

Implementation of National Mental Health Program in India:
Use of Digital Technology

A Capstone Project submitted to
Johns Hopkins School of Public Health & IIHMR University
In Partial Fulfilment of the requirements for the award of the degree of
Master of Public Health

by
Dr Udit Mohan
MPH – Cohort VI (2018-20)

Under the Guidance of
Dr SD Gupta
MD, PhD

October 2019

Acknowledgements

First and foremost, I would like to thank **God**, for making me capable enough of perceive this topic and work on it and through it even when there were many other things, parallely affecting my daily life.

Amongst the mortal beings, I would first like to thank my Faculty Advisor and Capstone Guide **Dr SD Gupta**, for giving me this opportunity of working on this topic for my capstone project and for his valuable guidance throughout the capstone work. The door to his office was always open for me, and he always addressed my queries, with full support, in spite of his busy schedule, being the Chairman of this prestigious university.

I would also like to thank IIHMR-GMHAT team for providing the data support for my capstone work, specially **Dr Nutan P Jain**, for her guidance, wisdom and feedback, right from the inception of this idea for me to work on this topic, to guiding me and clearing my doubts, whether on phone, message or email, whenever I got stuck with a problem. Along with her, I owe my gratitude to **Mr Matadin Sharma** as well, as he was always been kind enough to devote time to my queries, whenever required.

I am also greatly thankful to **Dr Mohan Lal Bairwa**, who steered me through all my doubts and issues on working or non-working days, in spite of him being extremely busy in his day to day schedule and being loaded with responsibilities, being the MPH program co-ordinator and a wonderful teacher which he is.

I am gratefully indebted to the immense guidance and knowledge bestowed upon me by all the above faculty members. Without them showing me the path, I would have been completely lost with my capstone work.

I would not forget to thank, **Ms. Richa**, for her support during my capstone work and overall, all the faculty from Johns Hopkins School of Public Health and IIHMR for teaching me the concepts of Public Health which were highly significant for choosing, planning and formulation of this capstone project. Also, I would like to acknowledge the huge support I received from the IT staff for any technical issue faced by me during my work and the staff in the DA Henderson library for their support in helping me access the library whenever required.

Lastly it would be wrong on my part to not thank my batchmate, **Dr Prerika**, for the entertaining support and the lengthy discussions over tea, regarding the capstone work, which helped me improve my capstone every time.

Finally, I must express my profound gratitude to **my parents and my sister** for providing me with unfailing support and continuous encouragement throughout my work on this project, right from selecting the area to work on to writing this report. This accomplishment would not have been possible without them. Thank you.

Udit Mohan

Contents

Acknowledgements	1
List of Abbreviations	4
List of Figures.....	5
List of Tables.....	5
List of Annexures	6
Executive Summary	7
1. Introduction & Background	9
1.1 Key Epidemiological Points.....	12
1.2 Gaps	13
1.3 Rationale.....	14
2. Research Questions	15
3. Objectives.....	15
4. Methodology	16
5. Current Indian Mental Health Situation Analysis at the Community Level	17
5.1 Post GMHAT implementation-IIHMR Pilot study data analysis	19
5.2 NMHS reports analysis	26
5.3 Literature review.....	28
6. Use of digital technology in Mental Healthcare	32
6.1 Global Mental Health Assessment Tool analysis	33
6.2 Literature Review	37
7. Identification of areas in NMHP for integration of digital technology	44
8. Discussion	48
9. Recommendations.....	52
10. Conclusion.....	53
11. References	55
12. Annexures	63

List of Abbreviations

1. WHO: World Health Organisation
2. NMHP: National Mental Health Program
3. GOI: Government of India
4. WHA: World Health Assembly
5. DMHP: District Mental Health Program
6. DALY: Disability Adjusted Life Years
7. SDG: Sustainable Development Goals
8. GMHAT: Global Mental Health Assessment Tool
9. mhGAP: The mental health Gap Action Programme
10. ANM: Auxiliary Nurse Midwife
11. MHAP: Mental Health Action Plan
12. LMICs: Low and Middle Income Countries
13. STARS: Sustainable Technology for Adolescents to Reduce Stress
14. UHC: Universal Health Coverage
15. HMIS: Health Management Information System

List of Figures

Figure 1: Prevalence of Eminent Mental Health Disorders Across Various States of India **(Page 13)**

Figure 2: Treatment Gap in Various Mental Health Disorders in India **(Page 14)**

Figure 3: Effect of Individual traits and activities or Social and economic conditions or Environmental influences on Mental Health and Well- Being **(Page 18)**

Figure 4: Effect of Individual traits and activities or Social and economic conditions or Environmental influences on Mental Health and Well- Being **(Page 19)**

List of Tables

Table 1: Sensitivity and Specificity of GMHAT for Overall all Mental Disorders, Neurotic illnesses, Depression, and Psychosis **(Page 35)**

Table 2: Psychiatrists' and GMHAT/PC(psychologists') Diagnosis Cross Tabulation GMHAT/PC Diagnosis **(Page 35)**

Table 3: Clinical diagnosis by psychiatrists Cross tabulated with Screening results by ANMs **(Page 36)**

Table 4: How and where digital technology can be incorporated into the NMHP **(Page 46)**

List of Annexures

Annexure-1 : Socio-Demographic Characteristics (Page 63)

Annexure-2 : Results of Bivariate Analysis between Socio-demographic variables and knowledge (Page 65)

Annexure-3 : Knowledge Status (Page 67)

Annexure-4 : Attitude towards mental health (Page 67)

Annexure-5 : Test of association between Knowledge and Attitude (Page 68)

Annexure-6 : Perception of community whether people/family members hide their psychiatric disorders or not (Page 69)

Annexure-7 : health seeking behaviour of the community (Page 70)

Annexure-8 : knowledge of IEC/BCC Material (Page 71)

Annexure-9 : Post GMHAT-IIHMR Pilot Study (Page 71)

Annexure-10 : Tables from the paper “Digital technology for treating and preventing mental disorders in low-income and middle-income countries: a narrative review of the literature” (Page 72)

Executive Summary

Background: India was amongst the pioneers of developing world to start NMHP, realising mental health's importance in overall human health. Currently, mental disorders' prevalence, excluding tobacco use disorder, is 10.6%. Related workforce requirement is also sub-optimal, and this situation is further strangled by lack of awareness and associated stigma, making it necessary, to think of new alternatives for tackling these issues.

Objectives: To determine state of awareness, attitude and health seeking behaviour of community with respect to mental health; to determine effectiveness of digital technology in addressing mental healthcare issues and analyse its integration into NMHP.

Methodology: Indian Mental Healthcare developments were studied. Data analysis of community survey Post-GMHAT IIHMR pilot study, was done for parameters mentioned above and tallied with same parameters from relevant literature and NMHS(2015-16). Digital technology effectiveness was determined by comparing GMHAT tool analysis(with ANMs) to same tool analysis(with psychologists), supported by data for other successful global digital interventions in mental healthcare. Recommendations for incorporating it in NMHP were given.

Discussion: WHO(under MHAP-2013) has started using digital technology in mental health as today everyone is versed with it and hence through this, larger, positive impact can be made in terms increasing awareness and bridging the treatment gap. From the pilot study(mentioned-above) data analysis, low community awareness

about mental health was ascertained. Only 15%(approximately) people knew minimum 1 symptom of psychiatric disorders and 70%(almost) people were concerned about their distance from people with mental illnesses. Literature review and NMHS also gave similar results. Analysis showed GMHAT as highly sensitive(0.94) and specific(1.0) and other technological use in mental healthcare around the world showed similar results.

Conclusion: Despite advancements, mental healthcare still requires positive moves towards increasing awareness and reducing treatment gap, to attain UHC by 2030. Digital technology is making huge impact in medicine (eg. Robot-assisted-surgery, advanced MRI/CT-scan machines etc.) and its time that it gets incorporated at program level mental healthcare too. India pioneered when it came to initiation of a national level mental health program and India must take similar strides, now too. Hence, selection and modification of an appropriate technology should be done followed by its earliest possible execution, to achieve goals of increasing awareness and reducing treatment gap, timely.

1. Introduction & Background

Mental health is not just a lack of mental disorder but it has been defined, by WHO, as “a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community” (1). Mental health is an important part of the definition of health, given by WHO, which is “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”.(1)

Mental health can be disturbed by numerous factors, which need to be tackled through effective and innovative approaches involving promotion, prevention, treatment and recovery(2). These can include factors ranging from individual characteristics like one’s ability to manage her or his own thoughts, emotions, behaviours and interactions with others, to socio-economic/cultural/environmental factors, to other factors such as national policies, living standards, working conditions, community social supports etc.

India, since long, has been suffering from a heavy burden of mental health morbidities along with a clear lack of infrastructure and strategies to handle this situation and so in August 1982, to tackle this issue, NMHP was launched(3) by the GOI. The program was launched with the basic strategy of integrating “basic mental health care” with “general health services” and was launched with these objectives(3):

“To ensure the availability and accessibility of minimum mental healthcare for all in the foreseeable future, to encourage the application of mental health knowledge in

general healthcare and in social development, to promote community participation in the mental health service development, to enhance human resource in mental health sub-specialties.”

India happened to be amongst the initial few countries in the developing world to articulate a national program for mental health(4). After five years of its launch it was observed that despite developments, financial limitations restricted its success. Which led to the birth of the concept of DMHP in 1996, based on the “Bellary model”(5). Bellary a district, located about 350 km away from Bangalore and which had a population of about 20 lakhs, was chosen for the pilot implementation(1985) of the district level mental health programme(5). Apart from training all the primary care staff, the Bellary model constituted(5) :

- 1) Provision of 6 essential psychotropic and anti-epileptic drugs(chlorpromazine, amitriptyline, trihexyphenidyl, injection fluphenazine deaconate, phenobarbitone and diphenyl hydantoin) at all primary health centres and sub centres.
- 2) A system of simple mental health case records.
- 3) A system of monthly reporting, regular monitoring and feedback from the district level mental health team.

The program has undergone many modifications ever since, with the consecutive five year plans. For instance, the XIth plan tried to address the barrier of shortage of manpower; the XIIth plan focussed on psychiatric problems specific to vulnerable sections(4)(senior citizens experiencing severely disabling diseases, children and adolescents affected by behavioural problems, victims of poverty etc.) of the population.

The change of focus of the program from the central/state level to the district level was one of the key changes in program which was done to add impetus to the program. But even then, the results were not positive enough(5). Hence a new initiative was taken for the betterment of mental health in India, in the form of the Mental Health Policy-2014. This step was taken by the central government with the idea “to promote mental health, prevent mental illness, aid recovery from mental illness, promote de-stigmatization and desegregation and ensure socio-economic inclusion of persons affected by delivering reachable, inexpensive and quality health care and social care to all through their life”. This policy was based on the values and principles of “equity, justice, integrated care, evidence based care, quality, participatory and rights based approach, governance and effective delivery and a holistic approach” to mental health.

Along with these steps, the National Mental Healthcare act was also passed in April 2017 which became effective from 29th May 2018(3). The law is described in its opening paragraph as "An Act to provide for mental healthcare and services for persons with mental illness and to protect, promote and fulfil the rights of such persons during delivery of mental healthcare and services and for matters connected therewith or incidental thereto.(6)" This Act overtook the formerly in place Mental Health Act, 1987 that was passed on 22 May 1987. The Act emphasizes that no individual or authority shall categorize any person as somebody with mental illness unless directly in relation with treatment of the ailment and it also “decriminalized” attempt to suicide which remained illegal under Section 309 of the Indian Penal Code till then.

1.1 Key Epidemiological Points

Regarding the global burden on Mental Health issues, the prevalence of mental health illnesses was about 10% in 2001 and was predicted to reach to about 15% by the year 2020, according to the world health report of 2001(7).

Currently(2017), this burden has reached to about 13%[13-18% across different countries](8). Amongst these, anxiety disorder and depression top the list with the burden being 3.8% and 3.4% respectively, as of 2017(8).

Coming to India, the prevalence of mental health disorder is about 10.6%[excluding, tobacco use disorder{13.1%}], according to the National Mental Health Survey-2015-16(NMHS) with the major chunk of it being formed by mental and behavioural disorders due to psychoactive drugs use (5%) and alcohol use disorder(4.6%)(9). WHO estimates that the burden of mental health problems, in India, is approximately 2,443 DALYs per 100,000 population , and the estimated economic loss due to mental health conditions, between 2012-2030, is 1.03 trillions of 2010 dollars(10). Following graphs depict the prevalence of eminent mental health disorders across various states of India:

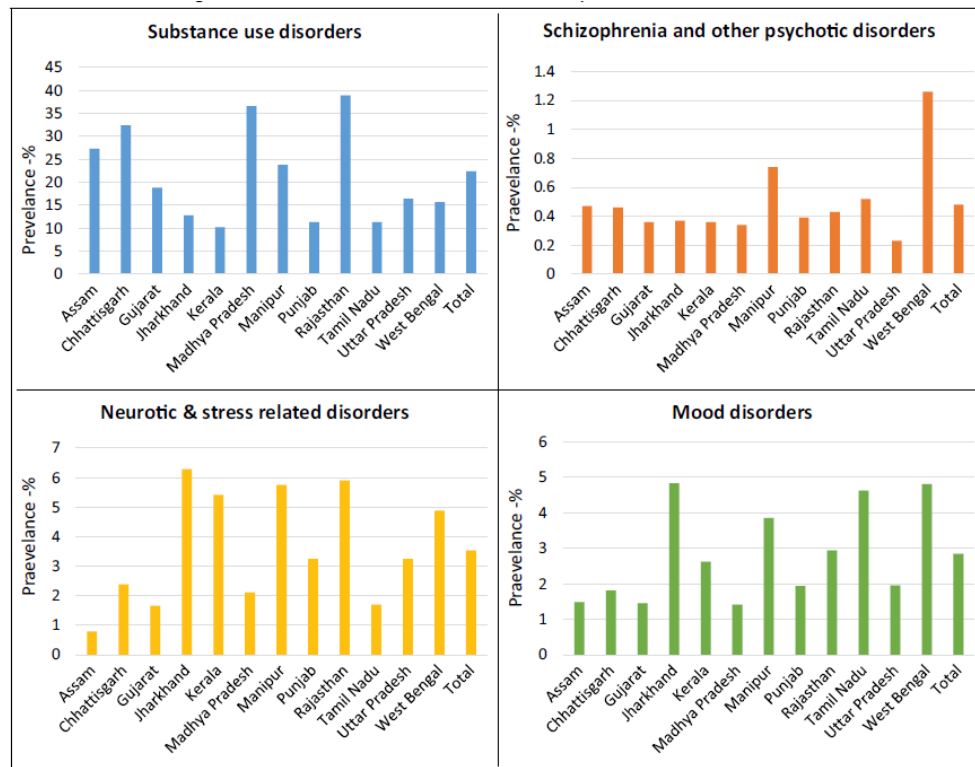


Figure 1: Prevalence of Eminent Mental Health Disorders Across Various States of India
Source: (23)

