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The mental health situation in Dar es Salaam and potential interventions

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Executive Summary

- Mental illnesses are very prevalent globally, with around 300 million people suffering from depression in 2015. Mental illnesses cause significant suffering to individuals and are associated with various social issues. Much of the burden of mental illnesses is likely to be borne by Low- and Middle-Income Countries, and, due to social factors, the impact on Dar es Salaam is likely to be particularly high.
- Given the high burden, it is concerning that mental illnesses seem to be undertreated, particularly in Tanzania and other LMICs. A gap between treatment demand and treatment supply is likely to be a key reason for this, though stigma and other factors that reduce take-up of treatment are likely to also play a role. This research considers two contrasting interventions to address these issues.
- **Mental health workshops in schools** may increase the likelihood of participants remaining in good mental health in the future. Workshops may also be able to improve access to help for those who do need it, for example by reducing stigma. It seems feasible for the Cambridge Development Initiative and Kite Dar es Salaam to implement this intervention.
- **Automated Cognitive Behavioural Therapy** would dramatically increase access to treatment by lowering costs and allowing patients to receive psychological treatment from home. Although the positive effects could be very significant, this intervention would be very resource-intensive to develop. Major NGOs are therefore better placed than CDI/Kite to implement this intervention.

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1 Introduction

Mental illnesses have a significant global impact. 300 million people are thought to have suffered from depression in 2015, for instance, making the condition the largest contributor to global disability, causing 7.5% of the total years lived with disability.¹ Anxiety disorders additionally caused 3.4% of years lived with disability.² Other conditions will have increased the disability burden still further.

Low- and middle-income countries (LMICs), including Tanzania, appear to bear much of this burden; four out of five people suffering from mental disorders, such as depression and substance abuse, live in Low or Middle Income Countries.³ One meta-analysis found that 10.8% of respondents from Sub-Saharan Africa met criteria for a common mental disorder during the 12-months preceding assessment.⁴ This represents a high number of sufferers in absolute terms, though the prevalence rate is in fact lower than the global average.⁵ In Tanzania, the World Health Organisation estimates that depressive disorders affect 4.1% of the population and that anxiety disorders affect 3%.⁶ There is reason to think that the rates of mental illness would be even higher in Dar es Salaam specifically. The city has a comparatively high rates of unemployment, difficult living conditions and drug abuse – all factors that are likely to contribute to mental health problems.⁷

This high prevalence is concerning, given the harm that mental illnesses cause, both to individuals and to society more broadly. Individuals with mental illnesses suffer unpleasant symptoms, such as feelings of worthlessness in the case of depressive disorders.⁸ Additionally, mental illnesses increase the risk of individuals contracting other communicable and non-communicable diseases and the risk of individuals undergoing intentional or unintentional injury.⁹ On a societal level, mental illnesses have a significant economic impact; it is estimated that the lost economic output due to mental illnesses between 2011 and 2030 will be \$16.3 trillion globally. Numerous factors, such as reduced productivity, contribute to this economic damage.¹⁰ Additionally, Funk et al. note that sufferers of mental illnesses are more likely to face numerous social issues, including

¹ ‘Depression and Other Common Mental Disorders: Global Health Estimates’ (Geneva: World Health Organisation, 2017), 5, <https://apps.who.int/iris/bitstream/handle/10665/254610/WHO-MSD-MER-2017.2-eng.pdf>.

² ‘Depression and Other Common Mental Disorders: Global Health Estimates’, 5.

³ Michelle Funk, Natalie Drew, and Martin Knapp, ‘Mental Health, Poverty and Development’, *Journal of Public Mental Health* 11, no. 4 (30 November 2012): 166, <https://doi.org/10.1108/17465721211289356>.

⁴ Zachary Steel et al., ‘The Global Prevalence of Common Mental Disorders: A Systematic Review and Meta-Analysis 1980–2013’, *International Journal of Epidemiology* 43, no. 2 (April 2014): 483, <https://doi.org/10.1093/ije/dyu038>.

⁵ Steel et al., 476.

⁶ ‘Depression and Other Common Mental Disorders: Global Health Estimates’, 17.

⁷ Joel Seme Ambikile and Masunga K. Iseselo, ‘Mental Health Care and Delivery System at Temeke Hospital in Dar Es Salaam, Tanzania’, *BMC Psychiatry* 17, no. 1 (December 2017): 1, <https://doi.org/10.1186/s12888-017-1271-9>.

⁸ Andrew M. Colman, ‘Depression’, in *A Dictionary of Psychology* (Oxford University Press, 2015), <https://www.oxfordreference.com/view/10.1093/acref/9780199657681.001.0001/acref-9780199657681-e-2201>.

⁹ Martin Prince et al., ‘No Health without Mental Health’, *The Lancet* 370, no. 9590 (September 2007): 859, [https://doi.org/10.1016/S0140-6736\(07\)61238-0](https://doi.org/10.1016/S0140-6736(07)61238-0).

