secondary benefits included the potential for better communication between HWs and FCHVs. Mental health and mHealth experts were wary of the FCHVs ability to use the mobile phones and expressed concern about maintaining patient privacy.

Challenges

Numerous challenges to mCIDT were mentioned by all interviewees. We summarized these challenges in 5 domains: Community, Participant, Facility, Program, and Technological.

The most prominent challenges were mentioned at the community level. FCHVs repeatedly said no mental health cases were present in the community, which is inconsistent with assessments finding high rates of mental health and psychosocial problems in the area [11]. This pointed to a lack of community awareness of the burden of MHD. FCHVs mentioned that previously Home-Based Community Workers (HBCW) in the area were responsible for identification of mental health cases. FCHVs acknowledged that

stigma towards mental health is persistent in the community. At times if an FCHV identified someone with a potential MHD, it was difficult to gain support from the family to get the patient to care. FCHVs were aware that AUD cases resided in the communities, but they were uncomfortable interacting with the patient fearing s/he was violent or thinking the patient cannot get better. FCHVs particularly felt discomfort dealing with male patients citing their gender roles. The fact that these FCHVs lived in the same community and they did not want to have potential conflict also added on this. Though no interviews with community members were done, FCHVs did bring up that community members were worried about breaches of privacy due to the use of a mobile phone.

FCHVs struggled to use the mobile phone for a myriad of reasons ranging from poor eyesight among older FCHVs to lack of self-confidence in the use of a mobile phone. Lack of technological literary was the most frequent issue observed during training sessions. It was also noted by trainers that the need to focus on how to use a mobile phone was unanticipated.

Low literacy rates also became a barrier when trying to type and send the structured SMS. The biggest challenges were in translating the visual aids of the paper-based CIDTs into the appropriate syntax for the structured SMS. Lack of literacy also became an issue when receiving error messages and the inability to read and respond with the correction. Lastly, FCHVs are highly overburdened through engagement in many parts of the health sector. Absenteeism of HW at the health post discouraged one FCHV whose referred case had to return without services. Financial incentives were brought up by most FCHVs as a way to increase motivation for them to engage in the mental health sector.

Technological and government challenges were not as frequently discussed in the interviews. Network instability was mentioned as the greatest technological challenge. Other interviewees except FCHVs talked about government level challenges in the context of implementing a policy that would set an educational threshold for FCHVs.

Suggested Recommendations from Participants

The main recommendations centered around more supervision for the FCHVs and increasing the level of awareness about mental health in the community.

Discussion

The mCIDT system was designed as a tool to strengthen the health system's structure and increase the number of cases referred from the community for care-seeking. Piloting of the mCIDT platform for three months resulted in only eight referrals. Qualitative and quantitative data from the study revealed a multitude of barriers and challenges with implementation of mCIDT at all levels of the health system. The mCIDT platform was not continued or scaled up after the pilot period due to these challenges.

Many mHealth tools developed for mental health are utilized by the patients with a focus on treatment retention or delivering treatment such as counseling through the telephone or motivational messages [12,

13] [14] [15]. In contrast, mCIDT focused on care seeking behavior and was utilized by lay health workers. Though issues with electricity and poor network reception are relevant in LMIC settings, it was not the most pertinent issue for mCIDT [16]. Of most importance to mCIDT, a systematic review of mHealth tools used by frontline health workers in LMICs identified age, level of education and years of experience of the health workers as three main barriers to adoption of mobile technologies [17]. A study in rural Nigeria showed that the younger and more educated a midwife was associated with a higher score on the knowledge assessment about the technology, yet they were hesitant about the usefulness of technology in their work [18]. Such a contradiction may be attributed to younger health workers having a more realistic outlook of the challenges that adding a technology causes, an idea that has been seen in a few other studies [18, 19].

LIMITATIONS

With the mCIDT tool only piloted for 3-months, the study duration was relatively short. When the paper version was used in other areas, this was in the context of a broader district mental health plan to improved primary care services and community awareness [20]. We did not evaluate the community's perceptions of the feasibility and acceptability of the tool prior to its implementation. In our other work with introduction of mHealth technologies in Nepal, we first conducted qualitative studies to identify acceptability and potential barriers to implementation [21]. Based on the experiences and challenges encountered in this study, we have provided recommendations for future studies introducing new technology in low resource settings to address mental health needs (See **Supplementary Table 4, Additional File 5**).