1.2 Gaps

Mental health personnels in India (per 100,000 population) include psychiatrists (0.3), nurses (0.12), psychologists (0.07) and social workers (0.07), whose numbers are substantially below the calculated requirement for the population of India. The required numbers were calculated in July 2002(4) and the numbers are (per 100,000 population): psychiatrists(1.0), nurses(1.0), psychologists(1.5) and social workers(2.0). Following is a flowchart showing the treatment gap in various mental health disorders in India:

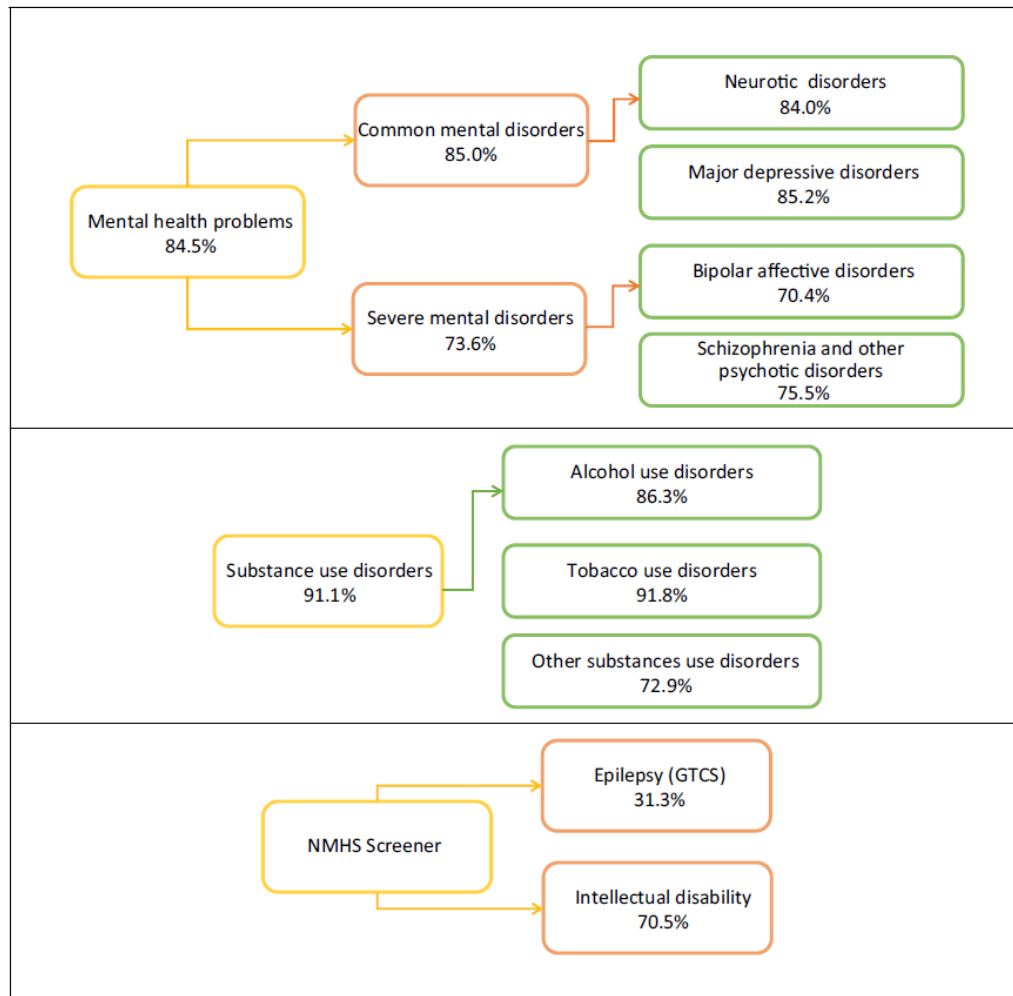


Figure 2: Treatment Gap in Various Mental Health Disorders in India
Source: (23)

1.3 Rationale

So, we can see that considerable gap exists between the required and the available mental health manpower. There have been considerable efforts by the government of India in the last 3 decades to bridge this gap, like “integrating mental health care with primary care services” or “training primary-care physicians and health workers in identification and management of selected mental disorders” or the launch of NMHP and consequently the DMHP and its upscaling from 27 districts to more than 220 districts eventually(11). However these efforts have still not been

able to curb the issues of mental health problems in the nation due to issues like problems in training and encouraging primary-care staffs, deficiency of constant backing from specialists, restricted coverage of mental disorders, and stretched gestation period before the issues finally get noticed(12). The approaches adopted by the Government has also created a kind of social inequity for mental healthcare as these approaches establish two separate levels of care, i.e. “a low intensity, minimalistic care delivered by non-specialists”; and “a more comprehensive and better quality care by specialists”(12). Therefore, it has become vital to think of options such as usage of digital information communication technology to tackle the issues of mental healthcare and close the gap of available and required manpower for addressing the community in this regard.

2. Research Questions

- What is the state of awareness, attitude and health seeking behaviour of the community with respect to mental health in India?
- How effective is use of digital technology in mental health scenario in addressing the issues being faced by mental healthcare?
- How can digital technology be integrated into the National Mental Health Program?

3. Objectives

- To determine the state of awareness, attitude and health seeking behaviour of the community with respect to mental health in India.

- To determine the effectiveness of use of digital technology in addressing the issues being faced by mental healthcare .
- To analyse digital technology integration into the National Mental Health Program.

4. Methodology

- The development of the National Mental Healthcare scenario in India was studied. For this National Mental Health Program(1982), National Mental Healthcare act(2017), and National Mental Health Policies(2014,2017), and National Mental Health Survey(2015-16) were studied and relevant literature review was done to assess the development of programs and policies in terms of mental health scenario.
- Data analysis from the community survey of the Pilot study(13) conducted by IIHMR post implementation of GMHAT, for the assessment of awareness, attitude and health seeking behaviour of the community with respect to mental health in India, was conducted and the results were tallied with the same parameters from relevant literature and the NMHS conducted by the GOI in 2015-16.
- The effectiveness of digital technology was determined by the GMHAT tool analysis(with ANMs)(13) which was compared with GMHAT tool analysis(with psychologists), which was already done, and the results were interpreted.
- The effectiveness was also supported by data for other successful digital interventions for mental health around the world, for which literature

review was done to comment on the effectiveness of digital technology for addressing the issues being faced by mental healthcare.

- Recommendations regarding the following points were framed and are provided in the recommendations section:
 - i. Areas of the national programs where digital technology can be integrated.
 - ii. Strengthening of psychiatric primary health care using digital technology
 - iii. Successful Universal Health Coverage for mental health in India and achievement of Sustainable Development Goals.

5. Current Indian Mental Health Situation Analysis at the Community Level

As already discussed above, there is considerable gap between the required man-power in mental health and the people suffering from psychiatric disorders. There is also a considerable burden of mental morbidity in India which needs to be addressed at the earliest in order to achieve the SDG number 3, in specific, 3.4 and 3.5 which are “By 2030, reduce by one third premature mortality from Non communicable diseases through prevention and treatment and promote mental health and well-being.” And “Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol” which is to make sure healthful lives and elevate well-being for all at all ages(14)(15).

Now according to a “background paper by WHO secretariat for the development of a comprehensive mental health action plan”(16) and the WHO

mental health action plan(17) itself, mental health can be affected by various determining factors. It can be affected by Individual traits and activities or Social and economic conditions or Environmental influences.



Figure 3: Effect of Individual traits and activities or Social and economic conditions or Environmental influences on Mental Health and Well- Being
Source: (16)

<i>Level</i>	<i>Adverse factors</i>		<i>Protective factors</i>
Individual attributes	Low self-esteem	↔	Self-esteem, confidence
	Cognitive/emotional immaturity	↔	Ability to solve problems and manage stress or adversity
	Difficulties in communicating	↔	Communication skills
	Medical illness, substance use	↔	Physical health, fitness
Social circumstances	Loneliness, bereavement	↔	Social support of family & friends
	Neglect, family conflict	↔	Good parenting / family interaction
	Exposure to violence/abuse	↔	Physical security and safety
	Low income and poverty	↔	Economic security
	Difficulties or failure at school	↔	Scholastic achievement
	Work stress, unemployment	↔	Satisfaction and success at work
Environmental factors	Poor access to basic services	↔	Equality of access to basic services
	Injustice and discrimination	↔	Social justice, tolerance, integration
	Social and gender inequalities	↔	Social and gender equality
	Exposure to war or disaster	↔	Physical security and safety

Figure 4: Effect of Individual traits and activities or Social and economic conditions or Environmental influences on Mental Health and Well- Being

Source: (16)

Hence the need of the hour is not only to bridge the treatment gap but also to analyse and address, where the community stands in terms of knowledge, awareness and attitude towards mental health. This has been done in the following 3 sections.

5.1 Post GMHAT implementation-IIHMR Pilot study data analysis

A survey(13) was conducted by Indian Institute of Health Management Research, Jaipur, backed by Indian Council of Medical Research, New Delhi, with the purpose of creating awareness of common mental health problems in the community. This study was done in 10 villages of district Alwar, Rajasthan, after the implementation of GMHAT created by Dr Vimal Kumar Sharma and Copeland, which

is a computerized, semi structured, clinical assessment tool to determine and diagnose mental illness at the primary care level, with frontline workers with the intention to aid early intervention and timely treatment in psychiatric disorder cases.

The survey(13) was done in 325 randomly selected households from the district, where the head of the family or any available person of age more than 18 years, was interviewed. The questionnaire was designed on basis of existing government tools, reports and literature and was designed to be completed in about half hour and had 6 sections, namely: consent form, identification, background characteristics, knowledge of mental health, attitudes towards mental health and health seeking behaviour. The questionnaire mainly focussed in gaining perspective about knowledge, attitude and practices, which either constrain or advance the achievement of mental health in the community, with the intention that this will help further to develop information, education and communication material to provide correct information to the public in future. Quality of data was checked through back checks and spot checks of the collected information.

Data analysis was done using SPSS software and Microsoft Excel software. After going through the data, it was noticed that most of the variables were qualitative. However, two variables, age and education, had to be recoded to transform them into qualitative. People were categorised(18) by age into 4 groups i.e. Child (0-12 years), Adolescent (13-18 years), Adult (19-59 years) and Senior Adult (60 years and above). And education level was categorised(19) into Uneducated, primary stage(1st to 5th class), middle stage(6th -8th class), secondary stage(9th -10th class), senior secondary stage(classes 11th to 12th), undergraduate

stage and postgraduate stage. After this data analysis was conducted in the following manner and the results are as below:

1. The survey, done in the Alwar district of Rajasthan, was specifically confined to, two blocks of the district, Rajgarh and Malakhera. The population taken belonged approximately half from each block(50.8% and 49.2% respectively). Most of the people surveyed were adults(92.3%), 4.9% being senior adults and 2.8% being adolescents. In terms of gender, 46.5% were males and 53.5% were females. And, out of the total population, 87.1% were married (Annexure-1).
2. Data analysis was then conducted to find association between the various socio-demographic variables (Age, Sex, Education, Family type, Marital status etc.) and the knowledge of the community regarding mental health issues(Annexure-2). The knowledge/awareness was assessed on the basis of the answers the people gave in response to questions:
 - Have you heard about psychiatric disorders?
 - Have you seen any person suffered from psychiatric disorder?
 - Have you heard about mental illness related toll free helpline?

For this analysis, chi-square test/likelihood ratio was used. Since both the categories of variables were categorical, these tests were selected.

Chi-square test was used where the data was distributed in 2x2 tables and also met the statistical requirements. Likelihood ratio was interpreted in situations where the tables were of 2x2 size or larger and the statistical requirements were not met(20)(21).

The data had to meet the following requirements(22):

- 1) The two variables should be categorical.
- 2) For each variable there should be two or more categories (groups).
- 3) There should be independence of observations, that is:
 - a) No association must exist among the subjects in every group.
 - b) Categorical variables should not be "paired" in any way (e.g. pre-test/post-test observations).
- 4) The sample size should be relatively large.
 - a) For each cell the expected frequencies are at least 1.
 - b) For the majority (80%) of cells, expected frequencies should be at least 5.

The results were interpreted based on following hypothesis:

- 1) **Null hypothesis:** H0: There is no association between the two variables (if p value > 0.05; accepted)
- 2) **Alternate hypothesis:** H1: there is significant association between the two variables (if p value < 0.05; accepted)

Statistical Association ($p < 0.05$) was found to be present only between Knowledge and Religion, education level, block and village to which a person belonged. On basis of this it can be said that IEC material needs to be designed on the basis of what is knowledge level about mental health issues in a particular area and according to how many people belong to what level of education level (here, majority were uneducated, 32.6% and this percentage was almost same for both the blocks, 32.5% and 32.7% respectively).

3. Data analysis was also conducted for knowledge (Question 22, 23 of the questionnaire) on the basis of how many people knew about symptoms of psychiatric disorder and how many symptoms were known by the people who gave a positive response for the former question (Annexure-3).

In the questionnaire, the people who were interviewed, were questioned about 23 symptoms of psychiatric disorders. Out of the 325 people, 301 people knew about at least 1 symptom. In totality 1101 responses were given (if we add all the responses given by all the people). Overall the average percentage of symptoms known by 1 person in the population was about 15% (14.72%) which is just about 3-4 symptoms. Not to mention, that there were 24 people out of the people who were interviewed who did not know even a single symptom of psychiatric disorder.

From this it can be said that, the overall knowledge of the people interviewed, was quite poor and hence interventions need to be designed to increase the awareness about mental health disorders.

4. For attitude data was analysed on the basis of (Question 33 of the questionnaire) responses from the community regarding questions relating to Attitude towards mental health. The responses were based on a Likert scale of 1 to 4 (Annexure-4).

From this analysis, interesting insights were gained regarding the people's attitude towards mental health. 55% of the people agreed that there is an increase in mental illness in the community and about 40% felt that shame is associated with psychiatric disorders and hence people hide them. Interesting thing to be noted was

that almost 60% people denied that any religious/cultural ceremony can help in reducing the bad effects of mental illness or curing it and almost 75% knew that these disorders are not something which people have to live with throughout their lives. So, from this it can be implied that it's a smaller part of the population which need to be addressed for improving their attitude towards mental health and the IEC/BCC activities need to be designed accordingly. This being a positive aspect, the irony is that, while 57% disagreed to the fact that people suffering from mental health issues should not be segregated from the rest of the community, almost 65% people agreed that one must stay away from the people suffering from mental illness. This just denotes the stigma associated and again underlines the need for appropriate IEC/BCC activities regarding it.