¹⁰ Sebastian Trautmann, Jürgen Rehm, and Hans-Ulrich Wittchen, ‘The Economic Costs of Mental Disorders: Do Our Societies React Appropriately to the Burden of Mental Disorders?’, *EMBO Reports* 17, no. 9 (September 2016): 1245–49, <https://doi.org/10.15252/embr.201642951>.

homelessness, unemployment and violence. Although the direction of causality is not always clear, the researchers note that there is evidence in many cases to suggest that societal stigma around mental illness is partly responsible. A number of studies have indicated, for instance, that businesses are unwilling to employ people with a history mental illness, even during periods of good health.¹¹

Despite these serious effects, mental health treatment appears to be fairly neglected, particularly in LMICs. Epidemiological surveys in 2008 suggested that globally 64.9% of physical disorders were treated, compared to 23.7% of mental health conditions. In LMICs specifically, 53.2% of physical disorders were treated, compared to only 7.7% of mental disorders.¹² In the case of Tanzania, it is easy to see how mental illness could go untreated. The country of 54 million people has fewer than 300 mental health professionals, or roughly one per 200,000 people.¹³ There are 900 psychiatric beds, mostly in the Mirembe National Mental Health Hospital in Dodoma, though Dar es Salaam's Muhimbili National Hospital has 100.¹⁴ Additionally, researchers found in 2017 that mental health workers in Temeke District Hospital believed that their field was given a low priority by the authorities. This seemed to lead to there being few staff specialising in mental health and even these staff members having limited training. This appeared to reduce access to treatment and treatment effectiveness.¹⁵

Simply increasing spending on conventional mental health treatment does not seem like a particularly viable way to reduce the number of people in LMICs who go untreated. In many LMICs, mental health is not seen as a priority, potentially making the allocation of far more resources politically unrealistic.¹⁶ Even with political will, however, it is not obvious how mental health resources could be significantly increased; LMICs are, by definition, very resource constrained. Given the scale and complexity of the problem, a range of different interventions are likely required. This paper identifies two such interventions. It also provides recommendations for how these interventions should be implemented in Dar es Salaam specifically. These are:

1. Mental health workshops for school pupils, and
2. Using technology to partially automate the provision of mental health treatment.

Although directed at CDI/Kite, this research aims to be useful for a range of organisations working on mental health in LMICs. Indeed, other NGOs will be much better placed than CDI/Kite to implement the second intervention.

¹¹ Funk, Drew, and Knapp, 'Mental Health, Poverty and Development'.

¹² Johan Ormel et al., 'Disability and Treatment of Specific Mental and Physical Disorders across the World', *British Journal of Psychiatry* 192, no. 5 (May 2008): 370, <https://doi.org/10.1192/bjp.bp.107.039107>.

¹³ 'Tanzania, United Republic Of', *Mental Health Atlas Member State Profiles* (Geneva: World Health Organisation, 2017), https://www.who.int/mental_health/evidence/atlas/profiles-2017/TZ.pdf?ua=1.

¹⁴ Perpetua Hardy Mwambingu, Damas Andrea, and Jesper Katomero, 'Using Mobile Phones in Improving Mental Health Services Delivery in Tanzania: A Feasibility Study at Mirembe National Mental Health Hospital in Dodoma', *Journal of Global Health Science* 1 (2019): 2, <https://doi.org/10.35500/jghs.2019.1.e6>.

¹⁵ Ambikile and Iseselo, 'Mental Health Care and Delivery System at Temeke Hospital in Dar Es Salaam, Tanzania'.

¹⁶ Benedetto Saraceno et al., 'Barriers to Improvement of Mental Health Services in Low-Income and Middle-Income Countries', *The Lancet* 370, no. 9593 (September 2007): 1164–67, [https://doi.org/10.1016/S0140-6736\(07\)61263-X](https://doi.org/10.1016/S0140-6736(07)61263-X).

2 Mental health workshops for school pupils

The term “mental health workshops” is used here to denote group sessions where participants can learn about a broad range of topics within mental health. This research considers two broad goals of mental health workshops. Firstly, workshops may maintain or improve the mental health of participants. Secondly, workshops may help participants or others around them to overcome barriers that prevent them from accessing mental health treatment that they require.

Although mental health workshops could plausibly be directed at a range of demographics, this research focuses on secondary school students. One reason for this is that CDI/Kite have experience in this form of intervention, having run workshops for education and health projects in recent years.¹⁷ Additionally, schools are well-suited to mental health interventions. They already have a role in promoting emotional competence and they offer a relatively easy way of reaching large numbers of people.¹⁸ There is also evidence to believe that school wellbeing initiatives improve academic performance.¹⁹ Even if educational policy makers were only motivated by academic results, therefore, they should be keen to take steps to improve their students’ mental health. This may make policy makers or schools more willing to collaborate with NGOs working in mental health. Indeed, 86% of interventions from NGOs working in adolescent mental health in 2012 had a component taking place in schools.²⁰

This section therefore considers the two goals of mental health workshops, with particular reference to school students. It then recommends how these workshops could be successfully implemented in Dar es Salaam.

2.1 Workshops to promote participants’ good mental health

The first type of workshop aims to improve or maintain the mental health of participants. This generally occurs by teaching participants skills associated with good mental health, such as coping strategies, construction of support networks and problem-solving skills.²¹ This form of workshop would have two positive effects if successful. Firstly, it would improve participants’ quality of life, by reducing the likelihood that they suffer mental illness. Secondly, it would make participants less likely to need mental health treatment in future,

¹⁷ ‘Education’, Cambridge Development Initiative, accessed 6 June 2020, <http://www.cambridgedevelopment.org/education.html>; ‘Health’, Cambridge Development Initiative, accessed 6 June 2020, <http://www.cambridgedevelopment.org/health.html>.

