Chapter

# Where Technology Meets Psychology: Improving Global Mental Health

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## Abstract

Mental health disorders are a growing concern worldwide. Unfortunately, they are not limited to a single demographic group, and there are not enough mental health professionals to evaluate every case. Training other healthcare providers in mental health topics is a possibility; nevertheless, relying on face-to-face training alone is not scalable. The use of technology has become an essential and feasible opportunity to address global education challenges. Furthermore, the use of e-learning could be an important strategy to reach effective mental health care and address disparities worldwide. This paper describes the importance of e-learning and e-MH (e-mental health) leaning for health providers and the possibility of e-learning as a solution to strengthen human resources for mental health globally. The use of e-MH learning creates an opportunity to overcome social, geographical, economic, and educational barriers and to train worldwide health professionals in mental health.

**Keywords:** e-learning, e-MH, technology-enabled learning, online learning, online education programs

## 1. Introduction

Mental health disparities are an urgent global issue, and we must take action. According to the United Nations, mental disorders are a leading cause of disability, accounting for 7.4% of disability-adjusted life years (DALYs) worldwide in 2010, a 38% increase since 1990 [1]. Furthermore, one in four people worldwide will suffer from depression, anxiety, or some other forms of mental illness over their lifetime [2]. Unfortunately, the situation is not better for children and adolescents, and the World Health Organization (WHO) has predicted that the burden of internalizing disorders in children and adolescents will surpass that of HIV by 2030 [3]. In Europe and the Americas, mental disorders among children aged 5-14 years ranked third among the causes of DALYs in 2000 and second in 2015 [4]. Most regions in the world had approximately 4 mental disorders in the top 20 diseases that cause the most DALYs in children aged 5–14 years. Conduct disorders and anxiety disorders were among the first two [4]. A meta-analysis published in 2015, including 27 countries and every region of the world, estimated a worldwide prevalence of mental disorders in children and adolescents of 13.4% [5].

Mental health is a pressing global health issue due to its burden, high prevalence, and alarming inequalities in access, stigma, treatment, and training. These

factors are not just the result of low funding into the field of mental health. A lack of workforce and inadequate workforce training is another significant factor associated with the unequal burden of mental health globally [1]. The World Health Organization estimates that there is a shortage of about 7.2 million healthcare workers globally, and by 2035, this number will increase to 12.9 million [6]. Training health workers is one key initiative to improve this critical problem.

Global mental healthcare providers face several challenges, particularly in underserved and rural areas. These challenges include not only insufficient training but also a lack of physical resources, heavy caseloads, limited time, and the absence of referral services [7]. Training programs for psychiatrists are present in only 55% of low-income countries, 69% of low-middle-income countries, and 60% of upper-middle-income countries [8]. Gaps in delivering mental health training can be mitigated through continued training [8], which has proven to be one effective way to undertake challenges brought by disparities [7]. However, continued education is not easily accessible to many health providers due to time constraints, expenses, and geographic barriers [7].

With the advances in technology, online learning platforms have become more accessible in many fields, including health. Electronic learning or e-learning is defined as education delivered through an electronic form [9]. The term e-mental health or e-MH refers to mental health education, training, treatment, or screening through an electronically based approach.

## 2. e-Learning

e-Learning is defined as the use of "technology and services (e.g., computer or electronic device) to provide training or learning material including tutorials, simulations, case-based, and game-based, learning modules" [10]. e-Learning modalities include, but are not limited to, CD-ROMs, e-books, and Microsoft PowerPoint presentations to more complex virtual courses [9]. A helpful resource to understand the different levels of e-learning is with Alexander's four-level model of e-learning [11]. The first level is about online presentations and publishing, for example, review an article uploaded by a professor. The second level includes online quizzes and assessments. The third level comprises online forums in which participating students are provided with feedback and have the opportunity to engage in an online discussion. The fourth includes interactive learning through role-play, face-to-face exchanges, debates, etc. As the levels increase, e-learning becomes more similar to traditional face-to-face learning, and the trainer becomes more involved with the student's learning process.

Most e-learning courses require a trainer or instructor that is responsible for the content of the program. This person could be a professor at a university, a medical doctor at a hospital training program, etc. The trainer has different obligations depending on the level. For the first level, the trainer would be responsible for selecting readings for students, including the creation of any material such as PowerPoint presentations. In the second level, the trainer selects the information, creates evaluation systems, corrects them, and delivers feedback. For the more interactive third and fourth levels, the trainer will provide classes and lead other activities, just like a face-to-face model of training. Although trainers are not involved with the technological creation of the program, they are involved with the content and content delivery [11].

