



Synopsis

Mental and physical multimorbidity in South Asia: a synopsis of the NIHR IMPACT programme

NIHR Global Health Research Group IMPACT in South Asia*

*Corresponding author najma.siddiqi@york.ac.uk

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Abstract

Background: The coexistence of mental and physical long-term conditions is highly prevalent, posing significant challenges for individuals, carers and healthcare systems. It leads to poorer health outcomes, increased mortality and economic burden. Despite growing recognition of the need for integrated care for mental and physical health, evidence for interventions remains limited, particularly in low- and middle-income countries. The National Institute for Health and Care Research Improving Outcomes in Mental and Physical Multimorbidity and Developing Research Capacity in South Asia Group focused on three distinct populations: (1) people with severe mental illness and physical health problems; (2) people with common mental disorders and non-communicable diseases and (3) people with common mental disorders and chronic communicable diseases, in Bangladesh, India and Pakistan.

Methods: The programme included epidemiological studies, systematic reviews, surveys and feasibility trials. Evidence reviews were conducted to estimate the prevalence of multimorbidity and identify effective interventions. Interventions were tailored to the local low- and middle-income countries' context using intervention adaptation frameworks and co-design processes and were tested in feasibility trials. Capacity-building for healthcare professionals and community engagement were integral to the programme, alongside the development of policy and research collaborations.

Results: Key findings included:

Epidemiology: High prevalence of depression (41%) and anxiety (29%) in non-communicable diseases populations; obesity (26%) and combined overweight/obesity (60%) in severe mental illness populations. In non-communicable diseases' clinics, 35% of patients had scores indicating depression, the majority at moderate or greater severity. Screening for depression in tuberculosis clinics identified possible depression in 35% of patients.

Healthcare gaps: Undiagnosed and untreated physical health conditions were prevalent in severe mental illness populations. For example, 70.8% of people with diabetes, hypertension or hypercholesterolaemia were undiagnosed, and over 50% of those diagnosed were not receiving treatment. Tobacco use was common, with 46.8% of men and 15.0% of women consuming tobacco, yet only 29.1% had attempted to quit in the past year, and two-thirds had not received formal cessation advice.

Interventions: Smoking cessation interventions tailored for severe mental illness populations demonstrated high acceptability and engagement. A culturally adapted behavioural activation intervention for depression in non-communicable diseases' clinics and integrated depression care in tuberculosis services may improve health outcomes and adherence.

Limitations: COVID-19 pandemic restrictions forced changes to methods or delays affecting several studies. We conducted formative research and feasibility studies rather than definitive studies, limiting conclusions about effectiveness of interventions.

Conclusions: The research highlighted critical gaps in the detection, treatment and integration of care for mental and physical multimorbidity in South Asia. Interventions such as behavioural activation and tobacco cessation counselling showed promise in low-resource settings. Barriers included stigma, fragmented healthcare systems and logistical challenges, requiring systemic solutions. Efforts to engage policy-makers and build capacity were instrumental in advancing integrated care strategies.

The National Institute for Health and Care Research Improving Outcomes in Mental and Physical Multimorbidity and Developing Research Capacity programme advanced the understanding of multimorbidity in South Asia and demonstrated the feasibility of tailored, scalable interventions and capacity-building initiatives in South Asia.

Future work: Addressing mental and physical health together is essential for reducing the burden of multimorbidity. Future efforts should prioritise research on how to implement and scale up integrated mental and physical health care and address contextual barriers to ensure sustainable and equitable health outcomes.

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Introduction

The coexistence of mental and physical long-term conditions (often referred to as multimorbidity) is highly prevalent and poses significant challenges for people living with these illnesses, their carers and healthcare services.^{1,2} Mental and physical multimorbidity leads to poorer outcomes for both the mental and physical conditions.^{1,3} For example, people with severe mental illness (SMI) (e.g. schizophrenia and bipolar disorder) die ~20 years earlier than the general population, mainly because of remediable chronic physical disorders.^{4,5} People with chronic physical disorders (e.g. diabetes) have higher rates of mental illness, such as depression.⁶ These coexisting mental disorders often go undetected and untreated and are associated with poorer diabetes outcomes, including increased mortality.^{7,8}

There is growing recognition of the importance of tackling multimorbidity and the need to address both mental and physical health conditions together. Yet, the evidence base for how to address this complex problem remains limited, particularly for low- and middle-income countries (LMICs).^{2,3} Most epidemiological and interventional research excludes populations with comorbid health conditions.² Healthcare services have also traditionally developed to offer increasingly specialist services, focusing on specific conditions, and often operating in silos, treating a single condition. There has been limited acknowledgement that people may have several coexisting long-term health problems simultaneously; and that not only will they need to manage the additional burden, but treatments for one may impact adversely on their other condition(s). This is particularly true for mental and physical multimorbidity.^{9,10}

The National Institute for Health and Care Research (NIHR) Improving Outcomes in Mental and Physical Multimorbidity and Developing Research Capacity (IMPACT) in South Asia Group^{11,12} aimed to address this evidence and service gap, with the overall long-term aim

to improve health and reduce deaths associated with mental and physical multimorbidity in LMICs. We planned to develop evidence relevant to three populations living with chronic conditions:

1. people with SMI and physical health problems and health risk behaviours
2. common mental disorders (CMDs) and non-communicable diseases (NCDs)
3. CMD and chronic communicable diseases [tuberculosis (TB)].

We focused on three countries in South Asia: Bangladesh, India and Pakistan, where the burden of these disorders is high (and increasing) and which share common demographic, socioeconomic and cultural characteristics along with geography, creating opportunities for shared learning and generalisability of findings.

Aims and objectives

We planned work to (1) contribute to the evidence base through a series of studies relevant to mental and physical multimorbidity research in LMICs in South Asia and (2) develop capacity in applied health research in this area. As we were setting out to establish new partnerships and collaborations, and given the paucity of previous research in this field, our focus was on identifying research gaps and priorities through evidence syntheses and conducting exploratory and feasibility studies to inform future research.

Our specific objectives were to:

1. understand the epidemiology and burden of mental and physical multimorbidity
2. inform the development of evidence-based interventions to improve mental and physical multimorbidity
3. develop collaborations, tools and capacity to support mental and physical applied health research in LMICs.

Methods and findings

Appendix 2 lists the studies and publications linked to each objective, which are described in this section.

The epidemiology and burden of mental and physical multimorbidity in low- and middle-income countries in South Asia

An understanding of the epidemiology and burden of health conditions and combinations of conditions is a prerequisite in order to develop evidence-based interventions for mental and physical multimorbidity and to inform appropriate care pathways and services. We therefore undertook evidence reviews and a survey to estimate the prevalence of physical health problems in people with SMI and systematic reviews on the prevalence of CMD in NCD. We further reviewed the evidence on the prevalence and costs of any mental illness in any population setting in South Asia in order to help support the case for investment in mental health services and address the large treatment gap for mental health in this region.^{13,14}

Physical health and health risk behaviours in severe mental illness

People with SMI (defined as those with schizophrenia and psychotic disorders, bipolar disorder and major depressive disorder with psychotic features) have been reported to be disproportionately affected by the global obesity epidemic. This increased risk is due to a combination of biological, treatment and socioeconomic factors. At the same time, some people with SMI may be at higher risk of underweight, driven by poverty and diets lacking key nutrients.^{15,16}

Prevalence of underweight, overweight and obesity: systematic reviews and meta-analyses

Objectives We conducted two systematic reviews and meta-analyses in order to estimate the prevalence of (1) underweight and (2) overweight and obesity in people with SMI. The detailed methods and findings of these systematic reviews and meta-analyses are published elsewhere.^{17,18} We aimed to generate estimates for global prevalence, and by region, and to compare rates between people with SMI and the general population.

Methods We followed recommended guidance for conducting high-quality reviews of observational studies, including publishing the review protocols¹⁹ and systematically searching in a wide range of databases from inception to July 2020. Two reviewers independently selected, appraised and extracted data from relevant studies, with disagreements resolved through consensus.

Random effect estimates were calculated for the pooled prevalence of underweight, overweight and obesity and for the pooled odds in people with SMI compared with the general population. Planned subgroup analyses were conducted for: type of SMI, setting, antipsychotic medication, region of the world, World Bank country income classification and sex.

Results For estimates of *underweight*, we included 40 studies from 22 countries. The pooled prevalence was 3.8% [95% confidence interval (CI) 2.9 to 5.0]. People with SMI were less likely to be underweight than the general population [odds ratio (OR) 0.65; 95% CI 0.4 to 1.0], although rates were highest in South Asia: 7.5% (95% CI 5.8 to 14.1). People with schizophrenia had the highest prevalence of underweight compared to other types of SMI.¹⁸

For *overweight and obesity*, we included 120 estimates from 43 countries (from 107 reports). Most studies (80%) were from high-income countries (HICs). The global pooled prevalence of obesity in people with SMI was 25.9% (95% CI 23.3 to 29.1), and the combined pooled prevalence of overweight and obesity was 60.1% (95% CI 55.8 to 63.1).¹⁷

For LMICs, the figures were only slightly lower, which indicated overweight and obesity were still a significant problem in these regions. The combined pooled prevalence for both was 55.7% (95% CI 49.5 to 61.7). Estimates from studies in South Asia were similar.

Twenty-four studies reported the prevalence of obesity in SMI compared with the general population by using matched controls. People with SMI were three times more likely (3.01; 95% CI 2.42 to 3.82) to have obesity than the general population. There was no difference, however, in the prevalence of overweight. In schizophrenia, women were more likely than men to live with obesity, but there was no sex difference among those with bipolar disorder.¹⁷

There were no substantial differences in the prevalence of overweight and obesity between the types of SMI and between inpatient, outpatient or community settings or antipsychotic use.

There was significant heterogeneity in overall estimates ($I^2 = 88\text{--}98\%$, $p < 0.01$), which was not reduced in the subgroup estimates ($I^2 = 97\text{--}98\%$, $p < 0.01$). Just over half of the included studies were classified as having 'low' risk of bias, with around one-fifth assessed as at 'medium' and a similar proportion at 'high' risk of bias.

