POLICY AND SYSTEMS

EDITORIAL

Title: Policy recommendations to harness e-mental health for young people across the globe

Running head: E-mental health for young people

Alex Lau-Zhu[a], Chantelle Doran[b], Rituja Kamble[b], Sufia Rahman[c] & Su-Ying Yeoh[b]

[a] Medical Research Council Cognition and Brain Sciences Unit
[b] Department of Clinical Medicine, University of Cambridge
[c] Department of Physiology, Development and Neuroscience, University of Cambridge

*Corresponding Author: Alex Lau-Zhu, Medical Research Council Cognition and Brain Sciences Unit, 15 Chaucer Road, Cambridge, CB2 7EF, United Kingdom. Email: alex.lauzhu@mrc-cbu.cam.ac.uk

ABSTRACT

Despite existing evidence for psychological interventions, young people's mental health needs are unmet by the lack of service provision on a global scale, particularly in low-income settings. Novel strategies are urgently needed for successful service delivery to this age group. We examine e-mental health alternatives, which show promise for overcoming barriers to help-seeking in young people and addressing the dissemination gap for psychological help in this age group. Specifically, we consider computerized interventions, social media and video games. To better harness e-mental health for young people, we draw policy recommendations in three areas: raising awareness for different stakeholders; integration into existing healthcare; and targeted research and development.

Key words: youth, young people, psychological treatments, mental health, e-health, e-mental health

1. Introduction

The critical window of youth mental health

Youth is defined by the United Nations for statistical purposes as aged 15-24, with the distinction between adolescents and young adults made at age 19. It signals a critical time period for biological, psychological and social development. Key life events and developmental milestones, such as identity formation, educational attainment and career development, occur during adolescence and continue into young adulthood. In industrialized countries (Arnett, 2007), this unique time window has been described as "emerging adulthood".

Although youth typically conjures up imagery of good health, approximately 1 in 5 youths experience a mental-health condition each year (Patel, Flisher, Hetrick, & McGorry, 2007) and this figure is expected to be greater in developing countries. Up to 75% of mental disorders have their onset during adolescence and early adulthood (Kessler & Berglund, 2005). Many mental health disorders are chronic and recurring and thus continue into adulthood, with over 80% of adults with mental disorders diagnosed before the age of 22 (Kim-Cohen et al., 2003). Mental health problems are the leading cause of years lived with disability worldwide (Whiteford et al., 2013) and can reduce life expectancy by up to 20 years (Chesney, Goodwin, & Fazel, 2014). It is not surprising then that the inclusion of mental health has been advocated for United Nations post-2015 sustainable development goals (Thornicroft & Patel, 2014).

There is a strong impetus to focus prevention and treatment strategies on youth. Early intervention can have long-lasting outcomes and reduce future risk of mental health problems (Gulliver, Griffiths, & Christensen, 2010). Poor youth mental health can cause considerable personal suffering as well as large societal and economic costs, especially when individuals have the potential to become productive contributors in society. As an example, the total cost of mental health problems in the UK in 2009/10, including health and social care, lost output and reduced quality of life was £105.2 billion (Centre for Mental Health, 2010).

Needs unmet by current services

At present, there is a large treatment gap resulting in a significant unmet need in youth mental healthcare across the globe. This can be especially large in low and middle income countries, which only have one child psychiatrist for every 1 to 4 million people (World Health Organization, 2014). This is of particular concern, considering there is large skew in the distribution of youths, with roughly 90% living in low-income countries (Patel et al., 2007). A wealth of effective psychological treatments exists for mental health disorders; however, even in high-income countries there is still a substantial treatment gap in youth mental healthcare. Critical barriers to youth mental healthcare include low mental health literacy (Lam, 2014), stigma and embarrassment (Rose, Thornicroft, Pinfold, & Kassam, 2007), poor transition from child to adult-focused services with high rates of service disengagement (Patel et al., 2007; Singh, Paul, Ford, & Kramer, 2010), and preference to handle their problems alone, i.e. self-reliance (Gulliver et al., 2010). These factors contribute to low self-help seeking behavior. Given the disparity between needs and accessibility to and

availability of mainstream healthcare providers, we urgently require alternative models of service provision taking into account the unique needs and capabilities of this age group.

A suitable candidate: E-mental health

E-mental health is defined as "the use of information and communication technologies to support and improve mental health, including the use of online resources, social media and smartphone applications" (Mental Health Network NHS Federation, 2013). Since early 2000s, research and application of e-mental health has increased rapidly, particularly in Australia, US and the Netherlands (Lal & Adair, 2014).