Initially, three main characteristics made e-learning different from the conventional face-to-face learning approach: asynchronicity (lack of unity of time), decentralization (lack of unity of place), and electronically mediated interaction and

communication [12]. The lack of time and place create a different form of communication between the trainer and the student, with an absence of preverbal communication and more close contact [12]. As technology has improved and depending on the type of course, e-learning can also be synchronous, for example, when doing online debates in which every student needs to log in at a specific time with the trainer.

### 2.1 Advantages

e-Learning is a student-centered model that allows students to learn and study at their own pace and on their schedules [10]. Efforts are centered around learning and the student's needs, not the teachers' [12]. It is, therefore, an individualized model, based on innovative and interactive methods of education in an "information-rich environment" [12]. Additionally, materials must be accessible for students at all times, so that students can review them as many times as they need it. Having available materials also requires the teachers to have the content prepared before the start of the course, which ensures higher quality [12].

High-quality health education is limited in several regions of the world [13]. With the fast and ongoing advances in medicine, being up to date with the latest treatments and interventions can be impossible for the majority of health providers. Nevertheless, e-learning has become an attractive way to improve these limitations, given its affordability, flexibility (in time and location given its asynchronous and decentralized nature [12]), accessibility, and capacity-building potential in those places that need it the most [13, 14]. e-Learning is more affordable than traditional face-to-face learning since operational costs (physical classroom, accommodation, and travel) are lower.

### 2.2 Disadvantages

The personal interaction between trainers and students is considerably altered in e-learning, and some trainers fear that this will end up affecting the learning process [12]. For trainers, the preparation of e-learning courses is very different from face-to-face classes and requires a different skill set. For one thing, trainers need to develop competencies in technology and in teaching in virtual environments [12]. Since trainers may face a technology learning curve and also need to prepare in advance of the class sessions, e-learning demands more time from trainers than traditional face-to-face training sessions [12].

Although e-learning is more affordable than face-to-face courses and more flexible, it is still based on the assumption that the student has technology that is appropriate for the course. While e-learning has the opportunity to make education more universal, the need for technology is still an impediment to some parts of the population who want to engage with e-learning. Nonetheless, from 2000 to 2015, Internet access has increased by 806% [15]. The most significant increase in access has occurred in Africa [15].

Language can also be a limitation when benefiting from these courses since they are usually in English. Although translating courses can be expensive and complicated, its need often depends on the target's audience literacy and education level [16]. e-Learning can overcome some of these barriers, as long as the program is "sensitive to the level of availability of infrastructure, [and has] technical support, [a] clear policy on implementation, evaluation and curriculum re-orientation" [16].

### 2.3 Effectiveness

Although it is still a growing model, e-learning has been used to provide medical education and has proven to be equally effective as a face-to-face instructor-delivered

training [17]. Several systemic reviews have concluded that the perceived experience of instructors and students is useful in the acquisition of clinical skills [12]. A program conducted in Kenya to support healthcare workers with respiratory infection control reported that the knowledge gains were almost equal between face-to-face and e-learning groups [16]. However, e-learning research has primarily focused on student's satisfaction and knowledge improvement, and it still needs to evaluate behavioral changes in healthcare professionals [9].

## 3. e-Mental health (e-MH) learning

e-Mental health is the use of technological tools and media to "provide screening, health promotion, prevention, early intervention, treatment, or relapse prevention as well as for improvement of health care delivery (e.g. electronic patient files), professional education (e-learning), and online research in the field of mental health" [18].