5. Following this association was found between knowledge and attitude by applying the Chi-Square test(Annexure-5) here again and the results were as following:

1. **Null hypothesis:** H0: There is no association between knowledge and attitude of the people (if $p \text{ value} > 0.05$; accepted)
2. **Alternate hypothesis:** H1: there is significant association between knowledge and attitude of the people (if $p \text{ value} < 0.05$; accepted)

The P value came out to be 0.548 which is more than 0.05 and hence according to this data we see that there is no association between knowledge and attitude of the people in this community. What can be inferred from here is that knowledge of issue and attitude towards that particular issue are two independent entities and need to be addressed accordingly

6. Then, attitude was also analysed regarding the perception of the (Question 34, 35 of the questionnaire) community members towards person/s suffering from psychiatric disorders and the results were that 64% disagreed to the thought that people or family members do not share their psychiatric disorders while just 36% of the people interviewed agreed to this thought(Annexure-6). But the points to be highlighted here is that the majority reasons which were cited for agreeing to this thought were fear of disrespect(89.74%), shame(65.81%) and stigma(12.82%), which calls for interventions accordingly (Annexure-6).
7. Lastly, the health seeking behaviour of the community was also analysed on the basis of how the people responded to questions regarding their or their near ones' visit to a health practitioner when they are sick (Annexure-7). Majority of the people said that they went to a proper established health facility in such situations(CHC 30%, PHC 16%, PVT doctor/clinic 40%). Only 0.9% said that they went to a tantric/bhopa/ojha when they were sick. However, the situation changed when they were inquired about their visits, pertaining specifically to psychiatric disorders. Majority still said that they visited a proper established health facility(Govt./municipal hospital 44%, CHC 21.5%, PHC 7%, PVT doctor/clinic 7%), but the percentage of people visiting a tantric/bhopa/ojha increased to about 13% here. And hence its quite evident that intervention needs to be devised in a manner that not only aids in reducing the doctor patient gap but also aids increase in awareness and de-stigmatisation of psychiatric disorders.

8. Finally, (Question 40, 42 of the questionnaire) people were also asked about their knowledge/awareness about the IEC/BCC material and also regarding the toll free mental health helpline. 64% said that they had never seen any IEC/BCC material related to psychiatric disorders. Of the 36% who said they had seen the material; majority had seen it at a govt (Annexure-8). health facility or a camp. Interestingly, visit to a private doctor was common, as discussed above but a meagre 1.72% responses were got, when it came to IEC/BCC material being observed at a private health facility. Also, the percentage was very low for IEC/BCC material at school and gram panchayats, which should be used to increase awareness(Annexure-8).
9. Information regarding awareness about the toll free mental health helpline was also asked where just 8.6% of the total people who responded, had heard about it.

In all, from the analysis it is quite clear that the prime issues which are being faced by the national mental healthcare in India are mainly treatment gap and dearth of awareness concerning mental health issues and for the later the above analysis can be used as a robust evidence.

5.2 NMHS reports analysis

According to NMHS 2015-16(9), IEC activities across the country are characterised by low mental health knowledge, widespread stigma and the massive treatment gap. The load of mental morbidities and the treatment gap aspect of the

NMHS report has already been discussed above. Coming to the other determinants of mental health i.e. the knowledge, attitude and health behaviour towards mental issues, an important example discussed in the report of NMHS was of homeless mentally ill(HMI). Homeless people due to factors like stigma and societal discrimination against their mental disorder are another category of people who needs our focus, and are labelled as homeless mentally ill in the NMHS report(23). They are the most ignored, underprivileged and vulnerable section among the mentally ill and although difficult to be determined through the household surveys, considering the major consequences for health care delivery, the burden, scope and existing provisions were scrutinised through the qualitative component of NMHS. The estimates from the main informants fluctuated from “NIL” or “almost minimal” to “1% of mentally ill” to as high as “15,000” which reflected serious lack of awareness about this issue(23). The answers were like(23) : “ ‘It is difficult to quantify’- (Assam respondent), ‘Within the city 40-50 HMI, totally 500 in the State’ – (Jharkhand respondent), ‘In Urban areas and big cities, homeless people are commonly seen’ – (Gujarat respondent)”. The interesting thing pointed out in the report was that, HMIs were described to be more in the urban areas and bigger cities(23). Though “chronic mental illness” can be treated and these patients can be rehabilitated, individuals still perceive that HMIs “can’t be helped” or treated, and this just being one example of so many disorders prevalent, it shows the importance of spreading awareness regarding mental disorders, not only in rural areas but also in urban area.

Stigma and mental health were also discussed in detail, separately, in the NMHS report(23). People who responded in the NMHS were commonly of the

perception, that persons with mental health troubles are “weak, untidy, harmful and dangerous and are a nuisance to the public”. It was a common belief that there is actually “no cure” for somebody having a mental health problem or that they have to be treated by traditional healers thus emphasising the strong, wrong ideas and limited awareness about mental health problems. And because of this perception of the community patients often try to hide their illness from their family or the community and become reluctant to seek medical care which often leads to a delay in treatment and decreased quality of life.

Hence, we see here too, that even NMHS reported, various other factors, apart from the treatment gap, as being responsible for low mental health.

5.3 Literature review

It has been made quite evident till now, from data analysis of the Post-GMHAT IIHMR study(13), NMHS and the progress of the NMHP over the years, that the two major concerns regarding mental health in India are the treatment gap and low awareness or stigma related to psychiatric disorders.

To further substantiate this knowledge, internet was used to conduct a literature search for literature regarding the same issues. An article published in the Indian Journal of Psychiatry, supported the NMHS findings that there is a shortage of mental health workforce in India. The article quotes “As is clear from the above sources, the number of psychiatrists in India currently is about 9000 and counting. Added to this, about 700 psychiatrists graduate every year. Going by this figure, India has 0.75 Psychiatrists per 100,000 populations, while the desirable number is anything above 3 Psychiatrists per 100,000. This is a very conservative estimate

going by the figures of 6 Psychiatrists per 100,000 population in the high-income countries. Taking three Psychiatrists (per 100,000 population) as the desirable number, 36,000 is the number of psychiatrists required to reach that goal. India is currently short of 27,000 doctors based on the current population of country.”(24)

Another article from the same journal supported the findings but interestingly pointed out that “Stigma remains a major impediment in the delivery of mental healthcare. It has been found across various studies that attitudes of doctors of other specialties and other healthcare professionals also contribute to stigma due to their lack of knowledge and awareness about psychiatry and mental health problems”(25). Another article from the Journal of Postgraduate Medicine pointed out that “an estimated 2.7 crore (27 million) people or 2.1% of Indians are living with one or other types of mental disabilities which is a sufficient reason to take immediate, urgent, and sustained actions on both mental health and disability”(26). The article also quoted that “There appears a momentum on mental health services in India as far as policy and legislative provisions are concerned; however, programmatic implementation needs to be accelerated. There is a perceived need for doing something and doing something now (26)”.

Then an article(27) addressing both issues i.e. treatment gap and the lack of awareness, quoted “Despite the high number of people who need care, mental health has been sorely neglected in India, rooted in stigma, taboo, and myths. Poor awareness about the symptoms of mental illness, stigma and the lack of mental health services available has resulted in a massive treatment gap, with inadequate numbers of trained mental health care professionals. The survey found that,

depending on the state, between 70 and 92 percent of those in need of mental health care failed to receive any treatment. There are just 0.3 psychiatrists, 0.07 psychologists and 0.07 social workers per 100,000 people in India. To compare, the ratio of psychiatrists in developed countries is 6.6 per 100,000 and the average number of mental hospitals globally is 0.04 per 100,000 while it's only 0.004 in India.”

Regarding knowledge, attitude and awareness of mental health a cross-sectional study(28) from National Journal of Community Medicine, done on 100 subjects from South India showed that awareness about mental illness was found in the manner: common mental disorders (60%), signs and symptoms of mental illness (60%), treatment (42%), causes (35%) and prognosis (30 %) and most people in the study had negative attitude towards mental illness. The study concluded that knowledge of mental illness in the community, overall, was quite inadequate and suggested the requirement for effective public education to increase mental health knowledge in the community in order to raise awareness and positive attitude of people about mental illness. On the same subject, an article, on a descriptive cross-sectional study(29) in the region of Kolar, published in the Indian Journal of Social Psychiatry highlighted the misconceptions regarding the misconceptions about mental health, prevalent in the community. The common misconceptions were mental illness is caused by brain disease(39%), mental illness is God's punishment(20%), individuals with mental health problems are mainly to blame for their own condition(22%), and somebody with a mental illness was usually “dangerous”(33%). The study also acknowledged the enormity of the stigma attached to mental illness and almost half (46%) of the participants said they would

not want that their mental illness be known to people. The study, in conclusion emphasised the requirement for well-coordinated public education, mental health awareness programs and increased accessibility of effective mental health services.

Another article(30) on a cross sectional study by Shyamanta das and Hemendra Ram Phookun, published in the Delhi psychiatry journal, pointed out the same facts. A study(29) published in Indian Journal of Psychiatry, with similar aims was conducted on the medical students in Karnataka which showed similar results and advocated the need for improved educational measures at undergraduate level in order to shape an encouraging attitude of the health care providers for psychiatry, which is important for ensuring better care for patients as well as lessening of stigma surrounding psychiatric disorders.

An article(31) from the Industrial Psychiatry Journal, by Kalpana Srivastava, Kaushik Chatterjee, and Pookala Shivaram Bhat, also gives similar finding and quotes “Despite improvements in various health indicators, India contributes disproportionately to the global burden of disease. Our health indicators compare unfavourably with other middle-income countries and India's regional neighbours. A large proportion of the population ends up impoverished because of high out-of-pocket health-care expenditures and suffers the adverse consequences of the poor quality of care. Task-shifting to non-specialist community health workers has been recommended as an effective strategy for delivery of efficacious treatments in low-resource settings. Given the dire shortage in numbers of psychiatrists, psychologists, psychiatric nurses, and social workers; piggy-backing on primary care systems and employing innovative force-multipliers are future courses of action.”

Lastly, an article from the Indian Journal of Psychological Medicine by Salve H, Goswami K, R. Sagar et. All, regarding a community based study for finding out South Delhi's Urban Community's Perception and Attitude towards Mental Illness (32), where a total of 100 people were interviewed, 25% attributed mental illness to "evil spirits", 12% preferred treatment from "Tantric/Ojha" and the community was shown to have "negative attitude for stereotyping, restrictiveness, and pessimistic prediction domains of OMICC (Opinion about Mental Illness for Chinese Community) scale" with mean score being 4.5 (SD: 0.2), 3.9 (SD: 0.9), and 3.8 (SD: 0.4), respectively, with the difference across age, sex, and literacy being statistically insignificant. The article also concluded the same things as produced by the other papers discussed above, that, health education and increased public awareness regarding mental health issues can decrease the stigmatisation of mental morbidity and improve help-seeking behaviour of the community; and that there is a requirement for generating awareness about biomedical concepts, availability of effective treatment for mental illness, for early identification and better care for these disorders in a community as a part of NMHP.

6. Use of digital technology in Mental Healthcare

So far, in above text, the challenges of Mental Healthcare of India have been discussed, which are primarily, treatment gap and lack of awareness regarding mental health. As discussed till now, mental health care services in India are majorly lacking resources, especially workforce, leading to a significant mental health treatment gap which in conjunction with the low awareness amongst the community members, about mental health issues and a high burden of mental morbidity, poses

a major public health challenge. The Indian policy makers have already been working since decades towards resolving this issue but in spite of those efforts(as already discussed) the issue remains far from being resolved.

It is a known fact that, of all the individuals suffering from mental disorders around the world, a very small proportion have access to mental health care, yet most have access to a mobile phone(33). It is also evident that relying only on the solution to generate more specialists to provide healthcare for people affected by mental, neurological and substance use disorders would not be sufficient and would lead to millions of people, still being unable to access the services required by them when needed(34). Therefore, it has become necessary to think of alternatives which can combine digital technology with healthcare and resolve the issues faced by mental healthcare in India till the time adequate number of mental health workers become available.

As support of this above solution below is some evidence of how digital technology can help in improving mental healthcare.

6.1 Global Mental Health Assessment Tool analysis

GMHAT was developed by Sharma and Copeland. It is a computer-assisted semi-structured, interviewer rated app to be used by primary care workers. This app has been translated into many languages of LMICs, including Hindi. It is a new way to tackle the problem of treatment gap. This aim is to enhance the identification of psychiatric disorders at the primary healthcare level and early appropriate treatment for the same, by training the primary care workers for it. The use of computers was

considered to be a constraint, but the program was then modified to be installed on a “touch-screen PDA”, making it easier to be used anywhere. This tool has taken several years to be developed and is based on computer-assisted research diagnostic tools(35).

For the above tool, a study(35) was conducted in Jaipur, India, in two settings, for a period of 6 weeks and 4 weeks respectively, involving psychologists and psychiatrists . The first setting was the psychiatric out-patient clinic of a hospital at Jaipur (Santokba Durlabhji Memorial Hospital(SDMH)), while the second setting was the neurology out-patient clinic of Sawai Man Singh Hospital (SMSH), Jaipur. The study was conducted for analysing the validity and feasibility of the tool. The study concluded that there was a good level of agreement, i.e. validity between the diagnoses made via GMHAT by psychologists and the diagnoses made by the psychiatrists, clinically, for any mental illness. The sensitivity and specificity was computed for diagnosing any mental illness, and was found to be 0.94 and 1.0 respectively which is good, and which meant that if the psychiatrist were diagnosing 100 patients as positive for psychiatric disorder, the tool was able to correctly diagnose 94 of them and was able to find out all the patients i.e. 100 out of 100, who didn't have any psychiatric disorder. Then the same measures were computed for eminent mental illnesses and were found to be:

S.No.	Psychiatric Disorder	Sensitivity	Specificity
1.	ALL	0.94	1.0
2.	Neurotic Illnesses	0.85	1.0
3.	Depression	0.91	0.94
4.	Psychosis	0.83	0.97

Table 1: Sensitivity and Specificity of GMHAT for Overall all Mental Disorders, Neurotic illnesses, Depression, and Psychosis
Source: (35)

Table 1: Psychiatrists' and GMHAT/PC (Psychologists') diagnosis cross tabulation GMHAT/PC diagnosis

Psychiatrist's clinical diagnosis	No.	Organic	Psychosis	Depression	Neurosis/stress	Other	Total
No	16						16
Organic		1					1
Psychosis			5	1			6
Depression	1	1	1	31			34
Neurosis/stress			1	2	17		20
Other						5	5
Total	17	2	7	34	17	5	82

Table 2: Psychiatrists' and GMHAT/PC(psychologists') Diagnosis Cross Tabulation GMHAT/PC Diagnosis
SOURCE : (35)

Also, the same analysis was conducted for the diagnoses made via GMHAT by trained ANMs(13) and diagnoses made by the psychiatrists, clinically. The sensitivity and specificity found here was 96.7 and 43.5 respectively, which showed that wrong diagnosis was being made by ANMs, more, as compared to the psychologists, thus pointing out more need for training for ANMs.