Implications Our reviews show that surprisingly, people with SMI are at lower risk of underweight. They confirm previous evidence that this population is at higher risk of obesity than the general population. Given its high prevalence, and association with morbidity and mortality, developing evidence-based interventions to prevent or reduce obesity are crucial to address the mortality gap for people with SMI. There is, however, a relative lack of evidence on the epidemiology of overweight and obesity in SMI from LMICs and further studies are needed from these settings.

Physical health and health risk behaviours in people with SMI in South Asian LMICs: a cross-sectional survey

Background Given the relative paucity of data on the physical health of people with SMI, particularly from LMICs, further primary epidemiological studies are needed from these settings. We therefore aimed to estimate the prevalence of physical health conditions and health risk behaviours (including tobacco use) and to assess whether physical health screening, health risk modification advice and treatments for physical health conditions were offered to this population.^{20–22} We also sought to explore the risk factors associated with overweight and obesity in this population.²³ The detailed methods and findings of the survey are published elsewhere.^{20–23}

Methods We undertook a cross-sectional survey of adults (> 18 years old) with SMI in three South Asian LMICs: Bangladesh, India and Pakistan. We recruited adults with SMI (schizophrenia, bipolar disorder and depression with psychosis), with capacity to consent, attending three mental health facilities: the National Institute of Mental Health in Dhaka, Bangladesh; the National Institute of Mental Health and Neurosciences (NIMHANS) in Bangalore, India; and the Institute of Psychiatry (IoP) in Rawalpindi, Pakistan. SMI diagnosis was confirmed using the Mini-International Neuropsychiatric Interview version 6.0.²⁴ We collected data in person, using standardised tools, on NCD and their risk factors, infectious diseases and mental health, health risk behaviours, health-related quality of life and on physical health screening, risk modification advice and treatments.

We used descriptive statistics to summarise data and compared findings with those reported for the general population from the World Health Organization (WHO) 'STEPwise Approach to Surveillance of NCD' surveys, weighted by sex and age distribution.^{25–28} In a secondary analysis of survey data, we also explored associated factors for obesity.

Results Three thousand nine hundred and eighty-nine out of 5801 people with SMI who were approached consented to participate (60% male; mean age 35.8 years). The mean EQ-5D-5L (health-related quality of life score) was 66.9.²³

The prevalence of type 2 diabetes was 11.0%; 46.3% had overweight or obesity, 23.3% had hypertension, 3.2% cardiovascular disease and 1% chronic respiratory disorders. Around one-half had hypercholesterolaemia. Considering chronic communicable diseases, 2.3% had TB and 2.0% had chronic hepatitis.

The great majority of people with diabetes, elevated blood pressure and hypercholesterolaemia were previously undiagnosed (70.8%); of those already diagnosed with these conditions, only around one-half were receiving treatment.

Overall, 46.8% of men and 15.0% of women consumed tobacco. Smoking prevalence in men was 36.5%, but only 2.5% in women. Additionally, around one-quarter of men and 13.2% of women used smokeless tobacco. Among smokers, 29.1% ($n = 244$) had made at least one quit attempt in the past year; but almost two-thirds of all tobacco users had not received any formal advice to quit tobacco.

There were 45.6% and 89.1% of participants who did not meet WHO recommendations for physical activity and fruit and vegetable intake, respectively.

Obesity is a common risk factor for multiple chronic health conditions. We therefore also explored its associated factors in a secondary analysis. Relative risk of obesity in people with SMI was double in women compared with men [relative risk ratio (RRR) = 2.04] and higher in people with hypertension than in people without (RRR = 1.69).²³

Compared with data for the general population, people with SMI had higher rates of diabetes, hypercholesterolaemia, overweight or obesity and health risk behaviours, including tobacco use. Despite this, their physical health problems were less likely to have been diagnosed, and they were less likely to receive tobacco cessation and weight management advice. A concerning high proportion were not on treatment even for identified physical health problems.

Implications There are significant gaps in the detection, prevention and treatment of NCDs and their risk factors in people with SMI.²⁹ Tobacco cessation and weight management support within mental health services offer

an opportunity to close the gap in life expectancy between SMI and the general population.

Common mental disorders in non-communicable diseases

People with NCD are known to be at a higher risk of developing coexistent CMD (i.e. depression and anxiety disorders). However, most reported estimates of the prevalence of mental and physical comorbidities are from studies based in HICs; these estimates are unlikely to be applicable to lower resource and culturally different settings. In order to develop services and interventions for CMD that are appropriate for the local context, it is important to first understand the epidemiology of CMDs in NCD in South Asia.

Prevalence of common mental disorders and NCD multimorbidity: a rapid evidence synthesis

Objective To summarise the evidence and provide pooled estimates of the prevalence of CMD in adults with NCD in Bangladesh, India and Pakistan. The detailed methods and findings of the study are published elsewhere.³⁰

Methods We conducted a rapid systematic review and meta-analysis. We searched international and country-specific databases for prevalence studies of CMD in adults with NCD: diabetes, cancer, cardiovascular disease and chronic respiratory conditions. We included studies conducted in Bangladesh, India and Pakistan, published from 1990 up to October 2018. Quality of studies was assessed using the appraisal tool for cross-sectional studies (AXIS).³¹ All steps to screen and select eligible studies, appraise quality and extract data were conducted by at least two reviewers independently, with disagreements resolved by discussions to reach consensus. Where data were available that could be pooled across studies, we conducted a random effects meta-analysis.

Results From 1654 unique records identified by the search, we selected 96 eligible studies, of which 83 included data which could be used in a meta-analysis. Sixty were from India, 30 from Pakistan, with only 5 from Bangladesh and 1 from all 3 countries. Almost all studies were conducted in hospital settings. The overall quality of the studies was limited by issues concerning sampling frames and participant selection processes and a lack of detail about the methods, missing data and non-responders.

The pooled prevalence of depression in NCD from 94 estimates was 41% (95% CI 37 to 44, $I^2 = 97\%$). The pooled prevalence of anxiety from 28 studies was 29% (95% CI 22 to 36, $I^2 = 96\%$). By NCD population, in chronic

obstructive pulmonary disease, the estimated prevalence of depression was 44% (95% CI 26 to 62); in diabetes, 40% (95% CI 34 to 45); in stroke, 39% (95% CI 23 to 56); hypertension, 38% (95% CI 32 to 45); and for cancer, 37% (95% CI 30 to 45).³⁰

Implications Depression and anxiety are highly prevalent in people with NCD in Bangladesh, India and Pakistan. These very high estimates suggest that physical health services should consider routinely identifying and treating CMDs in people with NCD. However, there are significant limitations in the quality of extant studies; further epidemiological studies using more robust methods are needed. Physical healthcare services seeking to integrate mental health care will require locally relevant data on prevalence and an understanding of the potential barriers and facilitators for implementation.

Prevalence of depression and NCD multimorbidity: a cross-sectional survey in non-communicable disease clinics in Karnataka, India

Background The co-occurrence of depression with NCD is often neglected, particularly in LMICs, despite the availability of relatively low-cost effective treatments. To address this 'treatment gap', there are calls to better integrate mental health care in NCD services. Quantifying the burden of depression in these settings is an essential first step for integrating mental health care into physical health and/or primary care services. We aimed to estimate the prevalence of depression–NCD multimorbidity in adults attending NCD clinics, as part of a broader effort to integrate mental health care into NCD services. The detailed methods and findings of the survey are published elsewhere.³²

Methods We used a cross-sectional, two-stage survey design to assess depressive symptoms among adults attending NCD clinics at six public sector community health centres within Kolar District in Karnataka state, India.

All consenting patients aged ≥ 18 years, diagnosed with cardiovascular disease, chronic respiratory disease, diabetes mellitus (type 1 or 2) or stroke, and willing to participate were eligible unless they lacked capacity to provide informed consent. Consecutive patients attending during the study recruitment period were approached by NCD counsellors (routinely employed at the clinics to provide physical health promotion counselling) or research assistants in order to seek consent and conduct data collection.

Counsellors and research assistants were trained to obtain informed consent and to conduct data collection, including collecting demographic data and administering the Patient Health Questionnaire (PHQ) in English or Kannada (the local language). The PHQ-2 (first-stage screening) and Patient Health Questionnaire-9 items (PHQ-9) (second-stage for those scoring ≥ 3 on PHQ-2) were used to determine depression caseness and depression severity. Data collection was carried out using a hybrid approach, involving both telephone and face-to-face interviews, which took around 15 minutes per patient.

Data analysis included descriptive summary statistics to estimate prevalence and estimating ORs to explore associations with sex, age and number of multimorbid NCD using logistic regression to provide adjusted ORs while controlling for confounders. Statistical analysis was conducted using Statistical Product and Service Solutions (SPSS) version 28.0.1.1 (IBM Corp., Armonk, NY, USA).

Results Of the 369 NCD clinic patients surveyed, 149 (40.4%) scored ≥ 3 on PHQ-2, and 129 (35% of those surveyed) were found to have depression (PHQ-9 score ≥ 5), with the great majority (80%) indicating depression of moderate or greater severity (score ≥ 10) (Table 1).

One-third of patients with hypertension (33.4%) and diabetes mellitus (30%) were assessed to have depression. The OR for developing depression in patients with multiple versus with a single NCD was 1.58 (95% CI 1.01 to 2.46), indicating a statistically significant association (p -value = 0.045); no associations were found with sex or age.

Implications Our findings align with previous research indicating high rates of depression in NCD globally and in South Asia, including a meta-analysis, which reported depression prevalence of 38% among patients with type 2 diabetes mellitus in South Asia.³³ Similarly, a study in India found a 40% prevalence of (previously undiagnosed) depression in patients with hypertension, substantially higher than the prevalence in the general population. These high figures for coexisting depression in patients who attend NCD clinics (the great majority with moderate or greater severity) underscore the urgent need for integrating mental health services into NCD care settings.

The prevalence and cost burden of mental illness in South Asia

We planned to estimate the additional costs of mental and physical multimorbidity in order to support the case and planning for services for these populations. However, we found no up-to-date and reliable summary estimates on either the prevalence or the costs of mental disorders in South Asia, which would be needed to calculate the additional cost burden. Such data are also crucial to inform mental health service development and to advocate for investment in mental health care. We therefore synthesised data from previous reviews to provide these estimates for mental disorders, irrespective of comorbid physical health conditions.