Given the global need to improve mental care, e-MH is one of the fastest-growing fields. e-MH is mainly for treatment programs and monitoring systems. With the use of apps, email, and the Internet, monitoring systems have been created as a supplement from clinical consultation for patients [15]. For example, the True Colors self-management system is an app created by Oxford University to help patients with bipolar disorders to monitor their symptoms and plan activities better [15]. Another e-MH has been web-based treatment programs such as electronic psychotherapy interventions, telepsychiatry (TP), or telemental health (TMH) [19], for patients suffering from depression, anxiety, eating disorders, substance abuse, and dependence [20]. Although there are many types of psychotherapies, most of these online interventions are based on the cognitive behavioral therapy (CBT) model, since it is useful and relatively simple to use through electronic media. In CBT, mental health providers act as trainers that teach patients several skills to better recognize symptoms and techniques to address them [18]. CBT has been effective in various mental disorders and has a structure that makes it compatible with technological platforms.

e-MH has not been utilized as much in professional education (e-learning), but it is becoming a pressing need given the shortage of healthcare providers and the increasing demands in mental health. While the availability of online programs that provide psychotherapy teaching to mental health providers is limited, existing research does indicate comparable efficacy results between e-learning and face-to-face mental health training [14]. The Queensland Centre for Mental Health Learning offers different online education options for mental health professionals. Recently, their sensory modulation approach program was tested on 121 participants, with positive results in improved knowledge and acceptability [14].

So far, positive results have been found in the use of e-MH for patients through educational apps, monitoring programs, and telepsychiatry. Now the challenge is to use e-MH as teaching platforms for mental health providers. Given the simplicity of cognitive behavioral therapy and its easy incorporation into electronic modules, CBT may be one of the first e-learning options for mental health personnel.

### 3.1 e-MH for children's mental health

According to the American Academy of Child and Adolescent Psychiatry (AACAP), there are approximately 8300 practicing child psychiatrists in the United States and more than 15 million children and adolescents with a particular need that requires the expertise of a child and adolescent psychiatrist [21]. This situation invariably leads to a delay in treatment or even no treatment at all [21].

Unfortunately, this disproportion might seem better than that of other countries, where the number of child psychiatrists is even lower. Furthermore, children and adolescents living in poverty conditions have a higher risk for mental disorders but are less likely to receive the appropriate help [22]. It is prevalent for people with mental disorders or difficulties to never see an expert; therefore, primary care providers are an essential solution in addressing mental health concerns [22]. With this in mind and the importance of promoting mental health in children and adolescents, e-MH has also become a solution in this area.

The Resource for Advancing Children's Health (REACH) institute is a nonprofit organization committed to ensuring up-to-date mental healthcare reaches everyone who needs it, through innovative training to primary care providers. Participants initially attend a 3-day interactive course in diagnosis and treatment of various mental health topics, followed by a 6-month case-based e-learning system. This program has consistently and successfully trained hundreds and extended throughout the United States and other countries. Other programs, such as the ECHO project, use video conference technology to train primary care clinicians in mental health, HIV, chronic pain, and endocrinology, among others. The mental health initiative in Cincinnati offers clinicians online support to improve the treatment and monitoring of their patients.

## 4. Considerations when creating a successful e-MH learning program

Self-paced modules, interactive activities, case scenarios, opportunities for self-reflection, and links to further information and resources are convenient when creating online learning platforms [14]. Also, the option to reassess the lessons following the completion of the training allows students to review the material and make the most out of it [14].

Learning strategies rooted in theory serve as a useful foundation when designing an e-MH learning program. For example, the Train-the-Trainer model is based on the Adult Learning Theory, which implies that learning works best when peers provide its resources. Also, the diffusion of innovation theory suggests that people adopt information better when it is provided by a social network they trust [23]. Some e-learning websites only provide digitalized versions of textbooks or courses, making the learner's experience more like reading an "electronic book" instead of being part of a class [10]. The social-cultural learning theory suggests the increased use of situated learning, which provides learners with representations of real-life experiences to solve and reflect on [10]. Situated e-learning "is defined as a computer-assisted educational program constructed with simulated situations, scenarios-based, or case-based learning activities" [10]. For example, the creation of virtual patients with a specific set of symptoms, lab tests, clinical course, and questions mimics the real-world and encourages the learner to acquire skills and knowledge to manage and solve unique situations [10]. Situated learning is an effective method to improve clinical students' knowledge and abilities while avoiding unnecessary risks of real patient encounters [10].

## 5. Organizational barriers and solutions to e-learning

The many advantages of e-learning have also presented the opportunity to study and better understand its limitations. The HeXL project (Health eXL: Surmounting the barriers to NHS e-learning in the North-East) is one of the many projects that aim to identify the obstacles and limitations of e-learning in NHS staff and healthcare students, to overcome them [24].