Clinical diagnosis by psychiatrists * Screening results by ANMs Crosstabulation					
			Screening results by ANMs		Total
			yes	no	
Clinical diagnosis by psychiatrists	yes	Count	59	13	72
		% within Screening results by ANMs	96.7%	56.5%	85.7%
	no	Count	2	10	12
		% within Screening results by ANMs	3.3%	43.5%	14.3%
Total		Count	61	23	84
		% within Screening results by ANMs	100.0%	100.0%	100.0%

Table 3: Clinical diagnosis by psychiatrists Cross tabulated with Screening results by ANMs
Source: (13)

For feasibility all the subjects were seen to be participating willingly in the study(35) and all gave a positive feedback. Satisfaction was expressed by the majority regarding the aspects of mental health covered by the psychologists using GMHAT/PC with everyone expressing their feeling of being under “quality and refined” assessment. The impact was such, that the patients and relatives, who visited the clinics after study completion, requested whether they could also have a “computer test” done for diagnosis on getting to know about the GMHAT/PC study. The psychologists who interviewed patients also found GMHAT a very useful training tool to detect mental disorders.

Earlier studies namely: “*The Global Mental Health Assessment Tool-Primary Care Version (GMHAT/PC). Development, reliability and validity, by V. Sharma, P. Lepping, Cummins et al*”(36) and “*Epidemiological and clinical use of GMHAT-PC (Global Mental Health assessment tool - Primary care) in cardiac patients by M.*

Krishna, P. Lepping, V. Sharma et al”(37), which were conducted on the PC version of GMHAT, also had similar findings and suggested that GMHAT is simple to use computerised tool which can be and should be used in primary care for the standardised assessment of mental health problems.

6.2 Literature Review

Citing the need for new and innovative interventions for mental health, WHO is developing many interventions, involving technology, to supplement the reduction of the mental health treatment gap, especially in LMICs. Of these, there is a technology supported, guided intervention for depression which delivers “psychoeducation and training in behavioural activation through an illustrated narrative with additional therapeutic techniques such as stress management (slow breathing), identifying strengths, positive self-talk, increasing social support and relapse prevention”. This intervention is called *Step-by-Step* (38) and this has been developed in a manner that it can be customized for use in situations with varied cultural contexts and resource availability and to be significant in communities affected by adversity. A study regarding its feasibility and validity is in progress in Lebanon(38).

Another area where WHO is using digital technology in the mental healthcare is adolescent mental health. This has been done for increasing access to mental healthcare for adolescents, worldwide, where depression is the foremost cause of illness and disability among them, and suicide being second. Barriers to treatment include a shortage of existing mental health services, difficulties in transport and stigma. And to aid this situation, WHO implemented STARS(39), a new digital

intervention for adolescents in 2018, with the aim “to create a digital psychological intervention which will be used by adolescents experiencing high levels of psychological distress (aged 15 - 18 years) globally, to increase access to mental health treatment”(39). To ensure its applicability, WHO collaborated with partners in five area (Jamaica, Nepal, Pakistan, South Africa and West Bank and Gaza Strip) to use this technology with adolescents and community members there and to test initial prototypes. Their results showed that most adolescents had access to a smartphone and enjoyed using this technology, and welcomed the idea of STARS(39), thus providing another positive evidence of using digital intervention for mental healthcare.

The above two are interventions being done by WHO under mhGAP which is “a WHO programme that seeks to address the lack of care for people suffering from mental, neurological and substance use (MNS) conditions “(40). There are many other interventions which have been done across the world and the following information from a paper “Digital technology for treating and preventing mental disorders in low-income and middle-income countries: a narrative review of the literature”(33), by J. Naslund, K. Aschbrenner, R. Araya et al., published in The Lancet Psychiatry, discusses the feasibility and validity of all, in the following manner:

- 1) Studies using digital technology for supporting clinical care and educating health workers**
- 2) Studies evaluating mobile tools for facilitating diagnosis and detection of mental disorders**

- 3) Studies evaluating technologies for promoting treatment adherence and supporting recovery**
- 4) Studies evaluating online self-help programmes for individuals with mental disorders**
- 5) Studies evaluating programmes for substance misuse prevention and treatment**

All the studies included in the above paper(33), assessed digital technology interventions targeting various mental health issues (a few of them being: schizophrenia, bipolar disorder; depressive disorders, substance use disorders; and other common mental health concerns, including anxiety disorders and post-traumatic stress disorder). All the studies included interventions involving usage of some form of technology (cell phones/ applications, “internet-delivered programmes”, “telepsychiatry”, messaging, “remote sensing”, wearable gadgets). The findings of all these studies were mainly “feasibility, acceptability, efficacy, safety, costs, effectiveness, or implementation”. Additionally, they also comprised “Preliminary feasibility/acceptability studies, and programme implementation/naturalistic studies”.

49 studies were included in this paper, which involved digital technology use for management of mental disorders(including treatment, prevention and diagnosis) or for giving mental health training and education to health workers in about 20 LMICs. These validated the “feasibility and acceptability” of digital technology for managing mental health issues(including treatment and prevention) along with substance usage disorders in LMICs. Many additionally demonstrated the likely usefulness of text-messaging, and on call assistance interventions along with online

interventions. The original tables comprising all the studies are attached in annexure (annexure 10) and a brief discussion on studies, with most promising outcomes is presented below:

A study by Balasrinorwala et al (2014) from India conducted an intervention for mental health using “Asynchronous (store-and-forward) telepsychiatry programme”, through which primary care physicians used to send treatment and consultation notes and reports of investigations via email to a psychiatrist for reviewing at a central hospital. The study showed that this intervention was feasible with a definite diagnosis in 95% patients.

Another study from Columbia by Barrera-Valencia et al (2016) again used “Asynchronous (store-and-forward) telepsychiatry model”, where primary care doctors used to hold consultations for convicts and send treatment notes by electronic means to a consulting psychiatrist for diagnosis, treatment, and medication recommendations. This model was contrasted in this paper with another model called the “synchronous telepsychiatry model” involving videoconferencing consultation between convicts and psychiatrists. The results from this study showed that 93% participants completed follow-up. The results also portrayed that use of both these models lead to a decrease in depressive symptoms among convicts ($p < 0.001$) however the asynchronous one, demonstrated a better decline than the synchronous model ($p = 0.01$).

A third study by Kale et al (2016) from India used “Telepsychiatry consultations” employing “web videoconferencing” at a rural hospital to provide diagnosis, treatment, and specialist follow-up care to the patients over there. In this

study the remotely consulted psychiatrists had the provision to use electronic medical records of the patients. Here, the feasibility of the programme was validated by giving 1200 consultations to 316 patients where a decline in referral frequency to medical colleges for psychiatric disorders and an enhanced contentment was reported by both, the psychiatrists who were consulted and the patients.

Another study from India by Chattopadhyay(2012) used “e-Dat”, which is an internet based intervention and can be used through any computer device or a mobile device, and this included 26 questions to evaluate symptoms and depression burden. This tool was analysed to be reliable and valid in diagnosing depression with 93% being the mean accuracy of the tool for detecting any form of depressions(mild, moderate, or severe).

Malhotra et al(2015), a study from India analysed “Internet-based psychiatric screening and diagnostic application” used by non-specialists in healthcare settings which were remotely located. The study assessed validity and reliability of the application by getting the patients evaluated by non-specialists through the application at such sites, and this was also evaluated using online video conferencing and also through a standard screening and diagnostic tool. On analysis, moderate to high agreement between different diagnostic methods was observed and high sensitivity, low positive predictive values, but high negative predictive values for most disorders was observed for the application while the internet-based diagnostic tool had reasonable validity and reliability when used by non-specialists at remote sites.

Then there was another study done with refugees, by Tomita et al (2016) from South Africa which used a mobile “SMS-based depression screening intervention” involving 16 symptoms of depression, the results of which were compared with “face-to-face consultation”. It was observed that for both, 135 participants completed follow-up with almost all participants having mobile phones and using SMS. There was a reasonable agreement observed amongst both SMS and face-to-face approaches and the participants labelled the SMS approach as satisfactory.

Then, Lara et al(2014), a study from Mexico used a “web-based psychoeducation, cognitive behavioural intervention, Help for Depression” was used, centred on face-to-face interventions. This was used for depression in Mexico and comprised seven self-help modules(symptom assessment, feedback for users, vignettes, recorded messages, relaxation exercises, workbooks, blogs, and a discussion forum). However, on analysis it was seen that this intervention had High attrition rate with just 5% of users completing all the modules. It was also observed that out of all the users 67% contributed to the blogs, 65% participants used the workbook and 61% of them used the discussion forum of which just 16% added a post; the modules were rated as highly helpful and useful with participants appearing to benefit, and consequently recommending enhancements to user interface. It was also noticed that there were a lot of, in-depth, positive exchanges in the forum including sharing of individual happenings and emotions, giving guidance or knowledge, or emotional support and no destructive or negative exchanges observed.

Lastly, a study from Iraq by Wagner et al(2012), used “Internet-based cognitive behavioural therapy intervention” adapted for Iraqi population, for post-traumatic stress disorder which was translated into Arabic. This consisted two, weekly 45 min written tasks over a period of 5 weeks where the counselors joined in weekly observation sessions and contributed to online observation forum. The results showed that 15 contestants (87% female) finished the intervention and follow-up period (38% retention) out of which, a significant reduction in post- traumatic stress symptoms was observed with time($p<0.001$) and a significant decrease in symptoms of depression and anxiety ($p<0.001$) along with improved quality of life ($p<0.001$) was also seen.

Hence, we can say that digital intervention can be and should be used, not only for bridging the treatment gap, but also for increasing awareness regarding mental health issues as both are prime concerns in this area of healthcare. Although not much literature was available advocating digital media usage solely for increasing awareness, but almost all the articles cited till now, as evidence for digital media usage, had a subcomponent of increasing the mental health awareness through those platforms. However, there are platforms still being developed for doing both, increasing awareness and recognizing early signs of mental health issues. One such platform is Mevoked(41) which is being developed with idea to promote awareness and overall mental and physical awareness. There are many other apps being developed and have already been developed but no scientific literature was found, advocating their feasibility and validity, to be used in programs at community level. The only paper found to be advocating the use of digital technology for

increasing awareness on mental health issues was by the authors Christoff and Boerngen- Lacerda (2015). The study was an RCT conducted for 3 months in Brazil including 333 college students. The study was about “computer-based and online screening and motivational intervention” to increase awareness of the risks of substance misuse, provide guidance, communicate coping skills, boost behavioural change, and obtain participant self-reports; compared with face- to-face version of the intervention.

Decline in substance misuse scores for tobacco, alcohol, marijuana, and other drugs was noted across all the groups and the online computer intervention did not seem to be extra effective than a face-to-face intervention.

Thus, we see, through this literature review, that there are digital interventions which are already available which can be used for addressing mental healthcare issues. WHO has already started doing, as pointed out above, and thus it is only imperative that India also starts using, the already available, feasible and valid technology (eg. GMHAT) for the betterment of Indian mental healthcare scenario.

7. Identification of areas in NMHP for integration of digital technology

National Health Programs have been implemented by the government of India, ever since independence, to improve the health status of the country(42). Human health not only influences the society, but also social structures, culture, politics, and economics(43). There have been many programs which have been implemented by the government of India, both for communicable and non-

communicable diseases, which have also been scaled up ever since their inception. Some attained their eventual goals(eg. Pulse polio program), some have been under constant improvement so as to meet the constant changing needs of the community(eg. National Tuberculosis control program(NTCP to Revised NTCP/RNTCP)), while some still have a long way to go, to achieve their targets, despite their constant scaling up. Amongst the last category is the National Mental Health Program, as already discussed so far.

Also, as discussed so far, it is the need of the hour to, incorporate digital technology, into mental healthcare, in such a way, that it can positively affect the maximum population, at a given period of time; and the sole objective of any National program is to do so, and hence the NMHP must incorporate digital technologies, available, for the enhancement of national mental healthcare and to fill in the gaps, present in the mental healthcare scenario.

DMHP was implemented under the NMHP in 1985 and was strategized again in the year 2003 to incorporate two schemes, namely “Modernization of State Mental Hospitals” and “Up-gradation of Psychiatric Wings of Medical Colleges/General Hospitals”. The objectives of these have been already discussed above. The NMHP was initiated in 1980s and used the planning, resources, and technology of that time to achieve its goals and objectives. In last few decades, the delivery of health care and mental health care has changed tremendously with newer technologies being introduced into the health sector. And so, what seemed suitable in the 1980s, perhaps now need revisions in light of innovations such as e-Health, m-Health, and Digital India(44).

Following is a table(Table 4), presenting how and where digital technology can be incorporated into the NMHP:

S. No.	Area of NMHP	How
<i>Firstly, digital technology can be used to achieve the objectives of the NMHP:</i>		
1.	“To ensure the availability and accessibility of minimum mental healthcare for all in the foreseeable future, particularly to the most vulnerable and underprivileged sections of the population”(45)	Frontline workers can be trained with a feasible and valid digital technology to reach the grass root level of the community; to diagnose early and provide appropriate treatment(which can be made available through that tech) or refer to a higher centre for treatment.
2.	“To encourage the application of mental health knowledge in general healthcare and in social development”(45)	Separate technology can be used, or a small interactive module can be designed and integrated in the same technology(as above) to reduce stigma and increase awareness and knowledge about common mental health issues.
3.	“To promote community participation in the mental health service development and to stimulate efforts towards self-help in the community”(45)	

<i>Secondly, digital technology can be incorporated into the common points of the DMHP(which was based on the Bellary model) and the re-strategization of the NMHP in 2003:</i>		
i)	Early Detection and Treatment	As point 1
ii)	Training & Research/Manpower development	Appropriate data can be extracted about the usage of the technology incorporated, which can be used for research about the upcoming or unaddressed needs and issues of the community concerning mental health and accordingly the required manpower can be trained and produced. The digital technology can be used to form HMIS for this purpose too.
iii)	IEC/Increasing Awareness	As point 2
iv)	Extension of DMHP to 100 districts	The DMHP is already working in 123 districts(46) but for further extension and integration of digital technology, the already successful DMHP

		implementations must be first integrated with digital technology. In the second phase each of former must help implement the same in 2 districts and so on so forth. This would assist India in achieving the mental health targets more efficiently. The use of telepsychiatry in combination with the new technology can also be used for this purpose.
v)	Monitoring & Evaluation	Through the data provided by the technology, as in point ii) or through a separate module being built into the same technology for the purpose.