Prevalence of mental disorders in South Asia: a systematic review of reviews

Objective To estimate the prevalence of mental disorders and intentional self-harm in countries in South Asia. The

TABLE 1 Two-stage depression screening in NCD patients with PHQ

First stage: PHQ-2		N = 369 (%)
No depression	< 3	220 (59.6)
Likely depression	≥ 3	149 (40.4)
Second stage: PHQ-9 if ≥ 3 on PHQ-2		N = 149
No depression	0–4	20 (13.4)
Mild depression	5–9	25 (16.8)
Moderate depression	10–14	76 (51)
Moderately severe depression	15–19	22 (14.8)
Severe depression	20–27	6 (4)

detailed methods and findings of the review are published elsewhere.^{13,34}

Methods We carried out a meta-review — that is a systematic umbrella review. Following recommended methods for conducting high-quality systematic reviews, we searched multiple databases from inception to September 2021 to identify reviews reporting the prevalence of at least one mental disorder and/or self-harm from countries in South Asia. We summarised data from eligible reviews in a narrative synthesis and reported estimates by each type of mental disorder. For CMD, we additionally pooled data from primary studies contributing to reviews in order to conduct a meta-analysis.

Results We identified 124 reviews for inclusion. The majority reported on CMD [mood ($N = 65$) and anxiety disorders ($N = 45$)]. There was a high reported prevalence of mental disorders and intentional self-harm in the general adult population and in vulnerable subgroups (e.g. depression prevalence was up to 33.0% in the general population and 55.0% among stroke survivors). There was considerable heterogeneity in estimates.

In a meta-analysis of 25 primary studies of CMD, we estimated a pooled prevalence of 16.0% (95% CI 11.0% to 22.0%, $I^2 = 99.9\%$) for depression, 12.0% (5.0% to 21.0%, $I^2 = 99.9\%$) for anxiety, and 14.0% (10.0 to 19.0, $I^2 = 99.9\%$) for both depression and anxiety among the general adult population; estimates varied widely by country and assessment tool used.¹³

Implications Overall, our findings suggest a high prevalence for mental disorders in South Asia, but with limited evidence on conditions other than CMD. Despite these gaps, and the limitations of heterogeneity and methodological quality of studies, nevertheless, the review provides important data for policy and other decision-makers to help formulate and implement policy and clinical measures for the prevention and early treatment of mental disorders and intentional self-harm.

Understanding the costs and economic impact of mental disorders in South Asia: a systematic review

Background Despite recognition in recent years of the increasing burden of mental disorders and the widening treatment gap (whereby the great majority of those in need of mental health services cannot access care), governmental expenditure on mental health in South Asia

has remained very low. An understanding of the wide-reaching economic costs associated with poor mental health, including those incurred outside the health sector, could help drive forward the case for action and investment in mental health. The detailed methods and findings of the systematic review are published elsewhere.^{35,36}

Methods We conducted a systematic review on the costs of all mental disorders, and intentional self-harm and suicide, for countries in the World Bank South Asia Region.^{35,36} We searched 10 global and South Asian databases and grey literature sources between inception and October 2021 for studies reporting on costs.

We extracted data on population characteristics, study design, perspective and key components of costing analysis, time frame and summary economic findings. We considered all costs: health and other sector costs of mental disorders, indirect costs such as lost productivity from paid and unpaid work, both for people experiencing mental disorders and their informal carers, and broader costs, such as impacts of discrimination and poorer quality of life. We conducted a narrative synthesis and organised findings by category of mental disorder. Costs were converted to purchasing power parity for ease of comparison across countries and time points.

Results We identified 72 eligible studies, including 38 which met quality criteria for reporting of cost data. Of these, most ($N = 27$) reported costs for India, with only five covering Pakistan, four Nepal and three Bangladesh and Sri Lanka. Most focused on depressive disorders ($N = 15$), psychoses ($N = 14$) and harmful alcohol use ($N = 7$); there were limited data on costs for any other conditions; 22 studies were for periods of up to 6 months, 15 covered periods of more than 6 months and up to 1 year, with only one study covering beyond 12 months.

Studies reported large economic impacts within and beyond healthcare systems. In 15 of 18 studies which reported on productivity losses to individuals and/or carers, these costs easily outweighed the costs of health care. In addition, multiple papers reported high levels of out-of-pocket expenditure associated with poor mental health.

Implications Despite the limited data, it is clear that mental disorders represent a considerable economic burden in countries in South Asia. However, current estimates are conservative as they do not consider long-term impacts

or include data on the full range of mental disorders. Modelling studies could be employed to provide cost estimates for longer time periods and more conditions.

Further studies are needed to estimate the costs for the full range of mental disorders in LMICs in South Asia. The finding of high out-of-pocket costs is particularly concerning in LMIC settings, where publicly funded health service coverage is limited and could signal a significant risk of incurring catastrophic healthcare costs. It will be particularly important to report out-of-pocket costs in future research, given their potential for profound impact on individuals and families, as well as health system costs. Given the additional and disproportionate physical health burden associated with most mental disorders, mental health service-specific and physical health-related costs should also be examined.

Despite an overall paucity of studies (and the likely overly conservative estimates), our findings on the high cost burden falling on individuals, health systems and society can be used to support the economic case for greater investment in mental health care.

Evidence-based interventions for mental and physical multimorbidity

We sought to identify or to develop evidence-based interventions to improve outcomes for mental and physical multimorbidity.

For people with SMI and long-term physical health conditions, we chose to focus on interventions targeting cardiometabolic risk and health risk behaviours. This was due to their high prevalence and key role in the development of comorbid chronic physical disorders in people with SMI as well as in mediating poorer health outcomes overall in mental and physical multimorbidity.

Several influential position statements, including by the WHO and a Lancet Commission have highlighted the importance of addressing cardiometabolic risks and health risk behaviours to improve physical health and reduce the mortality gap in people with SMI.^{1,7} A number of previous reviews have identified effective evidence-based interventions for obesity,³⁷ smoking,³⁸ alcohol abuse³⁹ and multiple health risk behaviours.⁴⁰ However, these syntheses have included evidence mostly only from high-income countries, which may not necessarily be applicable to the LMIC setting.⁴⁰

We therefore conducted a systematic review to evaluate 'what works' in the modification or prevention of cardiometabolic and health risk behaviours, specifically

for people with SMI in LMICs. The detailed methods and findings of the systematic review are published elsewhere.⁴¹ We searched databases from inception to 14 December 2020 and found six trials on healthy weight management, which tested lifestyle and pharmacological interventions alone and in combination. All trials reported that the intervention was effective for weight reduction [pooled effect size -3.17 kg (95% CI -4.88 to -1.45, 6 studies, 500 subjects, $I^2 = 37.8\%$)], with the highest effect size reported for a combination of lifestyle and metformin -7.30 kg (95% CI -10.08 to -4.52, 1 study, 43 subjects).⁴² We found a very limited number of studies evaluating interventions addressing other health risk behaviours (two on physical activity and one on melatonin for sleep), with no studies of interventions targeting tobacco use, alcohol or harmful drug use.

Tobacco cessation in severe mental illness

Smoking cessation support for people with severe mental illness in South Asia (IMPACT 4S): a randomised controlled feasibility trial of a combined behavioural and pharmacological support intervention

Background Tobacco use is one of the leading contributors to the lower life expectancy and poorer health outcomes in people with SMI.^{43–45} Based on the evidence from epidemiological studies of its high prevalence, the strong potential for effective interventions indicated by trial evidence from HICs,³⁸ and the current lack of trials from LMICs,⁴¹ we prioritised developing and evaluating a tailored intervention to address tobacco use for people with SMI in LMICs. We considered the differences in culture, health systems, patterns of tobacco use, nature of smoked tobacco products used and availability of resources, which limited the translatability of the existing evidence on interventions for smoking cessation developed for HICs to South Asia.

Following the Medical Research Council framework for development and evaluation of complex interventions,⁴⁶ we aimed to design a theoretically informed intervention for smoking cessation in SMI and to test its feasibility and the feasibility of trial evaluation. The detailed methods and findings of the study are published elsewhere and some of the texts in the below section are adapted from that source.⁴⁵

Methods We first developed a tailored smoking cessation intervention for smokers with SMI in India and Pakistan.⁴⁷ This was based on three evidence-based smoking cessation behavioural support interventions previously developed by our team: (1) the Smoking Cessation

Intervention for People with Severe Mental Ill Health (SCIMITAR+) intervention for adult smokers with SMI in the UK based on the UK's National Centre for Smoking Cessation and Training standard treatment programme;⁴⁸ (2) the TB and Tobacco intervention for TB patients in Bangladesh and Pakistan⁴⁹ and (3) a tobacco cessation smart guide developed by the NIMHANS Resource Centre for Tobacco Control Bangalore, India.^{45,50}

Development followed a systematic process using a well-established adaptation framework⁵¹ and co-design with stakeholders. The intervention, called 'IMPACT 4S', comprised behavioural support (up to 15 sessions over 3 months) based on evidence-supported behaviour change techniques and effective pharmacotherapy options (bupropion, nicotine gum or both). It was initially designed for in-person delivery; however, in-person delivery was not possible due to the COVID-19 pandemic. We therefore conducted a telephone consultation with the study Community Advisory Panels (CAPs) comprising people with SMI, caregivers and mental health professionals to explore the feasibility, challenges and solutions for remote delivery.⁵² Feedback from the CAPs resulted in changes to delivery of IMPACT 4S using a hybrid approach (remote delivery with face-to-face delivery where possible). The length of sessions was reduced to < 30 minutes, with the number of sessions increased to accommodate this. Other changes were inviting caregivers to attend sessions, simplifying tasks and resources, and delivering resources and Nicotine Replacement Therapy (NRT) medication to participants' homes. Breath carbon monoxide (CO) monitoring and feedback were only provided when sessions were held in person. Detailed information about the interventions can be found in the published paper.⁴⁵

To test the feasibility and acceptability of delivering IMPACT 4S and of conducting a definitive randomised controlled trial (RCT), we conducted an open-label feasibility parallel RCT (ISRCTN registry identifier: 34399445) among consenting adult smokers with SMI attending two tertiary care mental health facilities – NIMHANS, Bangalore, India, and the Institute of Psychiatry, Rawalpindi, Pakistan.