Young people have grown up with the internet and smartphones and have thus been labeled 'digital natives' (Youthnet, 2009). Up to 90% of 16-24 year olds own a smartphone, they spend over 27 hours a week online and over 90% of this group use social media. They have consistently shown the highest rates of Internet use, social media use and smartphone ownership than any other age group. Their propensity to embrace technology represents an opportunity for harnessing both online and offline platforms. Mental health needs can be met through provisions of information, screening, assessment and monitoring of symptoms and interventions (Youthnet, 2009).

E-mental health offers opportunities to resolve issues within traditional methods of service delivery for young people: information can be disseminated widely and efficiently facilitating spread of mental health awareness; support can be accessed privately and anonymously, thus avoiding the stigma associated with help-seeking; access to support is unconstrained by geographical barriers, and sometimes even by availability of specialists; and it encourages self-directed services, consistent with preference of youth for self-reliance.

Here, we argue the outlook for e-mental health targeted at youth is promising. E-mental health can help disseminate psychological strategies on a continuum of transformation, by scaling up existing evidence-based approaches on one hand, all the way to the creation of novel strategies harnessing new modalities inherent to e-health (Mental Health Network NHS Federation, 2013). To illustrate this continuum, we consider the cases of computerized interventions, social media and gamification.

2. Computerizing existing interventions

A growing number of computerised interventions, ranging from medical self-management apps, computer programs and online consultation services have been developed to empower sufferers of chronic physical conditions through enhanced understanding and self-management of their condition. In the context of increasingly limited resources dedicated to mental health, computerising psychological interventions in a similar manner may offer a promising strategy to increase access to mental health care, and facilitate self-management of chronic mental health conditions.

Great need for well-established approaches

Computerizing well-established psychological treatments has the potential for scaling-up for wider dissemination. Cognitive behavioural therapy (CBT) is the first-line treatment for a wide range of mental health disorders, including depression and anxiety (National Institute for Health and Care Excellence, 2006). The fundamental tenet of CBT is that prior learning is currently maladaptive and a contributory factor to an individual's distress; through a structured approach, CBT aims to target an individual's way of thinking - reducing dysfunctional thoughts, emotions and behaviors by altering thinking patterns. CBT has even been demonstrated as efficacious as antidepressants for the treatment of mild to moderate depression, and is often preferred by patients as it is non-invasive, lacks side effects of medication and equips them with long-lasting skills. Despite such demonstrated efficacy, patient access to CBT remains a serious problem with long waiting times up to more than a year (Mind, 2013). This period of untreated mental illness can be viewed as a precarious time for an individual, as up to 1 in 6 people are believed to make a serious attempt on their life whilst on a waiting list for psychological treatment (Mind, 2013).

Protocols on the go

The difficulty in accessing CBT timely has sparked growth of a plethora of self-help programs offering computerized CBT. A meta-analysis (Andersson, Cuijpers, Carlbring, Riper, & Hedman, 2014) of studies demonstrated that across spectrum of mental health disorders, guided computerized CBT (CCBT) produced equivalent overall results to conventional face-to-face CBT, with recent positive outcomes for youth (Ebert et al., 2015), though some suggest the benefits apply mainly to mild and moderate presentations (Twomey et al., 2014) and not maintained in the longer run (Gilbody et al., 2015). Beyond treatment after diagnosis, cCBT has shown promise in prevention (Imamura et al., 2015).

Case study 1: Website-based computerized cognitive behavioural therapy (cCBT, (Clarke et al., 2009)

In this study, 160 young adults in the USA (age range 18-24) were randomized to a pure Internet-based cCBT self-help website or followed treatment as usual (TAU).

CCBT was delivered via a website with no therapist contact. It adapts material normally used in conventional treatments into a self-help friendly format. The program consisted of four main sections:

1) 'Measure your mood' - where subjects completed a brief depression scale, and were able to review their graphically displayed depression scores over time.
2) 'Facts about depression' – an educational section offering information about the symptoms, causes of and treatment for depression.
3) A 'journal' section to record their private thoughts and concerns, which could be shared on a voluntary basis with other subjects involved in the trial.
4) 'Improve your mood' - with short cCBT tutorials and personalised feedback simulating how CBT for depression is delivered in a conventional manner, without any input from a therapist.

TAU was a heterogeneous group in which subjects received variable amounts of psychological talking therapies and psychotropic medication.

Depressive symptoms were assessed regularly up to 32 weeks after the start of the intervention. CCBT produced equivalent symptom reduction effects as TAU.

While long-term effects after program completion need to be determined, this study showed that cCBT represents a worthwhile candidate for immediate treatment of emotional disorders in youth, in the many cases where conventional face-to-face treatment is not readily available.