8. Discussion

In 2013, WHA adopted the MHAP 2013–2020 with the intention to improvise the mental health trends in populations throughout the world, in the coming 8 years(47). This was a “first in the history of WHO”, and this represented the official acknowledgment of the significance of mental health for all 194 member states of

WHO. It was like a pledge by them all to take required actions to enhance the global mental health and to promote the achievement of the agreed global objectives(47).

This action plan focused on 4 main objectives(17): “strengthening effective leadership and governance for mental health; providing all-inclusive, unified and responsive mental health and social care services in community-based settings; implementation of strategies for promotion and prevention of mental health; strengthening information systems, evidence and research for mental health.”

The action plan relied on “six cross-cutting principles and approaches ”(17): Universal health coverage, Human rights, Evidence-based practice, Life course approach, Multisectoral approach, Empowerment of persons with mental disorders and psychosocial disabilities. All these points put forward by the WHO were evidence enough to show significance of mental health in the world.

India too, hasn't been behind in its actions, for the development of mental health. With the evolution of the NMHP over the last few decades, the development of the DMHP, the formulation of the National Mental Health Policy in 2014 and it's consequent modification in 2017 and lastly the implementation of the National Mental Healthcare Act in 2018, just showed how seriously this issue of mental health needs to be addressed. But despite these efforts, the mental health indicators in India still lag behind, when compared with other countries. This sparks the need for something innovative to be done at the national level, to curb this issue to the maximum in shortest period of time.

Also, in 2015, 193 countries came together and created a set of 17 goals and 169 targets which all 193 UN Member States, including India committed to achieve

between 2016 and 2030 and these were together called “Sustainable Development Goals”. Health has a central place in SDG 3 ‘Ensure healthy lives and promote well-being for all at all ages’(40)(49) and is about “committing to reduce preventable maternal and child deaths, end the epidemics of communicable and noncommunicable disease, strengthen health systems capacity and achieve UHC”.

Since the definition of health, entails mental health being an eminent part of health, this needs to be addressed for with new innovative ideas for maintaining a healthy state and attaining the state of UHC. The major issues which mental health is facing today in India is the treatment gap and a high degree of stigmatization and lack of awareness in this regard. As evident from the Post GMHAT implementation-IIHMR Pilot study(13) data analysis, there were people who were still preferring to go for cultural healers when it came to psychiatric disorders. Though the awareness regarding the symptoms of mental disorders was low, but the people had the positive perception that psychiatric illnesses can be cured and that people with psychiatric issues should not isolated from the community. Even then majority of the people said that they would like to maintain distance from the people suffering such conditions. There was no association, relevant or worth highlighting, found between psychiatric disorders and socio-demographic characters. The findings from this study i.e. low awareness about mental issues were further substantiated from the literature review regarding the mental health scenario, and it was very much evident that awareness play a key role in improving the mental health scenario in the country along with measures to fill in the treatment gap.

Steps have been taken in the past to address these issues but because the progress has been unsatisfactory in the past decades, the situation now demands innovative interventions which can address these issues in an efficient manner. The answer to this “innovative” intervention lies in involving digital technology in mental healthcare. WHO has already started doing so, as discussed, and its time, that India too must adopt digital technology at the national program level.

The benefit of using digital technology is that, more population can be covered in a shorter duration and more data can be collected and stored in a more secure manner. Everyone, irrespective of his or her educational status, is quite versed with technology like mobile phones, tablets etc. Digital technology is popular among adults and young alike and hence this should be used to the advantage of the national program, to de-stigmatize mental health. This would not only lead to increased self-awareness about the psychiatric symptoms but also act as increasing the awareness in the community as a whole, which would in turn, hopefully, lead to increased number of people seeking professional help in mental disorders rather than going for traditional/cultural healers. It is also evident from the GMHATool analysis and the subsequent literature review for digital interventions for mental health around the world, that feasible and valid digital technology not only exists but also has positive results in terms usage in mental healthcare. Also, for achieving UHC by 2030, it is important to cover larger population in a shorter time span with the greatest impact for improvement and hence digital technology should be started to be used at the national program level to address the key issues, discussed above, mental healthcare is facing today.

9. Recommendations

From the discussion above, regarding the problems, which mental healthcare is facing today in India and its consequent solutions, following are a few key recommendations to improvise the situation to achieve universal health coverage as a part of sustainable development goals by 2030:

- 1) Identify a feasible and valid form of digital technology available, which can help in achieving the desired effect on mental healthcare (eg. GMHAT).
- 2) Modify it with the help of experts from all areas (Doctors, computer engineers etc.) to make it more user friendly and easier to be understood and used, alike by all levels of workers.
- 3) Incorporate the technology in the District Mental Health Program as a part of the National Mental Health Program as discussed above.
- 4) Lack of Awareness/Stigma and Treatment gap should be the main targets for digital technology usage.
- 5) Manpower should be trained to work for this technology at all levels (ASHA, ANM, Medical Officers, Psychologists, Psychiatrists)
- 6) Specialists using this technology should be given additional responsibility of training more people under them and also of covering more patients through this technology and to give regular feedbacks to make the technology stronger and better with times to come.
- 7) Further studies should be done and the per patient time through this technology should be reduced.

- 8) A component of this technology should also be made available*, free of cost to all the people seeking help (and their family members/people accompanying them) for mental illnesses to help them report any kind stigma/discrimination faced by them(for increasing self-help). This would instil a sense of security in them. Also, the step of distribution of the technology to the persons accompanying would also help in reducing the stigma and increasing the overall awareness regarding mental health issues.
- (*either through download or through specific IT support centres established for this digital technology in each district)

10. Conclusion

Despite repeated efforts and advancements, the mental healthcare scenario still requires a lot of steps to be taken in order to attain the goal of universal health coverage as a part of sustainable development goals, by 2030. The efforts need be to innovative enough to address the issues of mental healthcare efficiently so that other aspects of health can also be focussed for UHC to be achieved. Digital technology is making huge impact in every field of medicine nowadays(eg. Robot assisted surgery, advanced CT-scan and MRI machines etc.) and its high time that it gets incorporated in mental healthcare as well, at the program level. India was one of the pioneers when it came to initiation of a national level mental health program and India must take similar strides, now as well, and make digital technology incorporated in the national program. Many examples of technology are available, and the right type should be now selected, modified according to needs of the

community and the country and this new strategy should be executed at the earliest to reap results at the earliest of attaining a part of UHC.

11. References

1. WHO | Mental health: a state of well-being. WHO [Internet]. 2014 [cited 2019 Aug 17]; Available from:
https://www.who.int/features/factfiles/mental_health/en/
2. World Health Organization, Mental health in India. SEARO [Internet]. 2017 [cited 2019 Jun 10]; Available from:
http://www.searo.who.int/india/topics/mental_health/about_mentalhealth/en/
3. Pages R. District Mental Health Program : 2019. p. 4–7.
4. Khurana S, Sharma S. National mental health program of India : a review of the history and the current scenario. 2020;3(10):2696–704.
5. Roy S, Rasheed N. The National Mental Health Programme of India. 2015;(August).
6. MINISTRY OF LAW AND JUSTICE. the Mental Healthcare Act, 2017. Gaz India [Internet]. 2017;(DI):51. Available from:
https://www.prsindia.org/uploads/media/Mental_Health/Mental_Healthcare_Act,2017.pdf
7. WHO. World Health Report 2001, Mental Health New hope. World Health. 2001;
8. Whiteford H, Ferrari A, Degenhardt L. Global Burden Of Disease Studies: Implications For Mental And Substance Use Disorders. Health Aff [Internet]. 2016 Jun [cited 2019 Aug 18];35(6):1114–20. Available from:

<http://www.healthaffairs.org/doi/10.1377/hlthaff.2016.0082>

9. NMHS Collaborators. National Mental Health Survey of India, 2015-16: Summary. Natl Ment Heal Surv India [Internet]. 2016; Available from: [http://www.nimhans.ac.in/sites/default/files/u197/National Mental Health Survey -2015-16 Summary_0.pdf](http://www.nimhans.ac.in/sites/default/files/u197/National%20Mental%20Health%20Survey%20-2015-16%20Summary_0.pdf)
10. World Health Organization, Mental health in India. SEARO [Internet]. 2017 [cited 2019 Aug 17]; Available from: http://www.searo.who.int/india/topics/mental_health/about_mentalhealth/en/
11. Wig NN, Murthy SR. The birth of national mental health program for India. Indian J Psychiatry. 2015;57(3):315–9.
12. Malhotra S, Chakrabarti S, Shah R. A model for digital mental healthcare: Its usefulness and potential for service delivery in low- and middle-income countries. Indian J Psychiatry [Internet]. 2019 [cited 2019 May 20];61(1):27–36. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/30745651>
13. SD G. Assessing and Managing Mental Health Problems through Frontline Health Functionaries in Alwar of Rajasthan- A Pilot Study. Unpublished report IIHMR University, Jaipur. Jaipur; 2019.
14. Sustainable Development Goals. The Sustainable Development Goals Report 2017. Sustain Dev Goals Rep 2017. 2017;
15. United Nations. Transforming our world: the 2030 Agenda for Sustainable Development. United Nations Sustainable knowledge platform. Sustain Dev Goals. 2015;1-40a.

16. WHO. Risks to mental health: an overview of vulnerabilities and risk factors
Background paper by WHO secretariat for the development of a
comprehensive mental health action plan 27 August 2012. 2012;18(5 SPEC.
ISS.).
17. World Health Organization. Mental Health Action Plan 2013-2020. WHO Libr
Cat DataLibrary Cat Data [Internet]. 2013;1–44. Available from:
[http://apps.who.int/iris/bitstream/10665/89966/1/9789241506021_eng.pdf?ua=](http://apps.who.int/iris/bitstream/10665/89966/1/9789241506021_eng.pdf?ua=1%5Cnhttp://apps.who.int/iris/bitstream/10665/89966/1/9789241506021_eng.pdf)
[1%5Cnhttp://apps.who.int/iris/bitstream/10665/89966/1/9789241506021_eng.p](http://apps.who.int/iris/bitstream/10665/89966/1/9789241506021_eng.pdf)
df
18. Nithyashri J, Kulanthaivel G. Classification of human age based on Neural
Network using FG-NET Aging database and Wavelets. In: 2012 Fourth
International Conference on Advanced Computing (ICoAC) [Internet]. IEEE;
2012 [cited 2019 Aug 26]. p. 1–5. Available from:
<http://ieeexplore.ieee.org/document/6416855/>
19. Levels or Stages of Education in India today | Reviving Indian Education
[Internet]. [cited 2019 Jun 28]. Available from:
[https://revivingindianeducation.wordpress.com/about/levels-or-stages-of-](https://revivingindianeducation.wordpress.com/about/levels-or-stages-of-education-in-india-today/)
education-in-india-today/
20. Mchugh ML. The Chi-square test of independence Lessons in biostatistics.
Biochem Medica [Internet]. 2013;23(2):143–9. Available from:
<http://dx.doi.org/10.11613/BM.2013.018>
21. Chi-squared test and interpretation using SPSS (assumptions violated) -

- YouTube [Internet]. [cited 2019 Aug 26]. Available from:
<https://www.youtube.com/watch?v=-qcIVHECqco>
22. Yeager K. LibGuides: SPSS Tutorials: Chi-Square Test of Independence.
[cited 2019 Aug 19]; Available from:
<https://libguides.library.kent.edu/SPSS/ChiSquare>
23. NIMH, NS. The national mental health survey of India , 2015-16 prevalence ,
pattern and outcomes. 2016;
24. Garg, Kumar CN, Chandra PS. Number of psychiatrists in India: Baby steps
forward, but a long way to go. Indian J Psychiatry [Internet]. 2019 [cited 2019
Aug 21];61(1):104. Available from:
[http://www.indianjpsychiatry.org/article.asp?issn=0019-
5545;year=2019;volume=61;issue=1;spage=104;epage=105;aulast=Garg](http://www.indianjpsychiatry.org/article.asp?issn=0019-5545;year=2019;volume=61;issue=1;spage=104;epage=105;aulast=Garg)
25. Singh OP. Closing treatment gap of mental disorders in India: Opportunity in
new competency-based Medical Council of India curriculum. Indian J
Psychiatry [Internet]. 2018 [cited 2019 Aug 21];60(4):375–6. Available from:
<http://www.ncbi.nlm.nih.gov/pubmed/30581200>
26. Lahariya C. Strengthen mental health services for universal health coverage in
India. J Postgrad Med [Internet]. 2018 [cited 2019 Aug 21];64(1):7. Available
from: <http://www.ncbi.nlm.nih.gov/pubmed/29386412>
27. In India, struggles to address mental health | Devex [Internet]. [cited 2019 Jun
10]. Available from: [https://www.devex.com/news/in-india-struggles-to-
address-mental-health-92466](https://www.devex.com/news/in-india-struggles-to-address-mental-health-92466)

28. K G. KNOWLEDGE AND ATTITUDE OF MENTAL ILLNESS AMONG GENERAL PUBLIC OF SOUTHERN INDIA Issn: 0976 3325. Natl J Community Med. 2011;2(1):175–8.
29. Aruna G, Mittal S, Yadiyal MB, Acharya C, Acharya S, Uppulari C. Perception, knowledge, and attitude toward mental disorders and psychiatry among medical undergraduates in Karnataka: A cross-sectional study. Indian J Psychiatry. 2016;58(1):70–6.
30. Das S PH. Knowledge, Attitude, Perception and Belief of patients' relatives towards mental illness: a cross sectional study. Delhi Psychiatry J [Internet]. 2014;17. Available from: <http://medind.nic.in/daa/t13/i1/daat13i1p98.pdf>
31. Srivastava K, Chatterjee K, Bhat PS. Mental health awareness: The Indian scenario. Ind Psychiatry J [Internet]. 2016 [cited 2019 Aug 19];25(2):131–4. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28659690>
32. Salve H, Goswami K, Sagar R, Nongkynrih B, Sreenivas V. Perception and attitude towards mental illness in an urban community in South Delhi - A community based study. Indian J Psychol Med. 2013;35(2):154–8.
33. Naslund JA, Aschbrenner KA, Araya R, Marsch LA, Unützer J, Patel V, 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. 2017;4(6):486–500.
34. World Health Organization. mhGAP Intervention Guide Mental Health Gap Action Programme Version 2.0 for mental, neurological and substance use