Participants were randomised to IMPACT 4S or brief advice using a computer-generated, blocked, stratified (by country) randomisation sequence. Brief advice was adapted from a community-based trial of tobacco cessation in India,⁵³ which consisted of a single, 5-minute conversation on the harmful effects of tobacco and advice to stop smoking. All trial participants, regardless of trial arm, received a leaflet containing the information provided as brief advice.

Participants and/or carers completed follow-up assessments at 1, 3 and 6 months post randomisation either in person or remotely. Data were collected on demographics, psychiatric medication use; smoking status (using questions adapted from the Global Adult Tobacco Survey survey); nicotine dependence and quitting smoking intentions, motivations and behaviours.

At 6 months, we planned to verify self-reported smoking status biochemically using breath CO levels.⁴⁵ In addition, the following were assessed at baseline, 3 and 6 months after randomisation: health-related quality of life using the EQ-5D-5L; depressive symptoms; anxiety; physical and mental health using the Short Form questionnaire-12 items (SF-12); height and weight and health services utilisation. A mixed-methods process evaluation was also conducted.

The sample size was based on estimating participation and attrition rates and to allow control group event rates for potential primary outcomes to be calculated. With 344 eligible subjects, we would be able to estimate a participation rate of 50% to within a margin of error of $\pm 5\%$ and an attrition rate of 30% to within $\pm 8\%$.⁵⁴ Thus,⁵⁵ we aimed to randomise 172 (86 per country) participants and assumed 120 of these would provide outcome data.

We followed the Consolidated Standards of Reporting Trials guidelines for reporting pilot and feasibility studies.⁵⁶ All baseline data were summarised descriptively, by trial arm, using mean and standard deviation (SD), for continuous outcomes, and count and percentage for categorical data.

Results A total of 456 participants were screened for eligibility, and 172 were recruited and randomised 1 : 1 to the 2 trial arms between 16 April and 07 September 2021 (unpublished report). Three participants were randomised in error and were removed, leaving 169 in the study: 85 in the IMPACT 4S group and 84 in the brief advice group.

The mean age of participants was 42 years (SD 11.0), the majority were male ($n = 167$, 99.4%) and 86% ($n = 144$) had a diagnosis of psychosis or bipolar disorder. There was reasonable balance in baseline characteristics between groups across most variables. Most participants were receiving psychotropic medication ($n = 164$, 98%). Participants had been smoking for an average of 20 years (SD 12) and first started smoking at the age of 21 years (SD 7), with the majority smoking cigarettes and/or bidi (hand-rolled cigarettes; $n = 159$, 95.2%). Participants smoked most days and, on average, used 12 cigarettes (SD 8) and 14 used bidi (SD 9). Roughly, half of the sample had ever attempted to quit smoking (46%, $n = 77$); the last quit attempt was a median of 3 years ago, and the longest duration of abstinence after a quit attempt was a median of 61 months.

Approximately, one-third of the sample had visited a doctor in the past 12 months ($n = 60$, 36%), and of those, two-thirds had been asked about smoking tobacco ($n = 38$, 63%); half had been offered advice to quit smoking ($n = 30$, 50%). Counselling and brief advice were the most frequent forms of advice given.

Engagement with the IMPACT 4S intervention: Seventy-five (87%) participants attended at least 1 session, with 11 (13%) not attending any sessions. The reasons for non-attendance included unwillingness to attend sessions ($n = 3$), not contactable ($n = 2$), moved to another city ($n = 1$), poor health after an accident ($n = 1$) and unknown ($n = 4$). Overall, the average number of sessions attended was 5.4 (SD 3.7), with a median of 7 [interquartile range (IQR) 2–8]. Of those attending at least one session, the average number of sessions attended was 6.2 (3.2) with a median of 7 (IQR 3–8), highlighting very good engagement with the 4S intervention sessions. Adherence to pharmacotherapy was high.

Recruitment In the context of the two tertiary care mental health institutes in India and Pakistan, it was possible to successfully recruit 172 out of the 191 participants who were deemed eligible from the 456 screened, yielding a recruitment rate of 0.88. We were able to achieve the target sample size in the two sites even amidst the COVID-19 pandemic. Almost all the recruited participants could be successfully randomised without major logistical challenges.

Retention, follow-up, withdrawal and completeness of data

Of the 169 participants randomised into the study, 142 (84%) completed the 1-month, 134 (79%) completed the 3-month and 141 (83%) completed the 6-month questionnaires. Data completeness was good, with all patient-reported outcome measures [Heaviness of Smoking Index, Motivation to Quit (MTQ), Mood and Physical Symptoms Scale (MPSS), EQ-5D-5L, PHQ-9, Generalised Anxiety Disorder-7 (GAD-7), and SF-12v2].

Outcome data Due to problems with the design of the data collection tool, despite collecting these data with high completeness rates, we were unable to summarise smoking status in a meaningful and reliable way.

Discussion These findings compare favourably to those from smoking cessation trials involving persons with SMI in HICs. Around 80% of the participants completed follow-ups at each time point, indicating excellent feasibility of retention in the study. In terms of retention to treatment, 87% of participants randomised to IMPACT 4S attended

at least one intervention session, with an average of over five sessions per participant. Data completeness was also good for all patient-reported outcomes. Our study therefore demonstrates that it is feasible to recruit adequate numbers of trial participants in these settings with the inclusion criteria specified, engage them in intensive smoking cessation interventions and follow them up throughout the trial. It also indicates that it is feasible to collect smoking cessation trial data from persons with SMI in South Asian settings.

Study participants comprised middle-aged smokers, in line with the sample characteristics from RCTs in SMI from HICs. Unlike the studies from HICs, however, participants in this study were almost exclusively male. This may reflect the underlying cultural factors that discourage smoking in women in general in South Asia. We did not examine smokeless tobacco, which is the predominant form of tobacco use among the women in South Asia.

The pandemic necessitated adaptation in the mode of recruitment. The study was able to complete the recruitment target, with the option of remote recruitment being available. Several investigators have utilised remote interactions with study participants during the pandemic ranging from recruitment, data collection and outcome measurement. More than 40% of the participants were recruited remotely in Pakistan, whereas only a minority (7%) were recruited remotely in India. This may be because of the difference in the easing of the COVID-19 restrictions across the two countries during the recruitment period.

The predominant diagnostic groups were non-affective psychosis and bipolar disorder in both the groups. The balance of the sociodemographic, clinical and smoking characteristics across the two arms was reasonably similar, which testifies to the successful randomisation and allocation concealment in the study. There were a similar number of persons who smoked cigarettes only, bidis only and dual users across both arms. Bidis are unique to the South Asian context, and the equivalence with cigarettes has not been unequivocally established in terms of nicotine content and delivery.

The majority of the participants were medium-to-heavy smokers across both groups. The motivation to quit was similar in both the groups. Nearly half of the participants had ever attempted to quit smoking when assessed at baseline; it is well known that only a minority, even in the general population, can sustain abstinence in the long term. Low rates of asking about tobacco use during previous consultations and providing advice about quitting

were observed at baseline. In a previous study from the India centre, only half of the tobacco users in psychiatric inpatients were asked about use and only around 10% were provided with any assistance.⁵⁷

The IMPACT 4S intervention was successfully adapted for remote/hybrid use during the pandemic through involvement of all the stakeholders. Engagement with the intervention, including the remote option, was high overall.⁵² However, some participants attended very few sessions despite the flexibility to avail remote/hybrid options. We will need to evolve methods to overcome barriers to engagement for the fully powered trial. There was a difference in the number of participants who received the various modes by country, reflective of the COVID-19 situation being different in both countries. The majority of the participants in India opted for the hybrid/combined mode of delivery of sessions.

Although we set out to use CO monitors for objective assessment of smoking status in both the groups and for personalised feedback in the intervention arm, this was not possible in the context of the pandemic for all participants. Importantly, interpretation of the self-reported smoking status was not possible because of an anomaly in the design of the data collection tool. Self-reported smoking status as verified against urine cotinine levels has been reported to be reliable for persons with schizophrenia in the India site in previous studies.

In the post-pandemic context, it should be possible to collect objective assessment of smoking status using cotinine levels (urine/saliva) and use CO monitors for personalised feedback.

In summary, it was feasible to recruit and retain participants with SMI in a smoking cessation trial in two tertiary care mental health settings in India and Pakistan. Successful randomisation and allocation concealment could be achieved. The engagement with the IMPACT 4S intervention that was adapted for remote/combined delivery during the COVID-19 pandemic was encouraging. There were some challenges observed and lessons learnt in the measurement of smoking status and secondary outcomes.

We established the feasibility and acceptability of a tailored smoking cessation intervention for adults with SMI through a RCT in South Asia and the feasibility of conducting a future RCT. The study findings have informed a successful grant application and the development of a full RCT protocol to assess the effectiveness of the intervention.

Integrating care for common mental disorders in physical health services

For the second population under study, people with chronic physical disorders, there is good evidence showing that psychological and pharmacological therapies for mental disorders are effective.^{58,59} However, there remain considerable challenges in accessing evidence-based effective mental health interventions, particularly in low-resource settings, where mental health expertise is extremely limited or may altogether be absent in many areas.

An approach that is widely advocated to help expand capacity to deliver mental health care and to widen access is to integrate it within physical healthcare services and to use a 'task-shifting' or 'task-sharing' approach, whereby non-specialists are trained to deliver effective mental health interventions. There is a robust body of evidence supporting the feasibility and effectiveness of such integrated mental health care for CMDs, often delivered within a 'collaborative care model'.⁵⁸ However, this evidence mainly derives from HICs, with only a handful of studies from LMICs. We therefore investigated the feasibility of delivering evidence-based treatments for CMDs in a range of physical health services, including services for NCD and TB.

Effectiveness and implementation of psychological interventions for depression in people with non-communicable diseases in South Asia: systematic review and meta-analysis

People with NCD are known to be at increased risk of almost all mental disorders, with the most common being comorbid depression.⁶⁰ The prevalence of depression is increased (two- to threefold) in almost all NCD.^{1,61} Besides the additional burden of symptoms for people living with multiple conditions, comorbid depression drives poorer outcomes for both the mental and physical disorder, including increased mortality, morbidity and healthcare and wider economic costs.⁶¹

Yet, surprisingly, despite its importance to health and wider outcomes, depression is neglected; healthcare professionals commonly fail to recognise or treat it in people with NCD.⁶² This is notwithstanding a well-developed evidence base for effective interventions — at least for HICs.⁶³

There are growing calls for better integration of mental health care in NCD services⁶⁴ in a drive to tackle this unaddressed burden, improve health outcomes and offer more person-centred care. However, to support successful roll-out of integrated depression care, we need to understand the barriers and facilitators for its implementation, including

the policy context, and to develop and evaluate strategies for implementation and scale-up.