### 5.1 Organizational barriers

The HeXL project identified the following organizational barriers: adopting and developing e-learning programs is time-consuming, quality standards are lacking, modules need to be carefully scheduled, and marketing can be problematic [24]. Another considerable concern includes change management. Some trainers may have concerns about the process of change, lack the required skills to develop and teach an e-learning program, and lack time to do so, since developing an e-learning program is more time-consuming for trainers than traditional face-to-face approaches [24].

At the managerial level, solutions are related to the commitment of both institutions and trainers, the cooperation between departments, and the inclusion of software providers and trainers. Culture shift strategies, as well as planning and implementation processes with appropriate resource management, are key strategies to overcome organizational barriers [24]. As for the trainers, it is crucial to have a good collaboration between content, pedagogy, and technology. Trainers also need time to master the technique and to adapt their teaching styles to online sessions.

### 5.2 Economic barriers

e-Learning has some additional costs compared to the traditional learning scenario, which can be divided into initial fixed costs including hardware cost, start-up costs, equipment, and training and ongoing variable costs such as software, licenses, keeping equipment up-to-date, program development, and training, among others [24]. In this case, it is vital to know the real costs of the program, including its cost-effectiveness and cost-benefit analysis. For students, e-learning costs are usually low or even free, since operational expenses (travel and accommodation) are reduced compared to traditional learning [11]. Some programs, such as the Global Health eLearning Center, offer free courses. Nevertheless, this initiative is not always incentivized, since there is some discussion surrounding how payment makes students more involved with the program [24]. Course costs could be adapted to the income of the country, or, if the courses are associated with an institution involved in research, charges could be reduced if participants agree to participate in survey studies.

### 5.3 Hardware and software barriers

Technology is an especially challenging barrier since not enough research and innovation have been done in e-learning programs. Both trainers and learners need to feel comfortable with the program and have easy access to it [11]. The hardware must be reliable, and problems need immediate solutions [24]. An excellent way to provide the best software is through the initial evaluation research on software packages, carefully designed software from the learner's and trainer's point of view, and a pilot test with feedback and following modifications [24].

### 5.4 Pedagogical barriers

There are various skepticisms around e-learning. Many have to do with the idea that traditional methods are better, that technology cannot be trusted, that there is no personal contact, and that the quality of education is not the same. While many of these problems are real, growing technological advances have surpassed many of these limitations [24]. However, the rejection of trainers toward e-learning also has to do with their fears about how to teach in an electronic setting. The competences of face-to-face teaching and e-learning are not the same, and with the increase of e-learning, a documented need for e-pedagogy is also rising [12].

To overcome these barriers, standards of quality need to be created as an integrated system between content, pedagogy, and technology. Courses need pilot tests and should be evaluated regularly [24]. Also, programs need to be tailored according to the needs of the trainers and learners. Although there is still not enough evidence to fully understand the roles and best teaching methods for educators [12], the involvement of educators in the creation of the program and the use of pilot tests and training on the software are good ways to help with the adoption process.

### 5.5 Adherence to e-learning programs

e-Learning poses a challenge when it comes to maintaining students' interest. Not having a face-to-face approach and relying more on self-paced learning pose a higher risk, since students' lack of engagement can lead to losing them as the course advances.

Since e-learning is a new educational system that comprehends a different way to relate to the instructor compared to the face-to-face approach, with a greater emphasis on individualized education and self-paced learning, maintaining a student's interest can be difficult. e-Learning might have a higher risk of not engaging students enough and therefore, losing them as the course advances.

To prevent attendance attrition, courses could include pre- and posttest quizzes and a final exam that test the student's knowledge and grant a certificate with a score higher to a certain percentage on the final exam [16]. Additionally, although it is easier to make the course asynchronous, synchronicity improves the student's learning experience as well as involvement with the course.

## 6. Looking ahead on e-MH learning

### 6.1 Task shifting

Task shifting is defined as "delegating tasks to existing or new cadres with either less training or narrowly tailored training" [8]. It is proven as an effective and feasible intervention in response to the shortage of mental health providers [8]. Although e-MH is being used mostly with physicians, the training can be extended to nonmedical mental health workers as another potential solution to improve mental healthcare disparities [7]. Although these health providers are not trained or licensed to diagnose and prescribe medication, they can be trained in psychotherapeutic techniques, which are known as task shifting [7].