Computerising interventions improves self-management, especially when awareness of one's own mood states appears critical in mental health improvement. A prominent example originally designed for military personnel, T2 mood tracker (Bush, Ouellette, & Kinn, 2014), can be used to record problematic symptoms on a day-to-day basis; Results can be viewed over a period of time and shared with healthcare professionals to improve shared understanding of one's condition. Such methods of self-management may hold great potential in the emerging adults who are assuming greater responsibility for managing their own mental illness. Effective monitoring of symptoms at this stage to pick up early warning signs of a relapse is paramount.

3. Spreading via social media

The emergence of the Internet and social media mean users can now upload multimedia content, interact with each other and contribute to this content directly. Within this platform, public interaction on a rapid, global scale allows user-generated virtual communities to emerge. This new features can be exploited for mental health in young people.

The ubiquity of health in social media

Conversations about health-related causes and personal health experiences are common on social media platforms such as Facebook (De la Torre-Díez, Díaz-Pernas, & Antón-Rodríguez, 2012). Social networking sites provide support groups for a wide variety of health problems (e.g. diabetes, breast cancer) and blogs containing personal experiences of illnesses and recovery. By creating a forum for patient participation that extends beyond the reach of the hospital or the local clinic, social media confers to patients a greater sentence of control, supporting self-reliance- a particular concern in youth (Househ, Borycki, & Kushniruk, 2014).

Case study 2: '*Reach Out*!' (Blanchard, Metcalf, & Burns, 2007)

"*Reach Out!*" is an Australian online-moderated self-help program, based on CBT principles, designed to provide information and resources to increase young people's understanding of mental health issues, develop resilience, and improve coping skills and help-seeking behaviors.

Making use of podcasting, MySpace, and an online community forum amongst others, social media constitutes a major part in its treatment plan.

Online profiling of 1432 young people in 2006 showed that:
- 37% visited *Reach Out!* once in a week or more
- 1 in 3 stayed on the site for 20 minutes or longer
- 75% said that they would return to the site if going through tough times
- 80% said they would refer it to a friend.
- Of the further 279 professionals surveyed, 79% rated it as "excellent" or "very good".

The availability of a peer-moderated online forum moderated by staff (advised by clinicians) offers the ease in "opening up", which may be lacking in traditional therapy sessions, as it may be used at a pace and level that the user is comfortable with.

Financial benefits have also been observed and documented: Reach Out! costs less than $1 per visit, compared with $150 per hour for face-to-face counseling, and $19-$58 for tele-counselling per person.

The 'social' side of social media

While the application of social media for mental health -and even more specifically for youth - needs to be studied in greater detail (Francomano & Harpin, 2015), it has the potential to fill treatment delivery gaps. For example, social media could provide continuity of care between therapy sessions whereby low-level support can be provided analog to a 'keep-track' tool, and can also become extensions after treatment for relapse prevention. Critically, social media can be used as a platform to complement traditional therapy. There are indications that young people find support from peers on social media and blogging communities - and the online forums specific to their disorder- a helpful source for both mental health psychoeducation and informal support from peers (Montague, Varcin, Simmons, & Parker, 2015). An exciting area of further development is the inclusion of social media participation within the context of CBT treatment delivery.

Case study 3: Panoply

Cognitive reappraisal is an emotion regulation strategy that aims to change the direction of an emotional response by reinterpreting the meaning of the emotionally-linked event. Focusing on the strategy of cognitive reappraisal, the peer-to-peer platform of Panoply allows users to post content, respond to other users and to receive notifications when interactions occur.

People with depression and anxiety often have irrational thought patterns that allow them to perceive normal situations in a distorted, negative manner. When a user encounters a situation in life they find upsetting, they post its description as they perceive it, other users then point out the ways that the individual may have fallen into distorted patterns of interpreting the situation and proceed to reframe the situation. The hope is that gradually, users renounce their old, distorted interpretations of events to gain a more rational perception of their role in daily events. A recent study testing its efficacy showed evidence that Panoply improved reappraisal skills and reduced depressive symptoms (Morris, Schueller, & Picard, 2015).

4. ‘Gamifying’ therapies

Gamification refers to the process whereby video game elements and techniques are exploited to encourage changes in non-gaming domains, including health. Gamification has been more widespread in physical health applications (King, Greaves, Exeter, & Darzi, 2013), especially for children as it represents an opportunity to teach self-management skills in an interactive and fun manner. While concerns regarding the negative impact of video games on development have pervaded in the psychology literature (Greitemeyer & Mügge, 2014), recent years have seen an emergence of interest in the use of games specifically in mental health care.