¹⁸ Margaret M Barry et al., ‘A Systematic Review of the Effectiveness of Mental Health Promotion Interventions for Young People in Low- and Middle-Income Countries’, *BMC Public Health* 13, no. 1 (December 2013): 2, <https://doi.org/10.1186/1471-2458-13-835>.

¹⁹ Joseph A. Durlak et al., ‘The Impact of Enhancing Students’ Social and Emotional Learning: A Meta-Analysis of School-Based Universal Interventions: Social and Emotional Learning’, *Child Development* 82, no. 1 (January 2011): 405–32, <https://doi.org/10.1111/j.1467-8624.2010.01564.x>.

²⁰ ‘Adolescent Mental Health: Mapping Actions of Nongovernmental Organizations and Other International Development Organizations’ (Geneva: World Health Organisation, 2012), https://www.who.int/mental_health/publications/adolescent_mental_health/en/.

²¹ Barry et al., ‘A Systematic Review of the Effectiveness of Mental Health Promotion Interventions for Young People in Low- and Middle-Income Countries’, 4; Mina Fazel et al., ‘Mental Health Interventions in Schools in Low-Income and Middle-Income Countries’, *The Lancet Psychiatry* 1, no. 5 (October 2014): 389–90, [https://doi.org/10.1016/S2215-0366\(14\)70357-8](https://doi.org/10.1016/S2215-0366(14)70357-8).

freeing up treatment capacity for others. This is beneficial given that demand for treatment appears to outstrip supply.

Barry et al.'s 2013 systematic review found 14 studies describing this kind of intervention, delivered over the course of several weekly sessions. These programmes generally improved self-esteem, motivation and self-efficacy.²² The fact that many of these interventions took place in particularly extreme conditions, such as areas with armed conflict, may however suggest that caution is needed before generalising this finding to peaceful LMIC geographies, such as Dar es Salaam.

Perhaps more relevant to Tanzania is an intervention in Mauritius, another African country not affected by armed conflict, that was highlighted by Barry et al. as particularly promising. Students of between 12- and 16-years-old received the RAP-A programme over the course of 11 weekly sessions. The programme covers topics such as self-esteem, keeping calm and identifying support networks. Six months after the intervention, adolescents who received the intervention had improved self-esteem and coping skills compared with the control group.²³

Even more relevant to Dar es Salaam is Berger et al.'s intervention in the Meru district of Tanzania. Over the course of eight weeks, schoolteachers taught stress-reduction strategies to their classes. These included ways of calming the body, building social support and developing an optimistic outlook. When tested eight months after the end of the intervention, participants had lower anxiety and hyperactivity than controls, though the effect sizes were relatively small. Participants' academic achievements were also slightly improved.²⁴ It should also be noted that the researchers adapted the programme that they used to the Tanzanian cultural context, drawing on Barrera & Castro's Framework for the Cultural Adaptation of Interventions. This is valuable as culture plays role in psychology, meaning that psychological interventions potentially need to be adapted according to cultural context.²⁵ Examples of the adaptations included local spiritual leaders being involved to increase community buy-in and local folk tales and proverbs being used to illustrate points.²⁶

2.2 Workshops to overcome barriers to treatment

As well as helping participants to improve or maintain their mental health, workshops could tackle issues that prevent people from seeking out treatment when they need it. These issues include stigma, poor symptom recognition, and lack of knowledge about available help.

²² Barry et al., 'A Systematic Review of the Effectiveness of Mental Health Promotion Interventions for Young People in Low- and Middle-Income Countries'.

²³ Emilie Rivet-Duval, Sandra Heriot, and Caroline Hunt, 'Preventing Adolescent Depression in Mauritius: A Universal School-Based Program: Preventing Adolescent Depression', *Child and Adolescent Mental Health* 16, no. 2 (May 2011): 86–91, <https://doi.org/10.1111/j.1475-3588.2010.00584.x>.

²⁴ Rony Berger et al., 'Enhancing Resiliency and Promoting Prosocial Behavior among Tanzanian Primary-School Students: A School-Based Intervention', *Transcultural Psychiatry* 55, no. 6 (December 2018): 821–45, <https://doi.org/10.1177/1363461518793749>.

²⁵ Manuel Barrera and Felipe González Castro, 'A Heuristic Framework for the Cultural Adaptation of Interventions', *Clinical Psychology: Science and Practice* 13, no. 4 (December 2006): 311–16, <https://doi.org/10.1111/j.1468-2850.2006.00043.x>; Joseph Henrich, Steven J. Heine, and Ara Norenzayan, 'The Weirdest People in the World?', *Behavioral and Brain Sciences* 33, no. 2–3 (June 2010): 61–83, <https://doi.org/10.1017/S0140525X0999152X>.

²⁶ Berger et al., 'Enhancing Resiliency and Promoting Prosocial Behavior among Tanzanian Primary-School Students', 829–31.