Abbreviations

CIDT – Community Informant Detection Tool

MHD – mental health disorder

FCHV – female community health volunteer

mHealth – mobile health

mCIDT – mobile health community informant detection tool

TPO Nepal- Transcultural Psychosocial Organization Nepal

LMIC – low- and middle-income countries

PRIME - Programme for Improving Mental Health Care

SMS – short messaging service

HBCW- Home based care worker

HW – health workers

AUD – alcohol use disorder

PTSD –post-traumatic stress disorder

IRB – institutional review board

VDC- Village Development Committee

Declarations

All authors have no conflict of interest to declare.

Ethics approval and consent to participate

The study was approved by the Nepal Health Research Council (60/2017) and Duke University IRB board (E0109). A written consent was obtained from participants prior to interviews.

Consent for publication

Not applicable

Availability of data and materials

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' Contribution

AB, PS, and BK drafted the manuscript. BK, EG, LV, and SR conceptualized the study and design. BK, EG, and LV obtained the funding. MJ, BK, and PS developed the CIDT. EG supervised development of the mCIDT. SR and PS supervised data collection. RG supervised FCHVs and mCIDT training. AB and CB conducted the data analysis. BK supervised the qualitative data analysis. All authors reviewed and revised the manuscript.

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Table

Table 1. Sample quotes from interviewees regarding use of mCIDT

Theme	Description	Quote
Perceived benefits	Reduced travel burden for FCHVs when using mobile phone SMS for mCIDT	*"We don't have to go to the hospital time and again to ask about a patient. We don't have to ask the health worker. Previously we had to walk for 1 or 2 hours to reach the health institution but we can know about them if we send the message from our home. We can also find if the patient has gone for the treatment or not through messages." - FCHV* *"We got to know whether the patient went to hospital or not within a week after we had sent message despite the distance of patient's location. Otherwise, we need to go to the hospital to know if the patient went there or not. Now it is easy for us to go to patient's home twice and ask about not going to the hospital." – FCHV* *"FCHVS are engaged in other programs such as Vitamin A distribution, visiting the pregnant and recent mothers and were very busy in these activities due to which they had neglected mental health initially. But later when they were oriented about the mobile, they had a sense that they should work on this otherwise." - FCHV*
Feasibility	Lack of feasibility for implementing mCIDT because FCHVs are overburdened	*"Because recently what we have been doing is the government has been mobilizing the FCHVs and we can see that FCHVs has been mobilized a lot. Because they have been engaging in programs related to maternal health, related to child health, and population statistics. And they have also been providing services regarding distribution of hygiene issues and home infestations so they're quite busy so many times we have seen that they have not been referring the cases using CIDT due to the fact that they're over-engaged and they have not been provided basic salary. Due to this fact I think if we can use other people, like teachers, or local clubs, or mothers' groups I think there are a lot of mothers' groups in the community, if we can mobilize them, we can better provide coverage to a large number of people. The FCHVs are overly busy with their schedule so if we can ease the burden of FCHVs on part and shift it to people to mothers group, teachers, and local leaders who have recently been elected, I think that can cause a huge impact and we might be getting a large number of referrals." – Mental Health Expert*
Lack of perceived need	Some FCHVs did not see mental health care as a need for their communities	*"There aren't many cases in my ward. I cannot register anyone who doesn't have problem." - FCHV*
Stigma	Inability to use mCIDT because of MHDs stigma	*"When people hear the word* manasik (*mental), they feel different. They don't want to engage at all. May be because of such stigma in the community, the FCHVs might have had problems." – Government Health Official*
Perceived difficulty of mental health care	Reluctance to work with mental health patients because of perceived difficulties	*"It's difficult to work with* manasik samasya (*mental problems)? It's easy to work on other areas but for mental problems, it's quite difficult." - FCHV*
Privacy concerns	Reluctance to use mobile phones for mental health information	*"We need to create public awareness. Some patient has feeling that their illness is recorded in the phone and that information will be given to someone else." - FCHV*
Low technological literacy	Inability to use SMS function on mobile phones	*"Some of the FCHVs were finding it difficult to use the mobile phones and using the menu key." – Mental Health CIDT Trainer* *"Another challenge would be difficulty in typing. We don't know how to type messages here. If it had been hand written, we could have written down some according to our capability but*

		it is difficult to type it in the mobile." - FCHV
Supervision needs	Recommendation from FCHVs for more regular supervision when introducing technology	*"You taught them today, and when you call them after a month, they will get embarrassed if they are not able to do it. They might think that you'll scold them if they can't do it. Because of that fear, they will learn by whatever way they can e.g. by asking children, or looking at books, and come. But, if you leave as it is, then they might not care about it. Even if you don't scold later, if you keep following up with them from time to time, they might feel that they will be embarrassed, which will urge them to learn. I think the monthly supervision will be very beneficial."- FCHV*