In a systematic review, we evaluated the evidence for the effectiveness of psychological interventions for depression in people with NCD in LMICs in South Asia, and explored the barriers and facilitators for implementation and scaling up of these interventions. The detailed methods and findings of the systematic review are published elsewhere.⁶¹ We searched databases from inception to October 2021 and identified five trials (four RCTs) demonstrating the effectiveness of psychological interventions for improving depressive symptoms compared to usual care [pooled standardised mean difference = -2.31 (95% CI -4.16 to -0.45; $p = 0.015$, $I^2 = 96.0\%$)].

Qualitative studies and policy documents included in the review reported a range of barriers for implementation and scale up of mental health care in NCD. These included limited familiarity of staff with talking therapies; stigma around mental health and a failure to consider depression as something distinct from NCD. Facilitators included training on interventions for practitioners, focusing on knowledge and skills development; knowledge of local community assets that could support tailoring of interventions to the local context; and a supportive community environment for patients, with family engagement and resources; and use of simple visual materials to increase engagement.

Although support for mental health was present in the policy agenda, there was a policy gap relating to provision of training in mental health for NCD healthcare providers, and in practice, a lack of integration of mental health care with NCD care. There are important policy and delivery barriers to the implementation and scaling up of psychological interventions for people with NCD, which will need to be addressed for successful integration of depression care in these services.

Non-communicable diseases and common mental disorders in Pakistan: a policy analysis

Background There are multidirectional links between NCD and CMD; poor mental health exacerbates the prevalence and effects of modifiable risk factors for NCD, and NCDs increase the risk of mental disorders, leading to poorer outcomes and increasing social inequalities. Without tackling CMD comorbidity, the management of NCD is less effective and less cost-effective.

Tackling NCD-CMD multimorbidity requires appropriate and decisive policy and service delivery changes. The

WHO Mental Health Action Plan 2013–20 advocated the integration of mental health and chronic NCD programmes and the explicit inclusion of mental health within general and priority health policies, plans and research agendas. The Global Action Plan for the Prevention and Control of Non-communicable Diseases also proposed co-ordinated implementation of NCD and mental health action plans. Despite these calls, there has been relatively little progress – with a widening treatment gap for mental disorders and services for mental and physical health largely continuing to operate separately.

Objectives To help policy-makers in LMICs better address the rising burden of NCD and CMD multimorbidity (and reduce health inequalities).

We engaged stakeholders in a priority setting exercise in Pakistan to refine research and policy priorities relevant to NCD-CMD multimorbidity.

Policy analysis To inform this exercise, we undertook a structured policy analysis relevant to NCD-CMD. We systematically searched for and reviewed policy documents addressing NCD and CMD, guided by a structured policy analysis framework (see [Report Supplementary Material 1](#) for the report: ‘Non-communicable diseases and common mental disorders in Pakistan: a policy analysis and recommendations’). We broadly identified policy gaps and the opportunities which could be harnessed to address NCD-CMD multimorbidity in the future.

We developed and applied a tool with six broad domains (covering areas key to a comprehensive and effective health policy) for appraising policies. We adapted the Commonwealth systems framework for health policy for this purpose.⁶⁵ The structured information collected was entered into a searchable database. Our analysis was supplemented by information from interviews conducted with senior policy leads in Pakistan.

Findings Thirteen documents relevant to Pakistan’s mental health and NCD policy were identified from several sources. We highlight key findings, summarising our analysis using the six broad domains: governance, knowledge/intelligence, prevention, management of services, capacity and implementation.

Governance

- The provinces of Khyber Pakhtunkhwa (KP), Punjab and Sindh have all committed to addressing NCD (e.g. chronic lung diseases, diabetes and cardiovascular disease) as well as mental health problems. Punjab, for example, has formed the Provincial Unit/Program

for the Prevention and Control of NCD and Mental Health (Punjab Strategic Plan, PSP).

- In KP, there is a strong commitment to multisectoral approaches. There is a call for a common framework to be developed with multiple stakeholders across sectors for health promotion (e.g. education, food security, agriculture, environment, IT and law enforcement). Documents also highlighted the need for multiple stakeholders to achieve intersectoral co-ordination in advancing health, including the promotion of 'One Health' and 'Health in all Policies' approach to health promotion, and high-level/legislative/regulatory to achieve strategic development goals. Other strategies also demonstrate commitment to a multisectoral approach.
- The National 5 Year Plan's mental health section details plans to review laws to protect the rights of individuals with mental disorders.
- There is a commitment towards monitoring and evaluation of the implementation and progress of the strategies/policies in some of the documents. Others only mention performance evaluation reports or evaluation by a third party.
- PSP includes specific targets set to manage and prevent NCD and CMD. For example, it aims to achieve a 45% quit rate among smokers, a 50% increase in referral of adult mental health cases to specialist care and a doubling in case detection of chronic lung diseases, diabetes and hypertension. Others use the strategic development goals as targets.

Knowledge and intelligence

- For KP, there is a plan for disease surveillance, detection and reporting, but NCD and mental health are not explicitly mentioned. There is a committee to ensure that the department has established an effective disease surveillance system which might potentially include NCD-related behaviours.
- For Sindh, a NCD population survey will be conducted and pooling of data from public and private hospitals. A single comprehensive surveillance system is to be developed with standards set by the NCD commission.
- In Punjab, periodic progress and performance evaluation reports from districts and periodic NCD surveillance are all to be conducted at primary- and secondary-level facilities that offer NCD and mental health care (PSP). The documents, however, lack clear evidence of any commitment to the creation of key disease registries.
- Increasing funding of research on priority areas was mentioned, as well as a commitment to making research a national priority.

- A KP document states that a clinical subcommittee created an epidemiological profile of the province as well as estimates of utilisation rates at each level of care to inform proposals of which services were to be included at the secondary care level hospitals. The Khyber Pakhtunkhwa Social Protection Strategy (KSPS) mentions the Knowledge Management Centre, which aims to transform evidence into policy advice. In Sindh, the NCD Commission is to provide evidence-based strategic direction.
- There was a commitment towards facilitating evidence-based decision-making and encouraging provincial and national platforms for transforming evidence into policy.
- There are no explicit mechanisms to ensure allocation of resources to the most effective and cost-effective interventions based on best evidence.

Prevention

- The policy documents for the province of KP show a strong commitment towards prevention. The Khyber Pakhtunkhwa Strategic Plan (KPSP) mentions child immunisation programmes, an adolescent and youth strategy as well as coverage of health services for the problems of ageing. Tailored preventive interventions for a range of priority areas, including health education about diabetes, and mental health preventive care are also mentioned, as are prevention, early detection and subsidised curative support based on the life-cycle approach and continuum of care for common diseases.
- Upstream preventive interventions include taxation of tobacco and sugary drinks. There is also a call for intersectoral action for healthy environments to promote healthy lifestyles, environmental action, behavioural change and communication for health promotion and risk reduction in NCD and general health. It also calls for regulatory support on occupational and environmental health for NCD. The NCD Commission is to assist in the development of behaviour change strategy for lifestyle change.

Management of health services

- Policies and strategies frequently refer to vertical referral systems with a focus on a primary healthcare approach.
- The PSP has a specific plan of provincial NCD units to deliver care by maintaining staff and supplies and to evaluate and scale the district-level arrangements. The units will operate in addition to routine referral systems and delivery of NCD and mental health at the primary care level.
- In Sindh, there are elaborate but separate strategic plans for NCD and mental health services and to strengthen district health systems with an emphasis

on underdeveloped districts and urban Primary Health Care (PHC).

- In the KP province, there is an expressed commitment to improving basic health services in secondary hospitals and ensuring good referral systems for NCD and mental health. There is also mention of preventive geriatric care which will be responsible for screening of NCD and mental health. The KP Health Plan also refers to strengthening curative services in secondary care based on a Minimum Health Services Delivery Package (this includes NCD and psychiatric services) and to enhance coverage and access to essential health services for all, especially for the poor and vulnerable and primary healthcare approach for general health.

Capacity

- Nationally, there is a plan to develop human resource cells across provinces for capacity-building and appropriate exchange of information. This also refers to plans for more healthcare professional recruitment and continuing education. The KP Health Plan references the National Health Vision (NHV) human resources plan for its workforce establishment.
- Workforce: Sindh has explicit strategies (general health only) for retention and capacity to support priority health needs. However, the plan does outline strategic actions for certificate courses for continuing education for NCD, mental and general health (all separately). PSP looks at delivering NCD and mental health care at the primary level via lady health workers and at rural facilities. It talks about vertical integration.
- Only the Khyber Pakhtunkhwa Mental Health Act (KP MHA) addresses ethical considerations. It outlines protection of human rights for mentally disordered persons, confidentiality, repercussion for abuse and discussion of detention and guardianship.

Implementation

- Most policies do not explicitly address the resource (especially financial) implications of policies. However, the NHV's human resources section does mention joint strategies to enhance resource mobilisation, especially for peri-urban areas, slums and rural areas. Sindh documents mention financial allocation from the provincial private sector (such as tobacco excise, philanthropic and corporate sectors). The KP Health Plan also discusses financing, spending and revenue, but it does not mention budget allocations or any definite plan.
- Stakeholder engagement: KP MHA has civil society representatives and intersectoral representation for

mental health. KPSP and the Khyber Pakhtunkhwa Strategy (KPS) have some form of stakeholder engagement for general health promotion (via schools, food security, agriculture, etc.). Sindh Health Sector Strategy (SHSS) mentions establishing a multistakeholder provincial NCD focal body.

Summary of findings

Overall, the policies or strategies reviewed did not address physical and mental comorbidity in general, or NCD and CMDs specifically. Some plans (such as the Punjab Strategic Plan and the Sindh Health Sector Strategy) address NCD and CMD in detail, but the vision and implementation plans for each are separate.

Most policy documents did not cover key domains we identified as important, and they would benefit from a more systematic and comprehensive structure and content. The Baluchistan Health Policy document (2018–30) was one of the most comprehensive in terms of building a responsive health system, but it largely ignores NCD and mental health. It could provide a model framework for future NCD and mental health policy development.