It could be argued that increasing demand for mental health treatment is unhelpful given that treatment supply already struggles to meet demand; additional people seeking treatment may just be turned away or displace other people who would otherwise receive treatment. If health systems are able to triage patients reasonably effectively, however, this displacement would still be an improvement; the people who are currently prevented from accessing treatment may include people who would benefit from it more than the people who currently receive it. Additionally, mental health treatment seems to be more effective when delivered earlier, before it reaches crisis levels.²⁷ This is particularly the case among young people, the demographic affected by this intervention.²⁸ It might therefore be less resource-intensive to treat more people, if that means that people receive treatment before their symptoms become so severe that they have no choice other than to seek treatment.

2.2.1 Stigma

The most prominent barrier to help-seeking for mental health problems among young people seems to be stigma and embarrassment.²⁹ Research from Tanzania specifically has also suggested that stigma is a significant hurdle.³⁰ Reducing stigma could therefore make people more likely to seek out the help that they need. Reducing stigma could also improve the lives of people with mental illness more generally, such as by reducing the discrimination that is identified in the introduction.

Although not extremely promising, there is evidence to suggest that workshops can contribute somewhat to reducing stigma. Griffiths et al. 2014 found that educational interventions have a small effect on stigma, for instance. Interventions that include contact with people with mental illnesses seem to be more effective.³¹ Additionally, Yamaguchi et al. 2011 suggested that workshops to reduce stigma should aim to tackle myths about the dangerousness of people with mental illnesses, as well possibly explain the biological and other causes of mental disorders.³² Although it therefore seems that workshops could reduce stigma to some extent, it is important to note that much of the existing research is carried out on tertiary students in Australia and the USA. It is unclear how well such findings would replicate to school pupils in Tanzania.

2.2.2 Symptom recognition

²⁷ Patrick D McGorry and Cristina Mei, 'Early Intervention in Youth Mental Health: Progress and Future Directions', *Evidence Based Mental Health* 21, no. 4 (November 2018): 182–84, <https://doi.org/10.1136/ebmental-2018-300060>.

²⁸ McGorry and Mei.

²⁹ Amelia Gulliver, Kathleen M Griffiths, and Helen Christensen, 'Perceived Barriers and Facilitators to Mental Health Help-Seeking in Young People: A Systematic Review', *BMC Psychiatry* 10, no. 1 (December 2010): 5, <https://doi.org/10.1186/1471-244X-10-113>.

³⁰ Tumbwene Elieza Mwansisya, Anne H. Outwater, and Zhening Liu, 'Perceived Barriers on Utilization of Mental Health Services among Adults in Dodoma Municipality – Tanzania', *Journal of Public Mental Health* 14, no. 2 (15 June 2015): 86, <https://doi.org/10.1108/JPMH-09-2012-0008>.

³¹ Kathleen M. Griffiths et al., 'Effectiveness of Programs for Reducing the Stigma Associated with Mental Disorders. A Meta-Analysis of Randomized Controlled Trials', *World Psychiatry* 13, no. 2 (June 2014): 161–75, <https://doi.org/10.1002/wps.20129>.

³² Sosei Yamaguchi, Yoshio Mino, and Shahir Uddin, 'Strategies and Future Attempts to Reduce Stigmatization and Increase Awareness of Mental Health Problems among Young People: A Narrative Review of Educational Interventions: Strategies to Reduce Stigmatization', *Psychiatry and Clinical Neurosciences* 65, no. 5 (August 2011): 405–15, <https://doi.org/10.1111/j.1440-1819.2011.02239.x>.

It seems that some young people struggling with mental health problems avoid seeking out help simply because they do not realise that they have a condition that would benefit from treatment.³³ Teaching young people the basic characteristics of different conditions, or signs of poor mental health in general, might therefore help them to recognise that they have a problem and so make them more likely to seek treatment. Similarly, participants may be able to use their knowledge to recognise when their peers are facing problems and to encourage them to seek help.

2.2.3 Signposting

A further reason why some young people who would benefit from treatment do not seek it out seems to be that they do not know where to go for it.³⁴ Data collected by CDI/Kite support the claim that young people do not always know what help is available to them; a 2018 survey of secondary school pupils in two Dar es Salaam schools suggested that many did not know that they had access to a counsellor.³⁵ One valuable aspects of mental health workshops could therefore be informing participants about the resources available to them, such as school counsellors, should they need help.

2.3 Recommendations for mental health workshops

1. **Workshops should aim both to promote good mental health and reduce barriers to treatment.** Although uncertainties remain, the evidence above suggests that workshops can be effective at both goals. Examples of ways to promote good mental health include teaching coping strategies. Examples of ways to reduce barriers to treatment include breaking down stigma by addressing myths about the dangerousness of people with mental illness. The interventions cited generally took place over the course of several sessions. With the workshops proposed here aiming to be broader in scope, they could require even more time. This could potentially be achieved by embedding the workshops in a school's curriculum. Although CDI/Kite, or different NGOs, could therefore add value by running the workshops initially, this might ideally be in collaboration with schools, aiming to hand off the workshops to the schools themselves. This would be consistent with CDI/Kite's general goal of making interventions sustainable.
2. **Workshops should be designed at an appropriate level for participants.** CDI/Kite's 2018 survey has data about what students in Dar es Salaam already know about mental health.³⁶ More surveys of this kind may further reduce the risk of wasting participants' time with information that they already know or overwhelming them with information that is too advanced.
3. **Workshops should be designed or adapted for the Tanzanian cultural context.** Given the role that culture plays in psychology, psychological interventions, including mental health workshops, are likely to be more effective if taking the local culture

³³ Gulliver, Griffiths, and Christensen, 'Perceived Barriers and Facilitators to Mental Health Help-Seeking in Young People', 6.