- disorders in non-specialized health settings. World Heal Organ. 2016;1–173.
35. Sharma VK, Jagawat S, Midha A, Jain A, Tambi A, Mangwani L, et al. The global mental health assessment tool-validation in hindi: A validity and feasibility study. Indian J Psychiatry. 2010;52(4):316–9.
 36. Sharma VK, Lepping P, Cummins AGP, Copeland JRM, Parhee R, Mottram P. The Global Mental Health Assessment Tool--Primary Care Version (GMHAT/PC). Development, reliability and validity. World Psychiatry [Internet]. 2004;3(2):115–9. Available from:
<http://www.ncbi.nlm.nih.gov/pubmed/16633473>
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC1414685>
 37. Krishna M, Lepping P, Sharma VK, Copeland JRM, Lockwood L, Williams M. Epidemiological and clinical use of GMHAT-PC (Global Mental Health assessment tool - Primary care) in cardiac patients. Clin Pract Epidemiol Ment Heal. 2009;5:1–7.
 38. Carswell K, Harper-Shehadeh M, Watts S, van't Hof E, Abi Ramia J, Heim E, et al. Step-by-Step: a new WHO digital mental health intervention for depression. mHealth. 2018;4:34–34.
 39. WHO | STARS – designing a new digital intervention for adolescents. WHO [Internet]. 2019 [cited 2019 Aug 24]; Available from:
https://www.who.int/mental_health/management/stars/en/
 40. Clinical Management of Mental, Neurological and Substance Use Conditions in Humanitarian Emergencies mhGAP Humanitarian Intervention Guide

- (mhGAP-HIG) mental health Gap Action Programme [Internet]. 2015 [cited 2019 Aug 24]. Available from: www.who.int
41. Can Technology Play a Role in Mental Health Awareness? | EdSurge News [Internet]. [cited 2019 Aug 24]. Available from: <https://www.edsurge.com/news/2013-12-11-can-technology-play-a-role-in-mental-health-awareness>
 42. Park K. Park's Textbook of preventive and social medicine. 24th ed. Banarsidas Bhanot Publishers; 2017.
 43. National Health Programmes In India [Internet]. [cited 2019 Aug 25]. Available from: <https://www.jagranjosh.com/general-knowledge/national-health-programmes-in-india-1322806022-1>
 44. Khandelwal. From the immediate past president: Musings on Indian social psychiatry on the occasion of silver jubilee conference of Indian Association for Social Psychiatry. Indian J Soc Psychiatry [Internet]. 2018 [cited 2019 Aug 25];34(4):268. Available from: <http://www.indjsp.org/article.asp?issn=0971-9962;year=2018;volume=34;issue=4;spage=268;epage=272;aulast=Khandelwal>
 45. National Mental Health Programme (NMHP) [Internet]. Available from: https://mohfw.gov.in/sites/default/files/9903463892NMHP_detail_0_2.pdf
 46. National Mental Health Programme (NMHP) Background [Internet]. [cited 2019 Aug 24]. Available from: https://mohfw.gov.in/sites/default/files/9903463892NMHP_detail_0_2.pdf

47. Saxena S, Funk M, Chisholm D. World Health Assembly adopts Comprehensive Mental Health Action Plan 2013–2020. Lancet [Internet]. 2013;381(9882):1970–1. Available from:
<https://linkinghub.elsevier.com/retrieve/pii/S0140673613611393>
48. World Health Organization, Sustainable Development Goals (SDGs). SEARO [Internet]. 2017 [cited 2019 Aug 25]; Available from:
<http://www.searo.who.int/india/topics/sustainable-development-goals/en/>
49. IN THE YEAR 2015, LEADERS FROM 193 COUNTRIES OF THE WORLD [Internet]. [cited 2019 Aug 25]. Available from:
https://www.undp.org/content/dam/undp/library/corporate/brochure/SDGs_Booklet_Web_En.pdf

12. Annexures

Annexure-1(Socio-Demographic Characteristics)

Table 1.1(Population Attributes)

	Percentage
Age Distribution:	
- Children	0.0
- Adolescents	2.8%
- Adults	92.2%
- Senior Adults	4.9%
Gender Distribution:	
- Males	46.5%
- Females	53.5%
Marital Status	
- Currently Married	87.1%
- Married, gauna not performed	0.6%
- Widow/widower	2.8%
- Never Married	9.5%
Religion	
- Hindu	81.5%
- Muslim	18.5%
Caste Category	
- Scheduled caste	12.3%
- Scheduled tribe	18.2%
- Other backward caste	54.8%
- None of them	14.8%
School Attended	
- Yes	67.4%
- No	32.6%
Education Level	
- Uneducated	32.6%
- Primary stage	12.9%
- Middle stage	13.5%
- Secondary stage	12.3%
- Senior Secondary stage	12.0%
- Undergraduate stage	12.0%
- Postgraduate stage	4.6%
Type of Family	
- Joint	57.2%
- Nuclear	42.8%

Table 1.2(Population distribution)

Block	Frequency	Percentage
Rajgarh	165	50.8
Malakhera	160	49.2
Total	325	100.0

Table 1.3 (Educational status by block)

	Malakhera		Rajgarh	
	Frequency	Percentage	Frequency	Percentage
Uneducated	52	32.5	54	32.72727
Primary Stage	25	15.625	17	10.30303
Middle Stage	29	18.125	15	9.090909
Secondary Stage	18	11.25	22	13.33333
Senior Secondary Stage	15	9.375	24	14.54545
Undergraduate Stage	16	10	23	13.93939
Postgraduate Stage	5	3.125	10	6.060606
	160	100	165	100

Table 1.4 (Population by Caste)

	Frequency	Percentage
BAIRWA	21	6.5
BANIYA	3	.9
BANJARA	1	.3
BRAHMAN	41	12.6
DHANIKA	1	.3
DHANKA	4	1.2
DHOBI	1	.3
FAKEER	8	2.5
GOSHWAMI	2	.6
GURJAR	26	8.0
HARIJAN	2	.6
JANGID	5	1.5
JAT	7	2.2

JATAV	12	3.7
JOGI	2	.6
KOLI	3	.9
KUMHAR	6	1.8
MALI	15	4.6
MEENA	54	16.6
MEGHWAL	1	.3
MEV	51	15.7
RAJPOOT	2	.6
SAIN	6	1.8
SAINI	46	14.2
SEKH	1	.3
VAISHNAV	1	.3
YADAV	3	.9
Total	325	100.0

Annexure-2 (Results of Bivariate Analysis between Socio-demographic variables and knowledge)

*(Q1-Have you heard about psychiatric disorders? Q2-Have you seen any person suffered from psychiatric disorder? Q3-Have you heard about mental illness related toll free helpline?)

Null hypothesis: H0: There is no association between the two variables (if p value>0.05; accepted)

Alternate hypothesis: H1: there is significant association between the two variables (if p value<0.05; accepted)

Table 2.1

Variable	Question Asked*	Test Interpreted	p-value	Hypothesis accepted
1. Age	Q1 Q2 Q3	Likelihood Ratio	0.258 0.122 0.196	H0 H0 H0
2. Sex	Q1 Q2 Q3	Pearson Chi-Square	0.718 0.289 0.430	H0 H0 H0
3. Religion	Q1 Q2 Q3	Likelihood Ratio	0.000 0.196 0.001	H1 H0 H1
4. Caste category	Q1 Q2 Q3	Likelihood Ratio	0.025 0.913 0.545	H1 H0 H0
5. Marital status	Q1 Q2	Likelihood Ratio	0.617 0.199	H0 H0

	Q3		0.886	H0
6. Family Type	Q1	Pearson Chi-Square	0.910	H0
	Q2		0.835	H0
	Q3		0.419	H0
7. Education	Q1	Likelihood Ratio	0.002	H1
	Q2		0.023	H1
	Q3		0.798	H0
8. School attended or not	Q1	Pearson Chi-Square	0.408	H0
	Q2		0.087	H0
	Q3		0.956	H0
9. Occupation	Q1	Likelihood Ratio	0.409	H0
	Q2		0.182	H0
	Q3		0.004	H1
10. Block	Q1	Pearson Chi-Square	0.001	H1
	Q2		0.001	H1
	Q3		0.000	H1
11. Village	Q1	Likelihood Ratio	0.000	H1
	Q2		0.015	H1
	Q3		0.000	H1

Annexure-3 (Knowledge Status)

Table 3.1 and Table 3.2

Total people	325
People Who Didn't Know Any Symptoms	24
People Who Knew At least 1 symptom	301

Total Symptoms	23
total responses (Numerator)	1101
Total People * Total Symptoms (Denominator)	7475
Avg Symptom known	0.147291
%sym known by pop	14.7291

Annexure-4 (Attitude towards mental health)

Questions asked

- 1) Number of mentally ill people is increasing.
- 2) People feel ashamed to mention someone has psychiatric disorders in his/her family ?
- 3) Pooja/ havan can reduce the bad effects of psychiatric disorders ?
- 4) Individuals diagnosed as mentally ill suffer from its symptoms throughout their life ?
- 5) Stay away from people who is suffering from psychiatric disorders because their behavior is dangerous ?
- 6) The behaviour of people suffering from psychiatric disorders are unpredictable ?
- 7) People suffering from psychiatric disorders need the same kind of control and discipline as a young child ?
- 8) Working with patients suffering from psychiatric disorders is difficult ?
- 9) Psychiatric disorders can be cured by tantric/ ojha ?

10) People suffering from psychiatric disorders need to be isolated from the rest of the community ?

Responses taken in the form of Likert scale of 1-4 (1-Strongly Disagree, 2-Disagree, 3-Agree, 4-Strongly Agree)

Table 4.1

Response	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10
% of 1	0.62	7.69	24.00	4.31	2.46	0.31	1.85	0.92	35.38	31.69
% of 2	40.00	52.31	57.54	75.08	28.62	6.77	1.85	13.85	51.08	57.54
% of 3	55.38	37.54	17.85	19.08	63.69	82.15	51.69	79.08	12.92	8.92
% of 4	4.00	2.46	0.62	1.54	5.23	10.77	44.62	6.15	0.62	1.85

Annexure-5 (Test of association between Knowledge and Attitude)

Table 5.1 Analysis of people who knew at least 1 symptom (n=301)

Response	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Percentage
No. of 1	2	22	73	13	6	1	6	2	107	98	330	10.96
No. of 2	115	153	173	227	88	21	5	41	156	173	1152	38.27
No. of 3	173	118	53	57	191	248	153	241	37	25	1296	43.06
No. of 4	11	8	2	4	16	31	137	17	1	5	232	7.71

Table 5.2 Analysis of people who didn't know even 1 symptom (n=24)

Response	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Percentage
No. of 1	0	3	5	1	2	0	0	1	8	5	25	10.42
No. of 2	15	17	14	17	5	1	1	4	10	14	98	40.83

No. of 3	7	4	5	5	16	19	15	16	5	4	96	40.00
No. of 4	2	0	0	1	1	4	8	3	1	1	21	8.75

For Chi square test to be applied, Number of Responses as 1 and 2 were combined as total who disagreed and Responses as 3 and 4 were combined as total who agreed. The (2x2) table is as below:

		Attitude (Q33)		Total
		Agree	Disagree	
Symptom knowledge (Q22)	Yes	1482	1528	3010
	No	123	117	240
Total		1605	1645	3250

Annexure-6(Perception of community whether people/family members hide their psychiatric disorders or not)

	Frequency	Percent
Agree	117	36.0
Disagree	208	64.0
Total	325	100.0

Reason to Hide	Frequency	Percentage(calculated out of 117 for each)
disrespect	105	89.74
shame	77	65.81
stigma	41	35.04
hopelessness	15	12.82
lack of energy	1	0.85
lack of awareness	10	8.55
lack of psychiatrist at a nearby health facility	0	0.00
lack of financial resources	3	2.56
lack of insight	3	2.56

Annexure-7(health seeking behaviour of the community)

Table 7.1 (When members of a household get sick, where do they generally go first for treatment?)

	Frequency	Percent
Tantric/ bhopa/ojha	3	.9
Govt/ Municipal hospital	20	6.2
Govt dispensary	1	.3
CHC	99	30.5
PHC	53	16.3
Sub health Center	4	1.2
Private hospital	11	3.4
Private doctor/ clinic	130	40.0
Traditional practitioner	1	.3
Pharmacy drug/ store	3	.9
Total	325	100.0

Table 7.2 (Which is visited first for the treatment of any person suffered from psychiatric disorders?)