Only the KP Mental Health Act 2017 addressed, in broad terms, the stigmatisation of people with mental health problems by health professionals or the public.

Opportunities for better integration of NCD and CMD services

The establishment by the Ministry of National Health Services of a Noncommunicable Diseases and Mental Health Unit at the federal level, which is being replicated in some of the provincial levels, may provide an opportunity to take the mental and physical multimorbidity agenda forward. These units may provide a promising platform to plan and implement service changes which embrace prevention, control and treatment of NCD and mental health together.

There are several opportunities to better integrate NCD and CMD identification and management:

- within primary care through the large network of rural health centres and basic health units (which would also improve access to people from rural areas)
- as part of routine chronic disease management conducted as part of 'NCD corners' and annual screening for diabetes and other NCD.

However, there is a lack of workforce numbers and skills which require significant investment in training and capacity-building. There is also a need for investment in integrated information systems/registries.

Behavioural Activation for Comorbid Depression in Non-communicable Disease: a feasibility randomised controlled trial

Background Brief psychological interventions such as behavioural activation (BA) delivered by non-specialist health workers have been found to be effective for depression. However, we do not know whether BA delivered within NCD services is effective for people with coexisting depression and NCD. Further, BA was originally developed and evaluated in high-income settings. It is necessary, therefore, to also consider how it may need to be adapted for culturally different, low-resource settings.

Objectives In this study, we aimed to culturally adapt and test the feasibility of BA and to test trial procedures to inform the design of a future definitive trial evaluation of BA for depression in NCD in South Asian LMICs. Specifically, our objectives were to:

- identify the modifications needed to BA to adapt it for delivery by non-mental health specialists in NCD healthcare services in a South Asian LMIC setting
- test acceptability and feasibility of the adapted BA intervention
- test feasibility of trial procedures, including recruitment, randomisation, retention and data collection.

The detailed methods and findings of the study are published elsewhere.⁶⁶

Methods We conducted an open-label, parallel-arm, individually randomised controlled feasibility trial comparing the Behavioural Activation for Comorbid Depression in Non-communicable Disease (BEACON) intervention with enhanced usual care (EUC) for depression [registered with Clinical Trials Registry (<https://ctri.nic.in/Clinicaltrials/showallp.php?mid1=41194&EncHid=&userName=beacon>)].

Participants were recruited from six NCD Community and Taluka clinics in Karnataka, India. Community health centres are government hospitals in India, which provide secondary-level healthcare services to populations of 120,000 people (80,000 in hilly/tribal areas). A Taluka hospital refers to a government healthcare facility located at the taluka (subdistrict) level. These hospitals are components of the public healthcare system, designed to provide secondary healthcare services to rural and semi-urban populations.

Eligible participants were consenting adults (≥ 18 years) diagnosed with depression coexisting with a

NCD [cardiovascular disease, chronic respiratory disease, diabetes mellitus (type 1 or 2) or stroke]. Patients lacking the capacity to consent or unwilling to do so were excluded from the study. Depression was assessed using the PHQ-9, with a cut-off score of ≥ 10 for inclusion.

Consenting participants were randomised using an automated computer data entry system, administered remotely by York Trials Unit, and using a computer-generated randomisation sequence generated by an independent statistician [using Stata® (StataCorp LP, College Station, TX, USA); version 16 or later]. Participants were allocated in a 1:1 ratio using simple randomisation without stratification. Treatment allocation was concealed from the study team at the point of recruitment.

Interventions

BEACON intervention: Following well-established frameworks to design and test 'complex' interventions, and frameworks for cultural adaptation^{67,68} of interventions, we used a mix of methods, including surveys, interviews and review by an expert panel, to first identify the modifications that were required to BA to make it suitable for use in public sector NCD secondary care services.⁶⁹ We used a co-design approach (i.e. a series of workshops involving patients, carers, community stakeholders and healthcare professionals) to tailor the intervention to the context, incorporating these modifications. We called the adapted intervention BEACON.

Enhanced usual care: A EUC leaflet with information on what is depression, common symptoms of depression, treatment options and where to seek help was prepared and translated into the local language, Kannada.

Detailed information about the interventions can be found in the published paper.⁶⁶

Follow-up Data were collected at baseline and at 3 months from randomisation, including demographics, socioeconomic status and education, clinical factors – depression (PHQ-9) and anxiety (GAD-7) symptoms, quality of life and costs. We also conducted a process evaluation and assessed intervention fidelity.

Findings Study set up in 2020 coincided with the COVID-19 pandemic, which significantly affected the planned study procedures and timelines. Changing pandemic restrictions and timelines required us to modify our plans repeatedly. Findings on the feasibility of intervention delivery and trial procedures should be interpreted in this context.

Adaptation of BA We found BA was considered by the wide range of stakeholders as a potentially acceptable and appropriate treatment to offer integrated within NCD services in Karnataka. We identified several modifications that were needed to help tailor it for the context. These included: (1) simplifying and using more culturally relevant language, (2) reducing text and replacing with pictorial representations; (3) an increased number of (shorter) sessions and (4) delivery of sessions in the local language.

Following the adaptation process, we produced a manualised, tailored BA intervention. We defined its core components, retaining the structure and content of BA that are considered key to its effectiveness. BEACON comprised six sessions (30 minutes each) delivered 1 : 1 by trained counsellors. A counsellor's manual, patient-facing 'flipbook' and session logs were developed, with materials available in English and in the local language, Kannada. Images were also adapted to be culturally appropriate.

Progress on adapting the intervention was affected by the pandemic restrictions and by the considerable multiple other stressors affecting the population and health services during that time period. Nevertheless, we were able to complete the adaptation process to develop a tailored BA intervention, which included the flexibility to arrange in-person or telephone/online sessions.

We also designed a training package and demonstrated that NCD counsellors, usually employed in the NCD service, could be trained to deliver BA.

Recruitment Three hundred and seventy-one out of 515 patients attending NCD clinics during the study recruitment period were potentially eligible and consented to the two-stage screening with the PHQ; 149/371 scored ≥ 3 on PHQ-2; and 76 scored ≥ 10 on PHQ-9; 56 of these consented to participate in the trial; 29 were randomised to BEACON and 27 to EUC. The mean age of participants was 57 years and 70% were women.

Retention Sixteen out of 29 participants were followed up at 3 months in the BEACON arm, and 18/27 in the EUC.

Completeness of data at baseline and follow-up

- BA arm: baseline PHQ-9 completion: 29/29 = 100%;
endline (3-month follow-up) 16/29 = 55.17%
- EUC arm: baseline PHQ-9 completion:
27/27 = 100%; endline (3-month follow-up)
18/27 = 66.66%

Potential reasons for dropouts Major network issues were observed, as most individuals lived in remote

areas. Some relied on family members for access to mobile phones and recharges, and a lack of privacy was observed in some cases. Unlike NCD counsellors, they were not familiar with the BA counsellors and most likely felt uncomfortable sharing their issues.

Engagement with BEACON Twenty-two out of 27 participants received at least 1 session, and 16 completed all 6. All sessions were delivered remotely.

Implications We acknowledge that testing during the pandemic, with the severe and changing restrictions on people's movement, limits interpretation and generalisability of findings about feasibility of trial procedures. Nevertheless, despite the severe disruptions, we were able to recruit and follow up participants and to deliver the intervention to over half the planned sample. This indicates that the adapted BA intervention, BEACON, was feasible to deliver and acceptable to patients and the healthcare service. We also developed successful options for remote delivery of BA sessions and of remote follow-up.

A definitive trial of a similar intervention for depression in people with diabetes in Bangladesh and Pakistan is ongoing.

Integrating depression care in tuberculosis services

Chronic infectious diseases are known to be associated with an increased risk of mental disorders. This increased vulnerability may be mediated directly by the physiological effects of the infection, or may be associated with adverse effects of its treatment. The stress of living with a chronic condition and negative employment, education and economic impacts also contribute. In LMIC populations, the risk of mental illness is further augmented, owing to higher rates of chronic infectious diseases and adverse social determinants of health such as poverty, poor nutrition, lower literacy and limited access to mental health care.

As is the case for NCD, comorbid mental disorders in infectious diseases (of which depression is the most common) adversely impact on outcomes for both the mental disorder and the chronic communicable disease. TB infections are highly prevalent in LMICs in South Asia. In Bangladesh, India and Pakistan, there are relatively well-resourced and organised publicly funded health services and programmes for TB, supported by the Global Fund, and government and non-government organisations. These services could provide a platform for identifying comorbid depression and providing effective treatments alongside delivering physical health care.

Integrating depression screening in tuberculosis services in Pakistan: a feasibility assessment in Pakistan

Background Depression is highly prevalent in people with TB and contributes to poor treatment outcomes (including TB outcomes), prolonged hospitalisations and increased healthcare expenses. Yet, most TB services do not routinely screen, diagnose or offer treatments for depression.⁷⁰ Given the burden of managing TB, the limited mental healthcare capacity in LMICs and stigma associated with mental illness, it is unlikely that people with TB will be able to access treatment for their depression elsewhere while attending TB treatment facilities. Effective and scalable care for depression, integrated with TB services, is needed to address this multimorbidity.⁷¹ However, there is little evidence on how to achieve such integrated care, especially in LMICs.⁷² We assessed the feasibility of delivering a depression care pathway integrated within TB services in Pakistan. The detailed methods and findings of the study are published elsewhere and some of the texts in this section are reproduced from that source.⁷³

Methods We used a survey and focus group interviews following introduction of a depression–TB care pathway in three TB facilities in Peshawar, including primary, secondary and tertiary care settings.

The care pathway had been previously co-designed by stakeholders to offer efficient screening and treatment for depression, suitable for low-resource settings with limited mental health expert capacity. The pathway was implemented at the facilities and a readiness assessment of the facilities was performed using a checklist before the start of the survey. *Figure 1* illustrates the steps in the pathway: Every adult patient (≥ 18 years) visiting the three study sites was to be screened for depression. Directly Observed Treatment, Short-course (DOTS) facilitators were trained on the WHO's Mental Health Gap Action Programme depression module. As the first point of contact, they conducted screening using the PHQ-2 and PHQ-9 in a two-stage process and provided appropriate support for those scoring between 6 and 14 on the PHQ-9. All sites were linked to a mental health facility for referral of patients in case of higher scores, or failure to respond to interventions by the DOT facilitator.