³⁴ Gulliver, Griffiths, and Christensen, 6–7.

³⁵ 'Report on Baseline Data Collection Survey - Emotional Wellbeing Workshops' (Cambridge and Dar es Salaam: Cambridge Development Initiative and Kite Dar es Salaam, 2018).

³⁶ 'Report on Baseline Data Collection Survey - Emotional Wellbeing Workshops'.

into account. Berger et al. give several examples of how to do this in Tanzania.³⁷ Barrera & Castro provide a more theoretical overview.³⁸

4. **Any intervention should include rigorous monitoring and evaluation (M&E).** Much of the research cited above has large uncertainties or originates from contexts that are not particularly similar to Dar es Salaam. This decreases the confidence it is possible to have initially in the effectiveness of mental health workshops and so increases the importance of M&E. One effective form of M&E might be a longitudinal study comparing mental health and academic achievement over the long term between two groups: one group that receives the workshops and an otherwise comparable group that does not. Carrying out this study is one area where NGOs could be helpful, even if schools take over the actual running of the workshops, since NGOs are much more likely to have experience in this kind of research.

³⁷ Berger et al., 'Enhancing Resiliency and Promoting Prosocial Behavior among Tanzanian Primary-School Students', 829–31.

³⁸ Barrera and Castro, 'A Heuristic Framework for the Cultural Adaptation of Interventions'.

3 Automated Cognitive Behavioural Therapy

As noted in the introduction, Tanzania seems to currently suffer from limited political will to prioritise mental health treatment and therefore increase treatment capacity. Moreover, even if this political will were to appear, it seems plausible that there would still be capacity issues; Tanzania, a very poor country, would struggle to significantly increase funding. In addition, even if funding were to become accessible, there might be a long delay before the number of trained professionals would increase significantly, since training is likely to take a significant amount of time.

Using software to automate the provision of some treatment could be a way of addressing these issues. Since automation leads to marginal costs being very low, it would be very cheap to use software to treat an individual, once the software is developed. This could mean that a lot of Tanzanians who are currently turned away due to resource constraints could receive at least some treatment. The low costs could make lead to a very favourable cost-benefit ratio, even if the treatment were only slightly effective. Additionally, since software can be widely distributed quickly, this intervention could be quickly scaled-up. One final benefit of treatment delivered via software, is that people may be able to access it from home. This could lead to Tanzanians no longer being prevented from accessing treatment by lack of transport or long distances to a treatment centre, as they currently seem to be.³⁹ Additionally, the impact of stigma on seeking treatment may be reduced since people might find it easier to keep their condition confidential if they do not need to go to a treatment centre.

There is already a reasonable evidence base for the automation of Cognitive Behavioural Therapy (CBT). CBT is a form of psychotherapy, conventionally carried out one-on-one with a therapist. Where there could be doubt, it is here referred to as “face-to-face CBT”, to distinguish from software alternatives. Patients are helped to identify negative or inaccurate patterns of thinking and to reshape them. The therapist may, for instance, help the patient to move from thinking “I knew I’d never be able to cope with this job” to “The job’s not going well, but I am capable of working out a plan to overcome the problems”.⁴⁰

The term “Automated CBT” is used here to refer to treatment where interactive software, rather than a person, helps the patient to understand and implement CBT strategies. Automated CBT groups together three terms which are used in the literature and which define the technological details of the software:

- Computerised CBT (CCBT): the software runs on a laptop or desktop computer,⁴¹
- iCBT: the software is accessed over the internet, generally via a computer,⁴² and

³⁹ Mwansisya, Outwater, and Liu, ‘Perceived Barriers on Utilization of Mental Health Services among Adults in Dodoma Municipality – Tanzania’, 86.

⁴⁰ Addie Weaver et al., ‘Cognitive Behavioral Therapy’, in *Encyclopedia of Social Work*, by Addie Weaver et al. (NASW Press and Oxford University Press, 2014), <https://doi.org/10.1093/acrefore/9780199975839.013.874>.

⁴¹ Joseph Firth et al., ‘The Efficacy of Smartphone-Based Mental Health Interventions for Depressive Symptoms: A Meta-Analysis of Randomized Controlled Trials’, *World Psychiatry* 16, no. 3 (October 2017): 287–98, <https://doi.org/10.1002/wps.20472>; Derek Richards and Thomas Richardson, ‘Computer-Based Psychological Treatments for Depression: A Systematic Review and Meta-Analysis’, *Clinical Psychology Review* 32, no. 4 (June 2012): 329–42, <https://doi.org/10.1016/j.cpr.2012.02.004>.

⁴² Quincy J. J. Wong, Alison L. Callear, and Helen Christensen, ‘A Systematic Meta-Review of Internet-Based Cognitive Behavioral Therapy (iCBT)’, in *Oxford Research Encyclopedia of Psychology*, by Quincy J. J. Wong, Alison L. Callear, and Helen Christensen (Oxford University Press, 2018), <https://doi.org/10.1093/acrefore/9780190236557.013.332>.