Mental health e-learning can even be used for the general population, not only for patients to understand and track their diseases better but also for the general population to provide a mental health service when needed. In Australia, a Mental Health First Aid (MHFA) training course was developed for the general population to improve mental health first aid skills [17]. There is an increasing prevalence in mental health disorders and in the number of natural and human-made disasters (terrorist attacks, earthquakes, tsunamis, etc.), which can trigger existing mental illnesses or cause psychological symptoms. As a result, having the general population trained on mental health first aid is an essential first response, while appropriate professional help is received or crises are resolved.

### 6.2 Increasing enrollment

e-MH learning also works as an innovative way to improve mental health education for medical students. Not all medical students have access to psychiatrists and psychologists that can teach them. Others, on the contrary, do but not always

feel comfortable with the subject of mental illness. Patients with mental illness often cause fear in medical students. Additionally, negative attitudes from medical students toward psychiatry are explained by the perception that psychiatry is not scientific and not enjoyable and it does not include medical training in its practice [25]. The use of innovative educational initiatives increases knowledge about mental health, improves attitudes, and reduces stigma [25]. One example of this is the King's THET Somaliland Partnership (KTSP), which works to strengthen health care through the exchange of knowledge, skills, and experience between Somaliland and King's Health Partners in the United Kingdom [25]. To improve attitudes toward psychiatry, the KTSP mental health group provided teaching to medical students in Somaliland, who did not have any previous training in psychiatry. By the end of the course, there was a positive association between this brief education process and positive attitudes toward psychiatry [25].

The amount of mental health workers is limited, and, in part, this is related to medical students' negative attitudes toward psychiatry and mentally ill patients, which translates into a reduction of recruitment into psychiatry. e-MH learning could improve medical students' attitudes toward mental health and, therefore, increase enrollment in psychiatry residency programs.

## 7. Conclusion

The increasing prevalence of mental disorders has become an alarming problem, especially in children and adolescents. Its negative consequences extend from the patient to his/her family, community, health system, and society. Furthermore, there are critical inequities in mental health that make it even more challenging to address. Global mental health inequities are manifested in different ways. Some are related to insufficient access and therapies, others with limited promotion and prevention campaigns, and others with scarcity in mental health workforce and training.

The discussion about the workforce has become imperative, as the world leaders are trying to achieve more comprehensive and universal health coverages. Dr. Carissa Etienne, WHO Regional Director for the Americas, mentions that one of the challenges for reaching global health coverage is "ensuring that everyone—especially people in vulnerable communities and remote areas—has access to well-trained, culturally-sensitive and competent health staff" [6]. An analysis of the global workforce by the Joint Learning Initiative highlighted the need to strengthen human resources for health through the creation of knowledge and continuous learning opportunities [16]. e-Learning is becoming a necessary intervention to address global education challenges. Research regarding the use of health learning platforms has been effective. With growing evidence to support its use, the need to train health providers in mental health topics should be the next step.

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## References

[1] Farrington C, Aristidou A, Ruggeri K. mHealth and global mental health: Still waiting for the mH 2 wedding? Globalization and Health. 2014;**10**(17):1-8. Available from: http://www.globalizationandhealth.com/content/10/1/17

[2] Pike K. Want a Safer, More Prosperous World? Invest in Mental Health. 18 August 2015. Retrieved from: https://thehill.com/blogs/congress-blog/healthcare/251312-want-a-safer-more-prosperous-world-invest-in-mental-health

[3] Kato N, Yanagawa T, Fujiwara T, Morawska A. Prevalence of children's mental health problems and the effectiveness of population-level family interventions. Journal of Epidemiology. 2015;**25**(8):507-516

[4] Baranne ML, Falissard B. Global burden of mental disorders among children aged 5-14 years. Child and Adolescent Psychiatry and Mental Health. 2018;**12**(1):1-9

[5] Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA. Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. The Journal of Child Psychology and Psychiatry and Allied Disciplines. 2015;**56**(3):345-365

[6] World Health Organization. Global health workforce shortage to reach 12.9 million in coming decades [Internet]. 2013. Available from: http://www.who.int/mediacentre/news/releases/2013/health-workforce-shortage/en/

[7] Ravitz P, Cooke RG, Mitchell S, Reeves S, Teshima J, Lokuge B, et al. Continuing education to go: Capacity building in psychotherapies for front-line mental health workers in underserviced communities. Canadian Journal of Psychiatry. 2013;**58**(6):335-343