	Frequency	Percentage
Tantric/ bhopa/ojha	40	12.3
Govt/ Municipal hospital	144	44.3
Govt dispensary	4	1.2
CHC	70	21.5
PHC	22	6.8
Sub health Center	1	.3
Private hospital	23	7.1
Private doctor/ clinic	11	3.4
Dont know	10	3.1
Total	325	100.0

Annexure-8(knowledge of IEC/BCC Material)

Table 8.1 (Whether IEC/ BCC material related to psychiatric disorders was observed)

	Frequency	Percent
Yes	116	35.7
No	209	64.3
Total	325	100.0

Table 8.2 (Place visited)

Place	Frequency	Percentage(out of 116 for each)
Govt. Health Facility	71	61.2069
Private Health Clinic	2	1.724138
School/College	4	3.448276
NGO	14	12.06897
Camp	45	38.7931
Gram Panchayat	6	5.172414
Other	44	37.93103

Annexure-9(Post GMHAT-IIHMR Pilot Study)

Following is the link to the questionnaire, since the file provided was a PDF and was not properly getting converted into word file.

https://drive.google.com/open?id=1-NEKuWctsr5NL6HcmLPPk_kihu2TaXKx

(ONLY PEOPLE WITH THIS LINK CAN ACCESS IT)

Annexure-10 (Tables from the paper “Digital technology for treating and preventing mental disorders in low-income and middle-income countries: a narrative review of the literature”)

Table 10.1 Studies using digital technology for supporting clinical care and educating health workers

	Country	Study design and duration	Participants	Intervention	Outcome
Abdi and Elmi (2011)	Somaliland	Descriptive, naturalistic, pilot feasibility study; 18 months	132 participants (32% female) with a range of diagnoses including schizophrenia and mood disorders	Skype-based online telepsychiatry consultations from psychiatrists located in Scandinavia (Denmark, Norway, and Sweden) delivered on a computer within the central mental health clinic to outpatients in need of mental health care	Feasibility of programme shown by increasing use among patients, patients choosing to travel long distances for consultations, and satisfaction reported among clinic staff, local authorities, and communities
Balasinorwala et al (2014)	India	Retrospective analysis of feasibility; 6 years	94 participants (36% female) mostly with schizophrenia, other psychotic disorders, or mood disorders	Asynchronous (store-and-forward) telepsychiatry programme, whereby primary care physicians send notes and investigation reports by email to a psychiatrist to review at a central hospital	Feasibility shown as a definite psychiatric diagnosis was possible for 89 (95%) patients
Barrera-Valencia et al (2016)	Colombia	RCT and cost-effectiveness analysis; 6 month follow-up	106 male prisoners with symptoms of depression	Asynchronous (store-and-forward) telepsychiatry model, whereby primary care physicians see prisoners and send notes electronically to a consulting psychiatrist for diagnosis, treatment, and medication recommendations; compared with a synchronous telepsychiatry model involving videoconferencing consultation between prisoners and a psychiatrist	99 (93%) participants completed follow-up; both telepsychiatry models contributed to reduction in depressive symptoms among prisoners ($p<0.001$); the asynchronous model showed a greater decrease in depressive symptoms than did the synchronous model ($p=0.01$); the cost of the asynchronous model was significantly lower than that of the synchronous model ($p<0.001$)
Chipps et al (2012)	South Africa	Development and implementation project; 3 years	31 patients with a range of mental disorders including schizophrenia and mood disorders	Development, pilot testing, and implementation of a telepsychiatry service at the University of KwaZulu-Natal to provide telepsychiatry education to clinicians and clinical outreach services to patients using videoconferencing technology; patients participated in individual or group telepsychiatry sessions	The programme is feasible and appears beneficial for overcoming long distances, improving clinical efficiency, and delivering group sessions; there were many technical difficulties, challenges with scheduling, and high staff turnover

Hungerbuehler et al (2016)	Brazil	Pilot RCT; 6 month and 12 month follow-up	107 outpatients (71% female) with stable unipolar depressive disorder	Telepsychiatry involving monthly online Skype videoconferencing consultations with psychoeducation, medication monitoring, and counselling with a psychiatrist and medication delivery to patients' homes; comparison group had monthly face-to-face consultations at the psychiatric hospital, and medications available at the clinic following the consultation	85 (79%) participants completed 12 month follow-up; during the study there were 489 video consultations and 461 face-to-face consultations; both groups had a reduction in depressive symptoms ($p<0.001$) and an improvement in mental health status ($p=0.001$); clinical outcomes did not differ significantly between groups; patients in both groups reported satisfaction with their treatment
Kale et al (2016) ¹⁴	India	Descriptive, naturalistic study; 3 years	316 outpatients with mental disorders including depression, anxiety disorders, and schizophrenia	Telepsychiatry consultations using web videoconferencing to provide diagnosis, treatment, and specialist follow-up care to outpatients at a rural hospital; remote consulting psychiatrists had access to patients' electronic medical records	Feasibility of the programme was demonstrated by providing 1200 consultations to 316 patients; reduction in referral rates to medical colleges for psychiatric illnesses; satisfaction reported by consulting psychiatrists and patients
Keynejad et al (2016)	Somaliland	Mixed methods study; 1 year	48 medical students (half from Somaliland and half from the UK) divided into 24 pairs	Aqoon is an online psychiatry education programme involving peer-to-peer partnerships between medical students in Somaliland and the UK; ten instant messaging meetings between student pairs on the MedicineAfrica web platform cover core psychiatry curriculum including common disorders and cultural perspectives	Students from Somaliland rated online peer-to-peer education partnerships positively for enjoyment, interest, and academic helpfulness; attitudes towards psychiatry improved among Somaliland students, but not among UK students; Somaliland students reported more gains in factual knowledge and UK students reported greater cross-cultural learning
Lowenthal et al (2012)	Brazil	Pilot feasibility study; 4 months	25 primary care workers (75% female) including doctors and nurses	Online tele-education programme to provide primary care professionals with training in child and adolescent mental health; distance education includes videos about depression, anxiety, attention deficit hyperactivity disorder, conduct disorder, and pervasive developmental disorder with animated tutorials about screening for mental health problems; tele- education programme is followed by a 1 day classroom training session	Primary health-care workers showed acquisition of knowledge about the content and learning objectives covered in the tele- education programme ($p<0.01$), and improvement in their knowledge ($p<0.01$), attitudes ($p<0.01$), and practice associated with diagnosing and treating mental disorders in childhood and adolescence
Novaes et al (2012)	Brazil	Descriptive, naturalistic study; 12 months	1422 health-care professionals	Tele-education programme consisting of weekly web conference seminars and moderated discussion forums to provide education to family health-care teams about mental health	39 tele-education sessions were done during the 1 year period and 384 (27%) health professionals responded to follow-up evaluations; nearly all respondents were satisfied with the programme and thought that the seminars contributed to their professional development; two-thirds reported difficulties with video and audio connectivity
Pereira et al (2015)	Brazil	Pre-post study; 2 month follow-up	33 health-care professionals (82% female) working in primary care settings	Online course to enhance health professionals' knowledge about clinical management of alcohol misuse; course consisted of nine instructor-led classes and web conferences, video exhibitions, text materials, and online chats and forums	33 of 100 enrolled participants completed the course; participants who completed the course showed significant improvement in knowledge about clinical management of alcohol related problems ($p<0.001$), but no improvement in understanding about misconceptions and biases related to alcohol problems; participants expressed satisfaction with the course

Pereira et al (2015)	Brazil	Three arm cluster RCT; 3 weeks	213 primary school teachers recruited from nine different schools	Web-based programme to educate primary school teachers about childhood mental disorders; interactive programme consisting of tutorials, educational videos, online discussion forum, expert feedback and consultation from a psychiatrist, and written materials; compared with a text and video materials only control group, and a waitlist control group	115 (54%) teachers completed follow-up; teachers in the web-based programme had greater gains in knowledge about mental disorders such as depression and conduct disorder ($p<0.05$), and better understanding about mental disorders, such as less stigmatised views ($p<0.05$), than did those in the text and video only and waitlist control groups; no differences between groups in attitudes about mental disorders
Rahman et al (2006)	Pakistan	Pilot feasibility study; 6 months	20 child or adolescent (aged ≤ 16 years) outpatients (50% female) with various mental disorders	A child telepsychiatry programme using a store-and-forward approach, whereby information recorded on complex cases was	Programme is feasible for supporting diagnosis of complex child psychiatry cases, and providing training and supervision to
Rojas et al (2014)	Chile	Controlled pilot study; 3 month follow-up	81 patients (84% female) with depression	Online telepsychiatry programme that links primary care staff with a consulting psychiatrist to facilitate collaborative care; combined with telephone monitoring to provide patients with advice about medication side-effects and to promote medication adherence; compared with usual care	70 (86%) patients completed 3 month follow-up; significantly greater decrease in depressive symptoms in patient group than the control group ($p=0.037$); programme offers primary care teams remote access to a psychiatrist

RCT=randomised controlled trial.

Table 10.2 Studies evaluating mobile tools for facilitating diagnosis and detection of mental disorders

	Country	Study design and duration	Participants	Intervention	Outcome
Chattopadhyay (2012)	India	Pilot reliability and validity evaluation; 1 year	123 participants (51% female) with varying levels of depression	e-DAT is web based and can be accessed from a computer or mobile device; includes 26 questions to assess symptoms and depression load	e-DAT is considered reliable and valid for diagnosing depression; the mean accuracy of the tool for detecting mild, moderate, or severe depression is 93%
Malhotra et al (2015)	India	Pilot validity and reliability study; 6 months	100 outpatients (47% female) with a range of mental disorders	Internet-based psychiatric screening and diagnostic application intended for use among non-specialists in remote care settings; to assess validity and reliability of the application, outpatients were assessed by non-specialists using the application at remote sites, and were also assessed using online videoconferencing and using a standard screening and diagnostic tool	Moderate to high agreement between different diagnostic methods; the application had high sensitivity, low positive predictive values, but high negative predictive values for most disorders; the internet-based diagnostic tool has acceptable validity and reliability when used by non-specialists at remote sites
Malhotra et al (2015)	India	Pilot accuracy and feasibility study; 6 months	274 outpatients (42% female) with a range of mental disorders	Internet-based decision support system for diagnosis and management of common psychiatric disorders that consists of modules for diagnosis, pharmacological and psychosocial treatment, and follow-up care; compared with a standard screening and diagnostic tool	Internet-based application had high sensitivity, specificity, and negative predictive values for most disorders, but low positive predictive values; good inter-rater reliability and effective for assessing symptom severity and functional status; application seems feasible on the basis of satisfaction reported by patients and interviewers
Tomita et al (2016)	South Africa	Pilot feasibility, reliability, and acceptability study; 10 months	153 refugees (50% female) mainly from Zimbabwe and the Democratic Republic of the Congo	Mobile SMS-based depression screening intervention for refugees; involves a 16 item depressive symptoms inventory; compared with face-to-face consultation	135 participants completed follow-up and both the SMS and face-to-face depression screens; nearly all participants had mobile phones and used SMS; fair agreement between SMS and face-to-face methods; participants were satisfied with SMS approach

e-DAT=electronic depression assessment tool. SMS=short message service.

Table 10.3 Studies evaluating technologies for promoting treatment adherence and supporting recovery

	Countries	Study design and duration	Participants	Intervention	Outcome
Burton et al (2016)	Romania , Spain, and Scotland	Pilot RCT; 6 week intervention	27 participants (67% female) with major depressive disorder or depressive symptoms	Help4Mood is a computer application to support depression treatment between clinical appointments; the cognitive behavioural therapy- based programme involves daily and weekly mood checks, relaxation exercises, and activities to track progress; compared with usual treatment	Participants used Help4Mood a median of 10.5 times during the study; improvement in depressive symptoms observed, but no significant difference compared with the control group; participant feedback was mixed, many indicated they would continue to use the programme, whereas others raised concerns about repetitive content and need for more customisable content
Carrasco (2016)	Chile	Pilot feasibility and acceptability study; 1 year	15 female adolescent patients with symptoms of depression	Maya is an online adventure video game used for depression treatment in adolescents; narrative structure follows a hero's journey to promote skill building, problem solving, decision making, and behavioural activation. Information and resources also available through the private online system	Participants played the game for a mean 11.57 min (SD 3.42); four participants played the game more than once; 13 participants completed acceptability ratings; nine participants reported positive acceptability and considered the game beneficial; four participants did not find the game beneficial
Chandra et al (2014)	India	Qualitative pilot study of feasibility and acceptability; 1 month intervention	40 female participants aged between 16 and 18 years from urban slums in Bangalore with access to a mobile phone	Participants received one daily SMS text-message for 1 month with mental health tips, positive messages, or helpline information; participants could respond if they felt sad, angry or depressed, or to talk to a counsellor	Feasible and acceptable approach for mental health promotion and prevention among young women; most participants responded to the messages by phone (63%) or text-message (58%); most (62%) participants were satisfied with receiving the message; participants preferred the helpline messages
Chen et al (2007) ³⁴	China	RCT; 1 year follow-up	71 patients (46% female) with schizophrenia	Online psychoeducation for relapse prevention combined with drug treatment for non-acute schizophrenia; compared with general rehabilitation control group	Intervention group showed a significant decrease in positive and negative symptoms and relapse incidence compared with control group ($p<0.01$); intervention group had better medication adherence and social function than the control group ($p<0.01$)

Espinosa et al (2016)	Chile	Pilot feasibility and acceptability study; 8 months	35 patients (60% female) who received treatment for major depression	ASCENSO is an online programme to support depression treatment and prevent relapse; the programme includes reminder emails and web-based modules for symptom monitoring, self-care recommendations, online counselling appointments with a psychologist, and information and resources	23 (66%) participants actively used the programme and were sent 330 reminders to monitor their depressive symptoms; most participants reported that the programme was beneficial and that the monitoring component was useful; technical issues and limited time were cited as primary reasons for not using the programme
Fang et al (2011)	China	RCT; 2 year follow-up	91 patients (47% female) with clinically stable schizophrenia	Mobile SMS text-messages sent daily as reminders for medication adherence combined with antipsychotic treatment and telephone follow-up; compared with control group with antipsychotic treatment and telephone follow-up only	At 2 year follow-up, relapse rates were 36% in the intervention group compared with 61% in the control group ($p=0.03$); daily SMS text-message reminders appear effective for reducing relapse in schizophrenia
Fritsch et al (2007)	Chile	RCT; 3 month and 6 month follow-up	345 female participants with depression	Pharmacotherapy with phone monitoring for depression treatment in primary care settings; telephone contact from non-professionals to provide education and medication monitoring to reinforce adherence and provide support; compared with usual care	307 (89%) participants completed 3 month follow-up and 274 (79%) participants completed 6 month follow-up; significant improvement in depressive symptoms at 3 months ($p<0.001$) and 6 months ($p=0.015$) compared with the control; improved mental health at 3 months ($p<0.001$) and 6 months ($p=0.009$) compared with the control
Maiga (2011)	Niger	RCT; 4 month follow-up	100 participants (33% female) with psychosis	Reminder SMS text-messages and phone calls 2 days before monthly follow-up appointments; compared with control without appointment reminders	The intervention group attended significantly more monthly follow-up visits than the control group ($p<0.05$)
Marasinghe et al (2012)	Sri Lanka	RCT; 6 month and 12 month follow-up	68 outpatients (50% female) undergoing treatment following a suicide attempt	Brief mobile treatment includes face-to-face training in problem solving, meditation, mental health assessment, and advice on alcohol and drug use, and ten telephone follow-up calls to assess suicidality and provide guidance, access to audio messages to support meditation and problem solving, and weekly supportive and encouraging SMS reminders; compared with waitlist control group receiving usual care	Participants who received the intervention showed significant reductions in suicidal ideation and depression, and improvement in social support compared with the control group; no reduction in self-harm or substance misuse, and reduction in alcohol use among men only

Özkan et al (2013) ⁴² and Ozkan et al (2013)	Turkey	Pilot RCT; 6 month intervention	62 participants (50% female) with schizophrenia and their caregivers (53% female)	Psychoeducation with weekly telephone follow-up for both participants with schizophrenia and their caregivers; compared with control without psychoeducation and telephone follow-up	Improvement in treatment adherence and social functioning among participants with schizophrenia; caregivers also showed decreased family burden, emotional expression, and depressive symptoms
Taleban et al (2016)	Iran	RCT; 3 month follow-up	203 participants (94% female) from rural areas affected by depressive symptoms	Participants were given a booklet with evidence-based strategies for managing and preventing depressive symptoms; daily text-messages were sent to provide encouragement to participants and to recommend reviewing sections of the booklet for a 30 day period; the booklet with text-messaging was compared with a booklet only group and a control group	198 participants (98%) completed the study; all groups showed a decrease in depressive symptoms over time ($p<0.01$); the booklet with text-messaging group and the booklet-only group had a significant reduction in depressive symptoms compared with the control group ($p<0.001$); change in depressive symptoms did not differ between the booklet with text-messaging group and the booklet only group
Temmingh et al (2013)	South Africa	Prospective naturalistic study; 12 month intervention	761 participants (72% female) with serious mental illness, including schizophrenia spectrum disorder and mood disorders	Telephone-delivered lifestyle coaching intervention aimed at weight reduction and wellness improvement in psychiatric outpatients; weekly calls for 3 months followed by monthly calls for 9 months; consists of exercise and meal planning, goal setting, self-monitoring, encouragement, and health management education	467 participants (61%) completed the intervention; among participants who completed the intervention, mean weight loss was 4.8 kg (95% CI -5.67 to -3.82), and 46% of participants lost 5% or more of their baseline weight; weight loss ($p<0.001$) and improvement in general health ratings ($p<0.001$) were significant; participants who dropped out were younger and were more likely to have a mood disorder
Thomas et al (2016)	Nigeria	RCT; 6 month study period	200 patients (54% female) with first episode psychosis (45% schizophrenia)	The intervention consisted of SMS appointment reminders sent 5 and 3 days before follow-up appointments at the outpatient psychiatry clinic; compared with standard paper appointment reminder cards in the control group	Participants who received the SMS reminders were nearly twice as likely to attend the appointments compared with the control group (OR 1.80; 95% CI 1.02–3.19); the SMS reminders significantly improved clinic attendance ($p<0.03$)

RCT=randomised controlled trial. SMS=short message service.