- Smartphone-based CBT: the software is an app running on a smartphone.⁴³

This section reviews existing research into Automated CBT, focusing, like much of the literature, on depression. This research is used to make recommendations for how Automated CBT could be implemented in Dar es Salaam.

3.1 Evidence base

3.1.1 Face-to-face CBT

The effectiveness of Automated CBT is likely to depend to some extent upon the effectiveness of the treatment on which it is based, face-to-face CBT. Hofmann et al.'s 2012 review of 269 meta-analyses of CBT is therefore very promising. The researchers found that the evidence base for face-to-face CBT is very strong, across a range of disorders and geographies. The treatment is particularly effective for anxiety disorders, though also effective for depression, substance use disorders and others.⁴⁴ Although there is much less evidence from LMICs specifically, face-to-face CBT also seems promising here. For instance, one meta-analysis focusing on depression found that the treatment, with some cultural adaptations, had a large effect size, indicating that it is effective at treating depression in LMICs.⁴⁵

3.1.2 Automated CBT

There has already been some research into Automated CBT. Richards & Richardson's 2012 meta-analysis of CBT being carried out on computers, via CD-ROMs (CCBT) or the internet (iCBT), found that these tools had a moderate effect size on treating depression.⁴⁶ Firth et al.'s 2017 meta-analysis investigated smartphone apps that aim to reduce depressive symptoms including ones providing CBT. The researchers found the apps had statistically significant effects. There was no statistically significant difference between the effectiveness of interventions where participants were supported by a clinician or other health worker and those where they weren't. This implies that removing human intervention from Automated CBT treatment is not only possible, but, in some cases, not even detrimental.⁴⁷

There is also some evidence for the effectiveness of Automated CBT in LMICs specifically. Naslund et al.'s 2017 narrative review found 13 studies of online self-help programmes for mental disorders, though not all of the interventions had a CBT element. Since many of the studies included in the analysis are not Randomised Control Trials (RCTs), it was not possible to numerically calculate effectiveness. The researchers did find, however, that individuals who completed the programmes generally experienced reduction of symptoms.⁴⁸

⁴³ Firth et al., 'The Efficacy of Smartphone-Based Mental Health Interventions for Depressive Symptoms'.

⁴⁴ Stefan G. Hofmann et al., 'The Efficacy of Cognitive Behavioral Therapy: A Review of Meta-Analyses', *Cognitive Therapy and Research* 36, no. 5 (October 2012): 427–40, <https://doi.org/10.1007/s10608-012-9476-1>.

⁴⁵ Zahir Vally and Clint Maggott, 'Evaluating the Outcome of Cultural Adaptations of Cognitive-Behavioural Therapy for Adult Depression: A Meta-Analysis of Treatment Studies in Developing Countries', *International Journal for the Advancement of Counselling* 37, no. 4 (December 2015): 293–304, <https://doi.org/10.1007/s10447-015-9244-5>.

⁴⁶ Richards and Richardson, 'Computer-Based Psychological Treatments for Depression'.

⁴⁷ Firth et al., 'The Efficacy of Smartphone-Based Mental Health Interventions for Depressive Symptoms'.

⁴⁸ John A Naslund et al., 'Digital Technology for Treating and Preventing Mental Disorders in Low-Income and Middle-Income Countries: A Narrative Review of the Literature', *The Lancet Psychiatry* 4, no. 6 (June 2017): 486–500, [https://doi.org/10.1016/S2215-0366\(17\)30096-2](https://doi.org/10.1016/S2215-0366(17)30096-2).

In order to gain a better understanding of the effectiveness of Automated CBT, it would be helpful to be able to compare Automated CBT's effect size to that of other interventions which might be used instead, such as face-to-face CBT. Regrettably, it would not be methodologically sound simply to compare the effect size from meta-analyses into different forms of treatment. This is because different interventions might attract different study participants. People who are more comfortable with technology might be more likely to take part in research into Automated CBT, for instance, but could potentially also differ in other ways, creating a confounding variable.

3.1.3 Evaluating specific Automated CBT tools

Although there is a fairly large amount of research into the effects of Automated CBT in general, particularly in high-income countries (HICs), there is less research into the effectiveness of specific pieces of software. It is therefore hard to know which pieces of software are best. This was illustrated in 2015, when none of the CCBT tools listed by the UK's National Health Service appeared to have much of an evidence base to support them specifically.⁴⁹ Two factors seem to make it difficult to build a reliable evidence base to support the use of specific Automated CBT tools. Firstly, since technology is quickly improving, individual pieces of software are likely to become out-of-date by the time that they have been extensively evaluated.⁵⁰ Secondly, at least in the case of smartphone-based CBT, there is a high turnover in the tools available. This means that some tools may no longer be available by the time that they have been properly evaluated.⁵¹

Nevertheless, some specific tools have been extensively studied. As early as 2011, there were 13 studies investigating the CCBT tool *Beating the Blues*, for instance.⁵² Furthermore, the UK's National Institute for Health and Clinical Evidence decided in 2005 that there was enough evidence to recommend the tool for mild to moderate depression.⁵³ Additionally, *MoodGYM*, a different CCBT tool, boasts both several studies and a meta-analysis to pool their findings, concluding that for anxiety symptoms the tool has a medium effect size.⁵⁴ There appears to be less extensive analysis of iCBT and smartphone-based CBT tools, though a quality assurance study did find that 'Sadness Program', an iCBT tool, is effective when recommended by primary care practitioners.⁵⁵

⁴⁹ Simon Leigh and Steve Flatt, 'App-Based Psychological Interventions: Friend or Foe?', *Evidence Based Mental Health* 18, no. 4 (November 2015): 97–99, <https://doi.org/10.1136/eb-2015-102203>.