All patients aged ≥ 18 years attending the facilities between November 2021 and February 2022 were included in the survey.

For qualitative interviews, a total of six focus groups were undertaken with healthcare staff ($N = 12$) involved in

delivering the care pathway and service users (TB patients and their carers) ($N = 11$).

For quantitative data, we estimated completion rates for planned screening and mean screening scores. For qualitative data, we conducted thematic analysis.

Results One hundred and ninety-one of the 301 people with TB (63.45%) who visited the 3 facilities during the survey period were screened for depression; 35% had scores indicating the presence of depression, with varying severity levels. The remaining 110 patients did not physically attend the study sites, opting for medication collection facilitated primarily by their relatives. Screening rates were similar across all three sites and for men and women. Scores for the 55 patients who scored > 2 on PHQ-2 and were screened with PHQ-9 indicated that 13% did not have depression; the proportion with scores in the range of mild, moderate, moderately severe and severe depression was 18%, 14%, 35% and 20%, respectively. All participants with moderately severe and severe depression were referred to specialised mental health facilities.

Qualitative findings highlighted the acceptability of integrated depression care. Barriers to care included mental illness stigma, logistical challenges, patient non-compliance and cost burdens.⁷³ Facilitators included the empathetic attitude of healthcare providers and the availability of mental health services within the same facility.

Implications There is a high burden of depression in patients with TB, highlighting the pressing need for mental health support in this population. Acceptability of integrated screening and care was evident, with factors such as colocated mental health services, training healthcare providers and provider empathetic attitudes playing a crucial role. However a significant proportion – 4 out of 10 patients were unable to be screened because of non-attendance at follow-up visits. Alternatives to in-person screening or screening at clinic visits need to be explored. Further research is also required to evaluate the effectiveness of the integrated TB–depression screening systems in improving health outcomes, implementation, scalability and impact on the broader healthcare system.

Supporting applied health research on mental and physical multimorbidity in low- and middle-income countries

To develop the relatively new field of mental and physical multimorbidity research in LMICs, we identified the need to strengthen capacity not only in research methods and skills but also in research management and governance

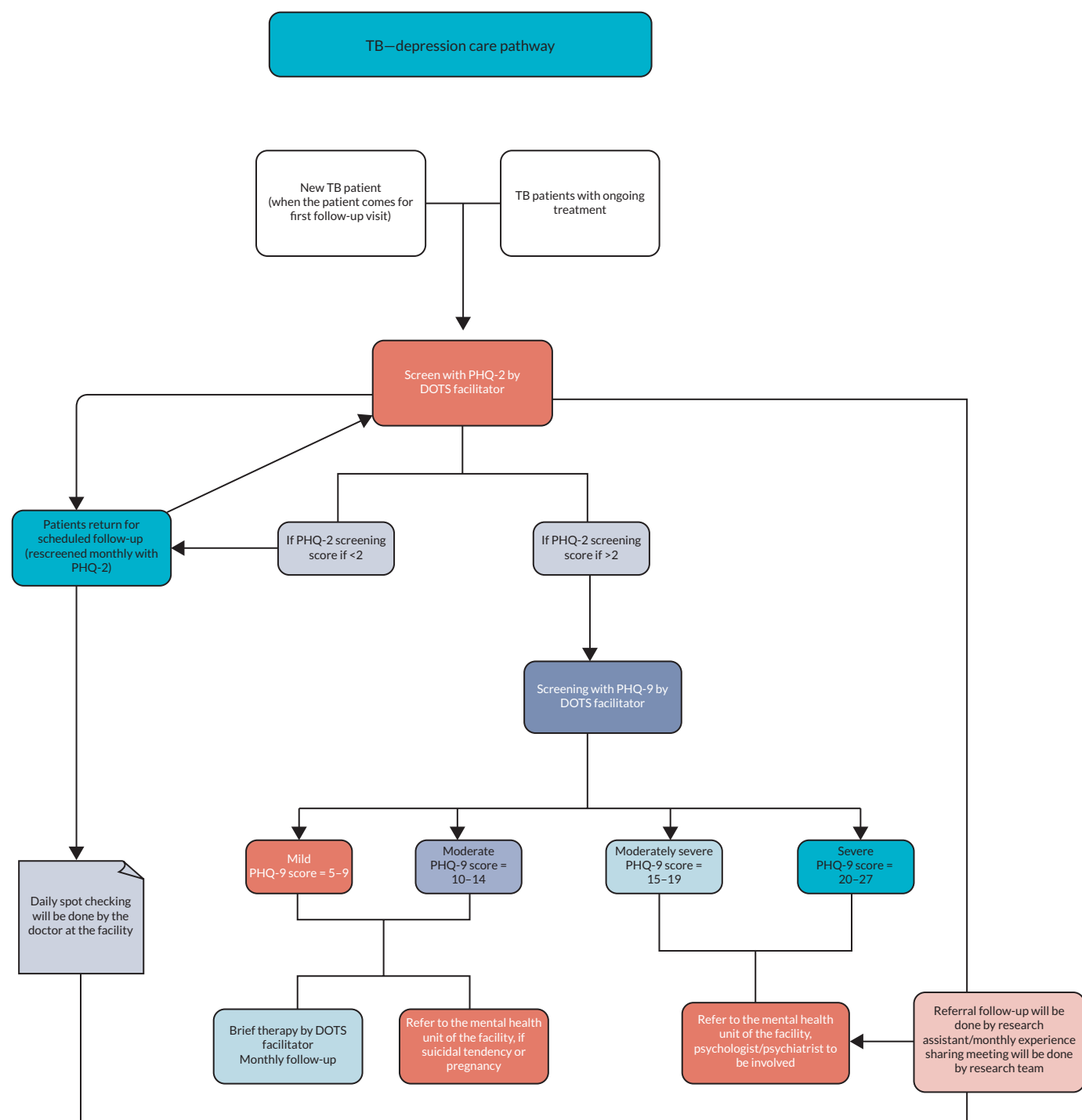


FIGURE 1 Tuberculosis–depression care pathway for primary, secondary and tertiary TB facilities in Peshawar (KP), Pakistan.⁷³

and in community engagement. We also needed to engage and secure support from policy-makers for this important agenda. A key gap in evaluating interventions for multimorbidity that we sought to address was agreement on which outcomes to measure. This section describes a number of studies and activities which contributed knowledge, tools and collaborations, and enhanced capacity to undertake applied health research in mental and physical multimorbidity in LMICs.

Building research capacity

IMPACT strategy to develop mental and physical applied health research capacity in Bangladesh, India and Pakistan

Our approach to capacity-building was informed by frameworks from the ESSENCE and CHEPSAA collaborations.⁷⁴ It was responsive to local needs (which were often changing) and developed iteratively, taking a

strategic approach, and also capitalising on opportunities as they arose.

The primary emphasis of our strategy was on developing individual and team expertise (i.e. training and development), but some organisational and systems issues were also addressed (e.g. HR support and research governance).

We assessed capacity needs, gaps and assets for individuals and partner organisations. We developed capacity-strengthening plans based on this assessment, first using, where possible, available 'assets' from each partner or country (e.g. experienced staff for mentoring, training courses) to increase sustainable capacity work. Key capacity needs for implementing IMPACT, which could not be met by these local assets, were addressed through integration of training courses within annual workshops, or organising targeted webinars. For example, we organised training on observational studies, on trials and on systematic reviews (the last in collaboration with York's Centre for Reviews and Dissemination). We delivered these as three series of online webinars with opportunities for experiential learning alongside. We also built clinical capacity by training 224 healthcare workers, including 142 in screening for depression and delivery of brief therapies at study sites. Finance learning sets helped capacity-building in finance governance.

Feedback on capacity-building activities was sought regularly at programme management and annual meetings in order to ensure our plans remained relevant and timely. Please see the capacity-strengthening strategic plan in [Appendix 3](#) and poster in [Report Supplementary Material 2](#), highlighting activities.

Community engagement and involvement in research in LMICs

Patient and public involvement in health research in low- and middle-income countries: systematic review

At the outset of our research programme, we found there was frequently a limited understanding of the purpose of community engagement and involvement (CEI) and little previous experience of engagement even among researchers and health professionals. There was also scepticism about the feasibility of securing meaningful CEI and a lack of appreciation for its importance. Further, although it is widely accepted that CEI leads to higher-quality health research, which better addresses identified

priorities, it was unclear which CEI models and activities were effective for supporting research in LMICs.

We conducted a systematic review to identify examples of patient and public involvement (PPI) in health research in LMICs and to explore their impact. The detailed methods and findings of the systematic review are published elsewhere.⁷⁵ PPI and CEI are used interchangeably, with the latter more commonly used in LMICs. We used the term PPI in the systematic review, although our search included a full range of terms for CEI.

We searched EMBASE, MEDLINE and PsycInfo® (American Psychological Association, Washington, DC, USA) databases, along with hand-searching references, grey literature, Google search and expert advice for any applied health research with evidence of patient or public involvement. There were no language restrictions, and we included studies from 1978 to 1 December 2017.

We extracted data on the stage and level of PPI involvement and any information (quantitative and qualitative) relevant to impact. All data were extracted by one researcher (NC). For qualitative data synthesis, a coding framework was developed using an inductive approach to examine the impact of PPI on research. Extracted data were then independently coded by a second lay researcher (RK). Discrepancies were resolved by a third independent reviewer (MT) through consensus.

Sixty-two studies met the inclusion criteria and were included in the review. The most common stage at which PPI was used was in research planning, and the most common level of involvement was 'collaboration'. Most studies did not provide any evidence or commentary on the effectiveness or the impact of PPI. Studies reported impact mainly from researchers' perspectives. Where impact was mentioned, PPI was reported to increase relevance to the community, empowerment of participants and lead to some alterations in study design.

We found sparse literature describing approaches to and impact of PPI in LMIC health research. As PPI is essential to conducting high-quality research, research reports should include details of PPI activities. Further, there is a need to evaluate the impact of PPI on research.

An outline of the approach used in our programme is given in [Community engagement and involvement](#).