Additional Files

Additional File 1.pdf – Supplementary Figure 1. Steps for using mCIDT to refer patient

Additional File 2.pdf – Supplementary Table 1. Demographics of Female Community Health Volunteers (n=36) trained in mCIDT platform

Additional File 3.pdf – Supplementary Table 2. Types of messages stored in server

Additional File 4.pdf – Supplementary Table 3a. - Factors associated with correct and incorrect use of mCIDT for each diagnosis, categorical variables (n=34)

Supplementary Table 3b. - Factors associated with correct and incorrect use of mCIDT for each diagnosis, continuous variables (n=34)

Additional File 5.pdf – Supplementary Table 4. Recommendations for introduction of novel technological applications for mental health care in low resource settings

Figures

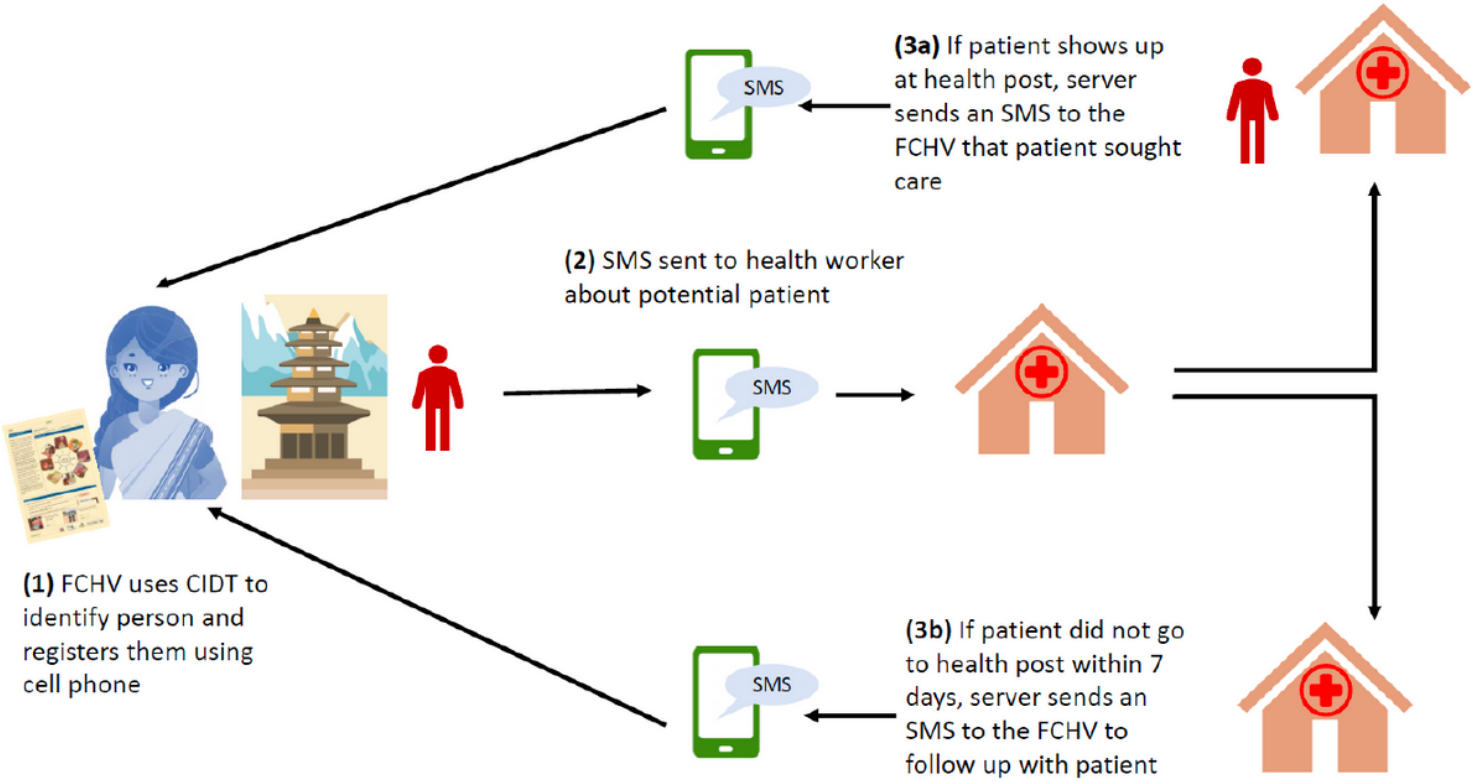

Figure 1

mCIDT workflow

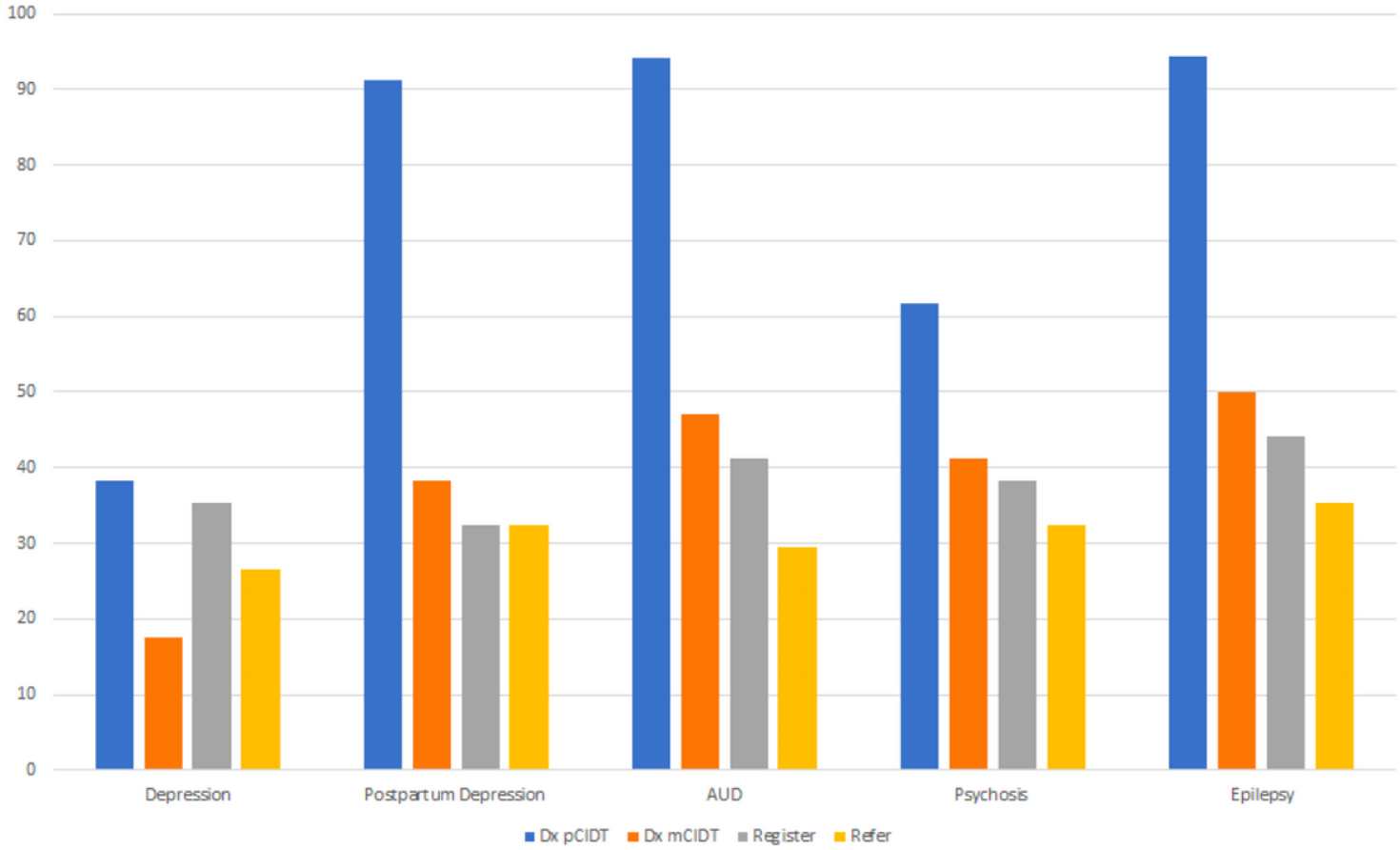

Figure 2

Simulation data (n=34) of correct diagnosis using pCIDT compared to mCIDT

Supplementary Files

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