⁵⁰ Elizabeth Murray et al., 'Evaluating Digital Health Interventions', *American Journal of Preventive Medicine* 51, no. 5 (November 2016): 843–51, <https://doi.org/10.1016/j.amepre.2016.06.008>.

⁵¹ Mark Erik Larsen, Jennifer Nicholas, and Helen Christensen, 'Quantifying App Store Dynamics: Longitudinal Tracking of Mental Health Apps', *JMIR MHealth and UHealth* 4, no. 3 (9 August 2016): e96, <https://doi.org/10.2196/mhealth.6020>.

⁵² Richards and Richardson, 'Computer-Based Psychological Treatments for Depression', 331.

⁵³ 'Computerised Cognitive Behaviour Therapy for Depression and Anxiety (Review)' (National Institute for Health and Clinical Excellence, August 2005), 1, <https://www.nice.org.uk/guidance/ta97/documents/final-appraisal-determination-depression-and-anxiety-computerised-cognitive-behaviour-therapy-ccb-t-review2>.

⁵⁴ Conal Twomey and Gary O'Reilly, 'Effectiveness of a Freely Available Computerised Cognitive Behavioural Therapy Programme (MoodGYM) for Depression: Meta-Analysis', *Australian & New Zealand Journal of Psychiatry* 51, no. 3 (March 2017): 260–69, <https://doi.org/10.1177/0004867416656258>.

⁵⁵ Alishia D Williams and Gavin Andrews, 'The Effectiveness of Internet Cognitive Behavioural Therapy (ICBT) for Depression in Primary Care: A Quality Assurance Study', ed. Gerhard Andersson, *PLoS ONE* 8, no. 2 (22 February 2013): e57447, <https://doi.org/10.1371/journal.pone.0057447>.

Although there may be limited evidence to support the use of any one smartphone-based tool, some meta-analyses have looked at which software features correlate with effectiveness. These features include summary statistics and progress scores.⁵⁶ Although this correlation does not necessarily imply causation, it may suggest that these features are beneficial. Additionally, research from a study investigating iCBT, where the dynamics could plausibly be similar to smartphone-based CBT, found that frequently updating content and dialogue elements, such as reminders to use the tools, predicted better adherence.⁵⁷

3.2 Applicability of Automated CBT research to Tanzania

As noted above, since culture plays a role in psychology, psychological interventions likely need to be adapted according to cultural context.⁵⁸ Berger et al. provide several examples of relatively minor changes, such as the use of local folk stories, that could be used to make Automated CBT more effective among Tanzanians.⁵⁹ More dramatic modifications may be required in the case of CBT, including Automated CBT. CBT's premise is that mental illness results from certain patterns of thinking.⁶⁰ This is at odds with the thinking of some Tanzanians, that mental illnesses have supernatural causes.⁶¹ CBT may therefore be unappealing to these Tanzanians, if not framed in a different way. The fact that face-to-face CBT interventions with cultural adaptations have been successful in several LMICs, including in Africa, could however suggest that these issues can be overcome.⁶²

Beyond cultural differences, Tanzania may be different from HICs, where Automated CBT are generally tested, in that people have different access to technology; Tanzanians seem mostly to access the internet via smartphone.⁶³ This suggests that forms of Automated CBT that require a desktop or laptop computer may be less accessible than they would be in HICs.

3.3 Recommendations for Automated CBT

1. **The Automated CBT should be smartphone-based.** Given that Tanzanians seem to have better access to smartphones than to computers, smartphone-based CBT is likely the form of Automated CBT that would be accessible to the most people. This smartphone app could either be developed from scratch or adapted from an existing tool. It seems likely that adapting an existing tool would be less resource-intensive

⁵⁶ Firth et al., 'The Efficacy of Smartphone-Based Mental Health Interventions for Depressive Symptoms', 292.

⁵⁷ Saskia M Kelders et al., 'Persuasive System Design Does Matter: A Systematic Review of Adherence to Web-Based Interventions', *Journal of Medical Internet Research* 14, no. 6 (14 November 2012): e152, <https://doi.org/10.2196/jmir.2104>.

⁵⁸ Barrera and Castro, 'A Heuristic Framework for the Cultural Adaptation of Interventions'; Henrich, Heine, and Norenzayan, 'The Weirdest People in the World?'

⁵⁹ Berger et al., 'Enhancing Resiliency and Promoting Prosocial Behavior among Tanzanian Primary-School Students', 829–31.

⁶⁰ Weaver et al., 'Cognitive Behavioral Therapy'.