Table 10.4 Studies evaluating online self-help programmes for individuals with mental disorders

	Countries	Study design and duration	Participants	Intervention	Outcome
Barrera et al (2015)	Argentina, Chile, Columbia, Mexico, Spain, and USA	Pilot RCT; 3 month and 6 month follow-up post partum	852 pregnant women who were mostly Spanish-speaking (83%) and from 23 different countries	Online intervention to prevent post-partum depression by teaching women how to create a healthy lifestyle for themselves and their newborn; eight weekly sessions in English or Spanish that include text, audio, and video materials and worksheets. Compared with information only control group	111 (13%) completed follow-up, had complete data and were included in the analysis; prevention of post-partum depression did not differ significantly between groups; benefits of the intervention were higher for pregnant women reporting higher levels of depressive symptoms ($p=0.023$)
Kishimoto et al (2016)	China	Controlled trial with use of propensity scores to account for non-randomisation; 8 week intervention	197 participants (73% female) with social anxiety disorder or elevated social anxiety symptoms	Internet-based cognitive behavioural therapy self-help programme for social anxiety disorder adapted for Chinese population; the 8 week programme consists of eight text-based information modules and homework assignments; therapist provides minimal guidance using weekly motivational emails and email support; therapist-guided programme was compared with self-guided programme alone and a waitlist control group	94 (48%) participants completed follow-up assessments; therapist-guided programme and self-guided programme contributed to improvement in social anxiety ($p<0.001$) and social phobia ($p<0.001$) compared with waitlist control group; no differences between therapist-guided and self-guided programmes; change in depressive symptoms did not differ between groups; therapist-guided and self-guided programme participants completed comparable numbers of programme modules
Knaevelsrud et al (2015)	Iraq	RCT; 5 week study intervention and 3 month follow-up	159 participants (91% female) experiencing post-traumatic stress	Internet-based cognitive behavioural therapy intervention for post-traumatic stress disorder translated into Arabic; consists of two weekly online sessions delivered over 5 weeks, and structured writing assignments and text-based asynchronous communication with a therapist; compared with a waitlist control group	59% of participants completed follow-up assessments; significant reduction in post-traumatic stress symptoms compared with control group ($p<0.001$); treatment effects were sustained at 3-month post-intervention follow-up

Lara et al (2014)	Mexico	Descriptive naturalistic study; 4 years	17 318 participants (84% female) who registered and accessed the programme two or more times (28 078 visitors to the website); 80% were aged between 18 and 40 years; 95% lived in Mexico City; and 65% had higher than high school education	Help for Depression is a free web-based psychoeducation, cognitive behavioural intervention based on face-to-face interventions for depression developed in Mexico; the programme includes seven self-help modules with symptom assessment, feedback for users, vignettes, recorded messages, relaxation exercises, workbooks, blogs, and a discussion forum	High attrition rate, 5% of users completed all seven modules; 65% used the workbook, 61% used the discussion forum of which 16% added a post, and 67% contributed to the blogs; the helpfulness and usefulness of the modules were rated as high; extensive positive exchanges within the forum including sharing personal experiences and feelings, providing advice or information, or emotional support; no harmful exchanges observed; participants appeared to benefit, and recommended improvements to user interface
Liu et al (2015)	China and Malaysia	Descriptive, naturalistic study; 7 months	4709 Chinese-speaking individuals (62% female) at risk of depression or suicide	Internet-based Chinese-language depression and suicide screener that targeted people who search for depression or suicide information online. Individuals who reported high levels of depressive symptoms or any degree of suicidality received personalised feedback, referral to online suicide-prevention resources, and recommendations to consult with a mental health professional or go to a hospital	11 631 individuals visited the website and 4709 completed the screener; 89% reported not knowing of available mental health services where they lived; 49% screened positive for a current major depressive episode, of whom 78% reported never seeking help; 18% reported attempting suicide in the past 2 weeks, and were mostly women; feasible for identification and reaching of at-risk Chinese-speaking people
López et al (2014)	Mexico	Pilot RCT; 3 month follow-up	66 participants with social anxiety	Internet-based psychoeducation programme for social anxiety based on cognitive behavioural therapy; the programme consists of three modules for evaluation, treatment and prevention; compared with face-to-face therapy and a waitlist control group	43 participants (61% female) completed the intervention and follow-up (65% retention); improvement in measures of anxiety in both active groups, and compared with the waitlist control ($p < 0.05$); supports feasibility of this programme for use in Mexico
Mogoase et al (2013)	Romania	Pilot RCT; 7 day intervention	42 undergraduate students (95% female) with depressive symptoms	Online concreteness training, involving cognitive skill exercises and relaxation techniques to overcome self-defeating thought patterns, for treatment of depression, consisting of daily writing exercises and questions related to positive or negative scenarios over a 7 day period; compared with waitlist control	Improvement in concreteness of thinking (more specific and positive thought patterns) compared with the control ($p < 0.001$); no effect on depressive symptoms or rumination; does not seem to be effective as stand-alone treatment for depression

Moritz & Russu (2013)	Russia	Pilot RCT; 4 week intervention	72 participants (54% female) with obsessive-compulsive disorder	Online Russian-language cognitive behavioural therapy self-help intervention for obsessive-compulsive disorder; consists of online materials to learn association splitting techniques; compared with waitlist control	48 participants (67%) completed follow-up assessments; significant improvement in obsessions ($p<0.05$) and depression ($p<0.05$) compared with the control group; highlights feasibility and effectiveness of online intervention for Russian-speaking participants
Plata et al (2014)	Mexico	Pilot feasibility study; 6 month follow-up	Eight participants (75% female) with depression	Online cognitive behavioural intervention for treatment of depression, consisting of 16 weekly sessions focused on problem solving, cognitive reframing, emotional expression, and self-esteem	Improvement in anxiety and depressive symptoms after treatment; improvements maintained at 6-month follow-up; participants were satisfied with the online intervention
Tulbure et al (2015)	Romania	RCT; 6 month follow-up	76 participants (41% female) with social anxiety disorder	Internet-based cognitive-behavioural therapy for social anxiety disorder consisting of nine weekly modules on behavioural strategies training; modules include writing exercises and questionnaires, a weekly social anxiety measure, and access to an online psychologist; compared with waitlist control	Significant reduction in social anxiety symptoms ($p<0.01$), social phobia ($p<0.01$), depressive symptoms ($p<0.01$), and negative emotions ($p<0.01$) compared with the control group post-intervention; most symptom reductions were maintained at 6 months except for social anxiety and depressive symptoms; participants reported satisfaction with the online treatment
Wagner et al (2012)	Iraq	Pilot study; 5 week intervention	40 participants experiencing post-traumatic stress	Internet-based cognitive behavioural therapy intervention for post-traumatic stress disorder adapted for Iraqi population and translated into Arabic; consists of two weekly 45 min writing assignments over a 5 week period; therapists participate in weekly supervision sessions and contribute to online supervision forum	15 participants (87% female) completed the intervention and follow-up period (38% retention); among completers, a significant reduction in post-traumatic stress symptoms was observed over time ($p<0.001$) and a significant reduction in symptoms of depression and anxiety ($p<0.001$); quality of life also improved over time ($p<0.001$)
Wang et al (2013)	China	RCT; 3 month follow-up	197 trauma survivors (103 from urban areas and 94 from rural areas; 78% female)	My Trauma Recovery is an online self-help programme for trauma based on social cognitive theory; the 1 month programme consists of six modules with videos and educational materials on trauma, coping skills, social support, and relaxation techniques; compared with a waitlist control	Of participants from urban areas, 61 (59%) completed post-intervention and 34 (33%) completed 3 month follow-up assessments; of participants from rural areas, 90 (97%) completed post-intervention and 87 (93%) completed 3 month follow-up assessments; significant reduction in post-traumatic symptom severity was observed in the urban ($p=0.007$) and rural ($p=0.02$) groups; these positive findings were sustained at the 3

					month follow-up assessments
Xu et al (2015)	China	Pilot RCT; 1 month follow-up	82 participants (75% female) who have experienced a traumatic event and had post-traumatic stress symptoms	My Trauma Recovery is an online self-help programme to help people cope with post- traumatic stress disorder; the 1-month programme consists of six modules with videos and educational materials on trauma, coping skills, social support, and relaxation techniques; compared with a waitlist control	50 (61%) participants completed 1 month assessments; post-traumatic stress disorder symptoms decreased in the intervention compared with the control ($p<0.001$); significant improvement in social acknowledgement ($p=0.007$) and disclosure of trauma ($p=0.02$) compared with the control group

RCT=randomised controlled trial.

Table 10.5 Studies evaluating programmes for substance use prevention and treatment

	Country	Study design and duration	Participants	Intervention	Outcome
Andrade et al (2016)	Brazil	Prospective naturalistic study; 6 week intervention	929 participants (46% female) classified as low-risk users (34%), harmful or hazardous users (32%), or suggestive substance users (34%)	Bebermenos is a web-based self-help programme for alcohol use supported by WHO. Includes alcohol use self-monitoring, goal setting with automated feedback, exercises to handle relapse and risky situations, weekly email reminders and progress reports, and support available in discussion forums	214 (29%) participants completed 6 week follow-up; reduction in alcohol consumption among harmful or hazardous users (63%) and suggestive substance misusers (65%) compared with baseline ($p=0.02$); overall programme adherence was low, but was higher among harmful or hazardous users than among low-risk users
Balsa et al (2014)	Uruguay	Descriptive naturalistic study; 3 month intervention	359 adolescents (50% female) in ninth and tenth grade	COLOKT is a web-based substance misuse prevention intervention implemented in ten private schools in Montevideo; the programme consists of educational materials, discussion forums mediated by a psychologist, and reminder SMS and emails	Participation was low, 74 (21%) participants used the website at least once, mainly because of disinterest in the subject; predictors of website use included greater weekly internet use, prior use of the internet to search for health-associated topics, fewer extracurricular activities, and excessive alcohol consumption in the past month; email and SMS reminders increased interaction with the website
Christoff and Boerngen-Lacerda (2015)	Brazil	Three arm RCT; 3 month intervention	333 college students (58% female)	Computer-based and online screening and motivational intervention to raise awareness of the risks of substance misuse, give advice, teach coping skills, encourage behavioural change, and obtain participant self-reports; compared with face-to-face version of the intervention, and screening only control condition	Reduction in substance misuse scores for tobacco, alcohol, marijuana, and other drugs observed across all three groups ($p<0.001$); students in the online computer intervention group had a greater reduction in alcohol use than did those in the screening only control group ($p<0.007$); online computer intervention does not seem to be more effective than a face-to-face intervention or screening alone
Fernandes et al (2010)	Brazil	RCT; 6 month follow-up	1744 participants (26% female) who self-reported marijuana use and who called a toll-free number	Brief motivational intervention delivered by telephone for marijuana cessation and relapse prevention; aims to promote motivation and self-efficacy to stop using marijuana, create strategies to prevent relapse, and set a quit date; control condition received printed self-help materials	524 (30%) participants completed the 6 month intervention and follow-up assessments; per-protocol analysis of completers showed that telephone-based brief motivational intervention contributed to greater self-reported marijuana cessation (73%) compared with the control condition (59%; $p<0.05$)

Wongpakaran et al (2011)	Thailand	Pilot RCT; 6 week study and 18 week follow-up	60 individuals (15% female) with alcohol misuse	Telephone-based intervention involving motivational interviewing and supportive techniques; consists of weekly telephone therapy sessions for 6 weeks; compared with control group that received weekly print materials by mail	56 (93%) completed 18 week follow-up; significant reduction at 6 weeks in mean amount and frequency of alcohol consumption compared with control ($p<0.01$); fewer days drinking compared with control ($p<0.001$); and 37% reduced alcohol consumption compared with 12% in the control group ($p<0.001$); outcomes sustained at 18 week follow-up; no change in depression, anxiety, or self-esteem between groups
Signor et al (2013)	Brazil	RCT; 6 month follow-up	637 self-reported alcohol users (29% female) who called a national helpline to stop drinking	Telephone-based brief motivational intervention for treatment of alcohol misuse, that includes a 20 min motivational call and follow-up questionnaires; both groups received printed materials and follow-up calls at days 1, 3, and 7, and months 1, 2, 3, and 6 after alcohol cessation date	147 (23%) participants completed 6 month follow-up; intention-to-treat analysis at 6 months found that 46 (58%) brief motivational intervention participants compared with 34 (42%) control participants had stopped consuming alcohol ($p<0.05$)

SMS=short message service. RCT=randomised controlled trial