[8] Kakuma R, Minas H, van Ginneken N, Dal Poz MR, Desiraju K, Morris JE, et al. Global mental health 5 human resources for mental health care: Current situation and strategies for action. Lancet. 2011;**378**(9803):1654-1663

[9] Sinclair PM, Kable A, Levett-Jones T, Booth D. The effectiveness of Internet-based e-learning on clinician behaviour and patient outcomes: A systematic review. International Journal of Nursing Studies. 2016;**57**:70-81

[10] Feng J-Y, Chang Y-T, Chang H-Y, Erdley WS, Lin C-H, Chang Y-J. Systematic review of effectiveness of situated E-learning on medical and nursing education. Worldviews on Evidence-Based Nursing. 2013;**10**(3):174-183. DOI: 10.1111/wvn.12005

[11] Chang V. International journal of information management review and discussion: E-learning for academia and industry. International Journal of Information Management. 2016;**36**(3):476-485. DOI: 10.1016/j.ijinfomgt.2015.12.007

[12] Koch LF. The nursing educator' s role in e-learning: A literature review. Nurse Education Today. 2014;**34**(11):1382-1387. DOI: 10.1016/j.nedt.2014.04.002

[13] Murphy R, Clissold E, Keynejad RC. Problem-based, peer-to-peer global mental health e-learning between the UK and Somaliland: A pilot study. Evidence-Based Mental Health. 2017;**20**(4):140-144

[14] Meredith P, Yeates H, Greaves A, Taylor M, Slattery M, Charters M, et al. Preparing mental health professionals for new directions in mental health practice: Evaluating the sensory approaches e-learning training package. International Journal of Mental Health Nursing. 2018;**27**(1):106-115

[15] Smith KA, Tomlin A, Cipriani A, Geddes JR. Evidence-based mental health and e-learning: A guide for clinicians. BJPsych Advances. 2016;**22**(1):55-63. DOI: 10.1192/apt.bp.113.012377

[16] Mwaikambo L, Avila M, Mazursky S, Nallathambi K. Utilizing eLearning to strengthen the capacity of global health practitioners and institutions around the world. Knowledge Management & E-Learning. 2012;**4**(3):293-309

[17] Jorm AF, Kitch-Ener BA, Fischer J-A, Cvetkovski S, Fellow R, Kitchener BA. Mental health first aid training by e-learning: A randomized controlled trial. The Australian and New Zealand Journal of Psychiatry. 2010;**44**:1072-1081

[18] Musiat P, Tarrier N. Collateral outcomes in e-mental health: A systematic review of the evidence for added benefits of computerized cognitive behavior therapy interventions for mental health. Psychological Medicine. 2014;**44**(15):3137-3150

[19] Hilty DM, Crawford A, Teshima J, Chan S, Sunderji N, Yellowlees PM, et al. A framework for telepsychiatric training and e-health: Competency-based education, evaluation and implications. International Review of Psychiatry. 2015;**27**(6):569-592

[20] Andersson G, Titov N. Advantages and limitations of internet based interventions for common mental disorders. World Psychiatry. 2014;**13**(2):4-11. DOI: 10.1002/wps.20083

[21] AACAP. Workforce Issues [Internet]. 2019. Available from: https://www.aacap.org/aacap/resources_for_primary_care/workforce_issues.aspx

[22] Hodgkinson S, Godoy L, Beers LS, Lewin A. Improving mental health access for low-income children and families in the primary care setting. Pediatrics. 2016;**139**(1):e20151175

[23] De Beurs DP, De Groot MH, De Keijser J, Mokkenstorm J, Van Duijn E, De Winter RFP, et al. The effect of an e-learning supported train-the-trainer programme on implementation of suicide guidelines in mental health care. Journal of Affective Disorders. 2015;**175**:446-453

[24] Childs S, Blenkinsopp E, Hall A, Walton G. Effective e-learning for health professionals and students-barriers and their solutions. A systematic review of the literature-findings from the HeXL project. Health Information and Libraries Journal. 2005;**22**(s2):20-32. DOI: 10.1111/j.1470-3327.2005.00614.x

[25] Keynejad R, Garratt E, Adem G, Finlayson A, Whitwell S, Sheriff RS. Improved attitudes to psychiatry: A global mental health peer-to-peer E-learning partnership. Academic Psychiatry. 2016;**40**(4):659-666