Case study 4: SPARX, a CBT-inspired videogames

This game available to residents in New Zealand (Merry et al., 2012)aims to encourage players to learn how to improve the management of their symptoms, via fantasy roleplaying as a means of teaching individuals how to tackle and resolve their problems.

The game is split into different levels, named ‘provinces’, each presenting a variety of tasks (puzzles) that work to reduce symptoms of depression by teaching core CBT skills. For example, in ‘swamp province’, the player has to learn to recognize unhelpful negative automatic thoughts that maintain their symptoms, and are taught to do controlled breathing as a stress management technique.

The game has already won an innovation prize at the United Nation’s World Summit Awards , evoking interest in the USA, UK, Canada and Australia, as well as some non-English speaking countries that wished to translate the game. Further possibilities are being considered for Internet release and adaptation to iPad and Android tablets, as well as developing ‘Rainbow SPARX’ targeted at gay youth.

Promising technologies

Evidence-based approaches such as CBT can also harness the benefits of being ‘gamified’, by making well-established techniques more ‘interactive’, or even simulating real-world scenarios via virtual reality (Srivastava, Chaudhury, & Das, 2014). An EU initiative, PlayMancer, aims to develop a videogame prototype for treating specific mental health disorders, with special interest in teaching emotional self-control skills. Interestingly, their prototype games can be played on an ordinary computer, and harness the multiple modality inputs, using biosignal, facial and

speech-based emotional recognition system, to detect the player's emotions during game-play to provide them with instant performance feedback, allowing for immediate recalibration and personalization.

Innovation driven by cognitive neuroscience

Scientists have also argued that gaming can lead to structural brain changes in regions that control spatial organization, memory, strategic planning and fine motor skills. Recent research suggests that such science-driven approaches can help develop treatments unlike traditional psychological therapies (Holmes, Craske, & Graybiel, 2014). For instance, strategically playing the computer game *Tetris*, thought to compete for selective brain resources, have shown initial promise to reduce unhealthy cravings (Skorka-Brown, Andrade, Whalley, & May, 2015) and unwanted memories (James et al., 2015). Gamifying an emerging treatment initially developed in laboratory settings can produce measurable mental health benefits. For example, a cognitive-bias modification procedure involving repeatedly ignoring threatening stimuli (such as an angry face) while focusing on nonthreatening stimuli (such as happy or neutral face) has shown to benefit those with high levels of anxiety (Dennis & O'Toole, 2014).

5. Implications for policy and onwards

The approaches reviewed so far showcase the way e-mental health can be harnessed to transform mental health in young people by harnessing their very own affinities and capabilities with technology. E-mental health can help disseminate existing evidence-based approaches, such as scaling up via computerizing interventions. Further, e-mental health can harness modalities unique to technology, including social media and gaming interfaces, to produce novel strategies that would not look like traditional treatments anymore. To better harness e-mental health for young people, we draw policy recommendations in three areas: raising awareness for different stakeholders; integration into existing healthcare; and targeted research and development.

5.1. Increasing awareness for multiple stakeholders

A unified response is critical to bring these new e-mental health strategies into greater light amongst the wider youth population. The convergence of stakeholders from diverse sectors (e.g. healthcare professionals, healthcare policy-makers and researchers) should thus contribute to long-term strategies of developing and implementing e-mental health.

Targeted promotion

In particular, we need to target youth across the globe with public education campaigns, which must carefully consider country- and culture-specific variables, such as religion, gender and stigma (Kalibatseva & Leong, 2014). For example, in the UK, the National Institute of Clinical Excellence has recommended the use of computerized CBT for the treatment of anxiety and depression (National Institute for Health and Care Excellence, 2006). This approach can bring awareness to already existing resources, reduce stigma, and democratize psychological help by reaching

young people directly and bypassing referral system. It would be important to consider dissemination channels preferred by young people, including social media platforms, mental health forums and apps.

Training the trainers

The development of e mental-health technologies also need to address practitioners' concerns and knowledge state. Awareness can be raised via step-by-step breakdown and analysis of clinical benefits targeted specifically at healthcare professionals involved in youth care. This shall not be exclusive to mental health settings, as specialist services and youth-specific skills are scarce (Betton & Tomlinson, 2013). For developing countries, a more effective strategy involves population-wide approach similar to that launched by the WHO Mental Health Gap Action Programme (mhGAP). This would provide intervention guidelines for workers within social services, schools and other everyday settings, who may be in contact with young people that would otherwise not present to mainstream healthcare settings.