⁶¹ Mwansisya, Outwater, and Liu, 'Perceived Barriers on Utilization of Mental Health Services among Adults in Dodoma Municipality – Tanzania', 88; Mdimu Charua Ngoma, Martin Prince, and Anthony Mann, 'Common Mental Disorders among Those Attending Primary Health Clinics and Traditional Healers in Urban Tanzania', *British Journal of Psychiatry* 183, no. 4 (October 2003): 351–53, <https://doi.org/10.1192/bjp.183.4.349>.

⁶² Vally and Maggott, 'Evaluating the Outcome of Cultural Adaptations of Cognitive-Behavioural Therapy for Adult Depression'.

⁶³ Fumbuka Ng'wanakilala, 'Tanzania Internet Users Hit 23 Million; 82 Percent Go Online via Phones: Regulator', *Reuters*, 23 February 2018, <https://www.reuters.com/article/us-tanzania-telecoms-idUSKCN1G715F>.

than designing a new one from scratch, though this would require permission (and most likely involvement) from the developer of the original tool.

2. **The intervention should be adapted to the Tanzanian cultural context.** At the more basic level, this means using examples that are likely to be understood by Tanzanians. At the more dramatic level, it may mean framing CBT in a new way, to get buy-in from people with traditional beliefs about the causes of mental illness. As noted above, Barrera & Castro, provide a theoretical overview for how to carry out this kind of cultural adaptation.⁶⁴ Examples of CBT being carried out with cultural adaptations are cited by Vally & Maggott.⁶⁵
3. **The smartphone app should make use of software features which are associated with increased Automated CBT effectiveness.** These include progress scores and dialogue elements. Firth et al. and Kelders et al. provide more examples.⁶⁶
4. **The intervention should be carried out in close collaboration with local officials.** Since Automated CBT aims to help people who might otherwise receive conventional treatment, referrals from the health system would likely be a major source of users, meaning that this intervention would require the close involvement of health officials. Moreover, close collaboration with authorities would likely be useful in navigating legal considerations involved in implementing Automated CBT in Tanzania. These might include permission being required to offer a tool that could be considered medical treatment.
5. **The intervention may need to be led by a major NGO.** Developing the tool would likely require significant technical and clinical expertise and be resource intensive. This institutional capacity is likely beyond the reach of CDI/Kite. Other types of socially conscious actors, such as the Corporate Social Responsibility arms of companies, could conceivably be an alternative to a major NGO.
6. **Any Automated CBT intervention should involve careful M&E.** With evidence on Automated CBT in LMICs currently being very limited, M&E of any smartphone-based CBT intervention in Tanzania would be very important; given that our understanding is currently so limited, we should not assume how effective this intervention would be. The M&E might take the form of an RCT comparing the effectiveness of the smartphone-based CBT to the treatment that patients would have received otherwise (such as conventional treatment or being turned away). Given that previous research has highlighted Automated CBT's high attrition rates, it is important that the research takes levels of dropping out into account when considering effectiveness.⁶⁷ Since there is currently little understanding of which specific forms of smartphone-based CBT work best, the RCT would ideally also test multiple apps. This would improve understanding not just of whether smartphone-based CBT works in Tanzania, but of which form of smartphone-based CBT works best. Given the

⁶⁴ Barrera and Castro, 'A Heuristic Framework for the Cultural Adaptation of Interventions'.

⁶⁵ Vally and Maggott, 'Evaluating the Outcome of Cultural Adaptations of Cognitive-Behavioural Therapy for Adult Depression'.

⁶⁶ Firth et al., 'The Efficacy of Smartphone-Based Mental Health Interventions for Depressive Symptoms'; Kelders et al., 'Persuasive System Design Does Matter'.

⁶⁷ Richards and Richardson, 'Computer-Based Psychological Treatments for Depression'.

amount of resources required to design or adapt a smartphone-based CBT tool, however, this may be infeasible, or not sufficiently beneficial to justify the cost.

4 Conclusion

In view of the high personal and societal costs imposed by mental illness, it is very regrettable that so many people in Tanzania, LMICs and globally appear to be going untreated. This phenomenon seems to be the result of several factors, including stigma and resource constraints limiting healthcare provision. This research highlights two contrasting interventions to improve the situation.

Mental health workshops in schools may reduce the gap between the supply of mental health treatment and demand for it by reducing demand; through teaching participants information and strategies, workshops may increase the likelihood of participants remaining in good mental health. Additionally, workshops could signpost participants who do need help to resources and reduce stigma. This could ensure that existing services, such as they are, go to those that need them most. A key benefit of this intervention is that it would be relatively easy to implement, consisting of designing the workshops and then delivering them. This seems feasible for CDI/Kite to do, though, to increase sustainability, the delivery of workshops would ideally be handed over to schools themselves in the long term.

Automated CBT takes the opposite approach and reduces the gap between supply and demand by increasing supply. Since the marginal cost of providing automated treatment would be very low, it would be cheap to use Automated CBT to dramatically increase the numbers of people receiving treatment, once the tool is in place. Additional benefits may accrue from people being able to access treatment from home, potentially reducing the impact of stigma or access issues. Developing or adapting an Automated CBT tool for Tanzania would be a significant undertaking, however; rather than CDI/Kite, Automated CBT would likely require a major NGO. Nevertheless, given this idea's potential, such actors may be able to have a very large positive impact by implementing it. The recommendations here hopefully provide a useful roadmap for such an implementation.

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