5.2. Integration within existing healthcare structures

With the lack of transition care, more resources should consider the integration of e mental-health strategies as adjunct to support and enhance traditional treatment protocols, while also embedded within an ongoing research program monitoring effectiveness to inform further optimization.

Active waiting

Waiting times for evidence-based psychological treatments can be long and often exacerbated in youth. We support further examination of using e-mental health tools as a mental health first aid tool particularly for young people awaiting conventional therapies. Adaptation of current evidence-based psychological treatments into Internet format is a crucial step towards increasing accessibility at a global scale. Online resources should be deliverable by mobile internet as mobile phone technology is a major source of information technology in low-income countries (Christensen & Petrie, 2013).

New toolbox for practitioners

We also support training programs for mental health professionals on how to harness e-mental health to increase engagement in young people. This may make use of patient-generated data (e.g. charts showing trends in depressive symptoms over a month-long period) to inform the management of their patients. Use of in-between-session low-level support, such as via social media or computerized exercises, can boost treatment engagement. Knowledge can be developed for offering these tools to high-risk individuals of developing mental health difficulties, such as due to chronic physical health or to suffering a traumatic event. Related toolkits have been developed by the World Health Organizations (World Health Organization, 2004), but more streamlined outputs are needed for dissemination.

Appropriate moderation

Governance and safety must be a high priority, especially for social media. Poor quality information can even lead to patient harm, such demonstrated by research demonstrating copycat behavior induced by portrayal of suicide and self-harm in the media (Stack, 2003). Further, the occurrence of "trolling" and posts glamorizing mental illness and suicide pose a threat to the recovery process of the patient, and are not uncommon. Hence both moderation strategies and their evaluation must be in place. Integration of social media requires also provision of trained personnel, for which cost-effectiveness should be fully assessed for realistic translation especially in developing countries. An alternative would be to implement Mechanical Turk workers paid to determine whether every post passes certain criteria before going online; further, algorithms screen the text of each post and hence quarantine those that contain potentially offensive or dangerous words and phrases (Cohen, 2013).

5.3. Research agenda should focus on optimization, personalization and safety monitoring.

For e mental-health to fulfill its promise for global youth, in particular their long-term benefits, a comprehensive program of research and development should be conducted bringing together healthcare professionals, research scientists and policy-makers.

Personalized support

We advocate funding for further research and development in a select number of evidence-based CCBT programs. A step-wise approach should be taken to tackle problems and optimize its delivery and uptake. For instance, low completion rates should be addressed by providing regular text message or email reminders, before dispensing online treatment on a large scale. The specific needs of emerging adults could be taken into account in the re-development phase, by trialing programs on individuals and using their feedback to guide amendments to the program. Social media and video games provide possibilities to deliver the 'goods' from CBT in ways that could be particularly suitable and attractive for young people, hence they deserve further research. Psychological help may look little similar to current talking therapy formats.

Comprehensive database

The multitude of available e-mental health resources can vary in quality. Further, patients are often unaware of their existence of the evidence-based apps. Amongst depression apps, there is poor reporting of organization affliction and the source of the content, making it difficult for users to judge their reliability (Shen et al., 2015). Choosing and sticking with an app to help with mental health without guidance can be difficult, and may serve to be a current barrier to the usefulness of self-management tools in mental health. In this regard, the build-up of a one-stop high quality reliable national and international e-mental health resource directory is imperative.

Investment in basic science

Outcome research on effectiveness should be combined with research into mechanisms that promote symptom reduction. This is of important consideration for the ongoing developing brain in young adults. As exemplified by video games,

research backed within a cognitive neuroscience framework can give us a better understanding of how to best develop new forms of e mental-health. A research program founded in evidence is needed to validate mental health benefits and possible side effects.

6. Conclusion

There is clearly a disparity in service provision between physical and mental health, and in no demographic group is this injustice more palpable than in young people. We believe e-mental health can address the mental healthcare dissemination gap by exploiting the unique technological expertise of the emerging adult group. E-mental health can transform mental health service delivery all the way from scaling up existing approaches to developing completely novel strategies harnessing novel tools, such as social media and video gaming. E-mental health as a health approach modality is still very much in its infancy, but may hold the key to transforming the current landscape of mental health provision for young people across the globe.

Financial Support
Alex Lau-Zhu is supported by the Cambridge International Scholarship awarded by The Cambridge Commonwealth, European and International Trust. Sufia Rahman is supported by a BBSRC DTP studentship.

Acknowledgement
We would like to thank Dr Marit Sijbrandij, Toby McMaster and Siobhan Botwright for their comments on earlier drafts.

Declaration of Interest
None

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