Policy forum: 'mental and physical health together'

We identified a need to engage policy-makers in our research for multiple reasons. First, to ensure that it was addressing identified global and local priorities. Second, we needed support from policy-makers for successful delivery of the research, in particular to help secure agreements to access public health and clinical services and engage with key stakeholders. Policy-makers also have a crucial role in effective dissemination and uptake of findings. Lastly, we recognised the need to strengthen the capacity of policy-makers to use research findings. We provide here a summary of one policy-maker engagement event designed to address these needs, as an exemplar.

The NIHR IMPACT in South Asia Global Health Research Group and WHO organised an online research policy forum on 10 August 2022. The online event was entitled: 'Bringing Mental and Physical Health Together: Translating Research into Policy'. The full report of the event is provided in [Report Supplementary Material 3](#).

The purpose of the Policy Forum was to establish a network and channel for ongoing communication between researchers, policy-makers and other key actors working in fields relevant to mental and physical multimorbidity in South Asia. We also wanted to showcase WHO guidelines and key policy-relevant findings from the IMPACT research programme and to gain insight from policy-makers on how best to effectively communicate research findings. We anticipated that the Forum would lead to ongoing communications and similar events that could serve to engage policy-makers.

There were 54 attendees at the event from 9 different countries, with 33 from the South East Asia and Eastern Mediterranean region. The participants included senior leadership from government (8 attendees), WHO (13), national and international organisations (6) and from research and academia (27), all working in fields relevant to mental and/or physical health.

Following the opening remarks by NCD and Mental Health Directors, Dr Arash Rashadian, Director of Science, Information and Dissemination at WHO EMRO Office, shared details about a new online Evidence to Policy toolkit.

The IMPACT research team then presented key findings from the programme that were of most relevance for policy-makers. The topics included CMDs (such as depression and anxiety) alongside NCDs (diabetes) and chronic communicable diseases (TB and hepatitis), the

cost of mental illness in South Asia, and the physical health of people with SMI (SMI survey and smoking cessation in SMI).

Following this, the IMPACT team asked questions of a policy-maker panel, within the theme of future communications, ahead of the closing remarks. Members of the wider audience were able to post questions and comments throughout the event via Google Jamboard (Google Inc., Mountain View, CA, USA) or Zoom (Zoom Video Communications, San Jose, CA, USA) chat functions, which were reviewed and answered at the end of each session.

In terms of the way forward, some of the key priorities identified were as follows:

- to maintain a continued dialogue between policy-makers and researchers, and to consider policy-makers' inclusion at all stages of the research, from design to dissemination. This should ensure that the focus stays relevant and help policy-makers gain clear recommendations for actions as a result of research
- to consider how evidence is going to fit and be adaptable to the reality of the context and health systems as well as scalable and sustainable
- to raise awareness in order to address the stigma and discrimination around mental health and mental illness
- to develop and use a single repository for sharing evidence and communication
- more information is needed about the longitudinal impact of mental and physical multimorbidity, across the lifespan.

It was agreed that the IMPACT team at the University of York will carry out the following next steps:

- set up and circulate a repository for sharing of findings and materials
- create a mailing list for the forum participants
- set up a Twitter (Twitter, Inc., San Francisco, CA, USA) account for forum participants to share and advertise new papers, policy documents, guidelines and so on
- set up a WhatsApp group for sharing of brief communications between participants
- make plans for the next online meeting to take place within 12 months
- add an agenda item to the next event for policy-makers brainstorming sessions about effective transformation from research results to policy in local context

- add an agenda item to the next event for policy-makers to identify priority research areas that are not yet investigated
- ask the event invitees to send contacts of junior colleagues who may benefit from this network.

Outcomes for multimorbidity trials

Core outcome sets for trials of interventions to prevent and to treat multimorbidity in adults in low- and middle-income countries: the COS-MOS study

The burden of multimorbidity is increasing in LMICs, creating an urgent need for effective evidence-based interventions.^{76,77} Evaluating such interventions requires choosing appropriate outcomes that are relevant to people living with these conditions, their carers, healthcare services and policy-makers. Yet, trials often fail to measure key outcomes, particularly those most relevant from the perspective of people most affected by multimorbidity.⁷⁸ There is also inconsistency in included outcomes between trials, making it difficult to synthesise evidence across trials.^{79–81}

Core outcome sets (COS) are a group of agreed key outcomes that should be included in all trials of interventions for a particular condition and population. They are developed using consensus methods to reflect the views of all stakeholders.^{82,83} COS that are appropriate for the study of interventions for the prevention or management of multimorbidity in LMICs do not presently exist. They are required to standardise reporting and contribute to a consistent and cohesive evidence base to inform policy and practice.

We therefore developed two COS for intervention trials aimed at preventing and treating multimorbidity in adults in LMICs. The detailed methods and findings of the study are published elsewhere, and some of the texts in this section are adapted from that source.⁸¹

We followed recommended methods for developing COS,⁸² including registration (www.comet-initiative.org/Studies/Details/1580) and publishing the protocol.⁸⁰ We first generated a comprehensive list of potentially relevant prevention and treatment outcomes. To do this, we conducted a systematic review to identify published multimorbidity trials in LMICs and extracted details of all outcomes. We also conducted qualitative individual interviews with people with multimorbidity and their caregivers living in 10 LMICs to explore if there were

additional relevant outcomes, not previously included in trials.⁸¹

We used modified two-round Delphi surveys to identify outcomes most important to stakeholders (people with multimorbidity/caregivers, researchers, healthcare professionals and policy-makers). Survey participants included representatives from 33 countries. We presented summaries of the ratings from the surveys at two online consensus meetings. We noted agreements and differences across stakeholder groups and facilitated discussions to understand the reasons behind these. We used iterative discussions, ranking and voting to reach agreement on the two final COS for prevention and for intervention trials.

We identified 24 outcomes for prevention and 49 for treatment of multimorbidity trials from the systematic review and qualitative interviews. A further 12 prevention and 6 treatment outcomes were added from suggestions made by participants in the Delphi survey. Delphi round 2 surveys were completed by 95 of 132 round 1 participants (72.0%) for prevention and by 95 of 133 (71.4%) participants for treatment outcomes.⁸¹ Four outcomes were agreed for inclusion in the prevention COS: (1) adverse events, (2) development of new comorbidity, (3) health risk behaviour and (4) quality of life; and four outcomes were agreed also for the treatment COS: (1) adherence to treatment, (2) adverse events, (3) out-of-pocket expenditure and (4) quality of life.⁸¹

We developed two COS for trials of interventions for multimorbidity prevention and treatment in adults in LMICs. These outcomes should be included as a minimum in future multimorbidity trials to help advance the evidence base for effective interventions for multimorbidity in LMIC settings. Their use may help promote consistency in outcome selection and reporting and support synthesis of evidence across studies, reducing research waste and maximising the potential impact of research through pooling findings to enhance health outcomes for people living with multimorbidity.

Community engagement and involvement

Community engagement and involvement was integral to all studies in our programme. We defined CEI stakeholders broadly to include people living with the conditions under investigation and their families and carers. We also included other members of the community, who might be affected by, or influence the

impact of our research, for example teachers or faith leaders and advocacy groups.

For each study, we identified relevant CEI stakeholders and sought their perspectives on priorities for research, the feasibility of conducting planned research activities and advice on dissemination.

As there was often a limited understanding of the purpose of CEI and little previous experience of engagement even among researchers and health professionals, we conducted multiple orientation sessions for communities and professionals to develop a shared understanding and approach. We found considerable initial scepticism about the value of CEI among health professionals and researchers. However, over time, this changed to an appreciation of the unique and specific perspectives and insights brought forward by CEI representatives and recognition of their critical importance to the success of the research.

To secure ongoing and timely involvement, we organised CAPs comprising key CEI stakeholders. Panels met regularly to advise at various stages of the studies. At the start, CAP meetings were facilitated by researchers. Following training and over time, CAP members chose a patient, family or community member to chair, who facilitated meetings, taking over from researchers after the initial set-up sessions.

Feedback from panels indicated that CAP membership helped build capacity and confidence among community members and to challenge traditional professional/lay member hierarchies in voicing opinions.

The CAP model of contributing to CEI helped to ensure that our research aligned with the priorities of the people most affected and enhanced the quality of the research. This model for integrating CEI in research has been taken forward in multiple other research programmes in LMICs. Learning from our CEI activities has also contributed to a training package and manual on CEI in LMICs for a depression and diabetes multimorbidity trial (see [Report Supplementary Material 4](#)).

Key findings

1. Prevalence of mental and physical multimorbidity

Our studies reveal a significant burden of coexisting mental and physical multimorbidity in LMICs. Depression and anxiety are highly prevalent among individuals with

NCDs, with meta-analysis findings reporting depression prevalence rates as high as 40% among individuals with diabetes and hypertension. Anxiety prevalence in the same population was estimated at 29%. These figures highlight the urgent need for integrated approaches to address mental health challenges alongside physical health conditions.

2. SMI and physical health

Individuals with SMI, including schizophrenia and bipolar disorder, exhibit disproportionately higher rates of cardiometabolic risks. A systematic review and meta-analysis reported that people with SMI in LMICs have a combined pooled prevalence of overweight and obesity at 55.7%, with obesity rates nearly three times higher than in the general population. Women with SMI, particularly those with schizophrenia, are more likely to experience obesity than their male counterparts, further emphasising the gender disparities in multimorbidity.

3. Screening and treatment gaps

Evidence from surveys conducted in Bangladesh, India and Pakistan demonstrates a significant gap in the detection and management of physical health conditions among individuals with SMI. Approximately, 70.8% of participants with diabetes, hypertension and hypercholesterolaemia were undiagnosed, and only about half of those diagnosed were receiving appropriate treatment. Furthermore, tobacco cessation and weight management advice were found to be provided to fewer than 40% of individuals in mental healthcare settings, indicating a missed opportunity to address modifiable risk factors.

4. Integrated care

Findings underscore the feasibility and acceptability of integrating mental health care into physical health services in LMICs. Examples include the integration of BA for depression into NCD clinics and a depression care pathway implemented within TB services. Both models showed promise in improving access to mental health care, addressing comorbidities and enhancing overall health outcomes.

5. Health risk behaviours

Health behaviours, such as tobacco use and physical inactivity, are alarmingly prevalent among individuals with SMI. Among men with SMI, 46.8% used tobacco (36.5% smoked, and 29.1% had attempted to quit in the past year), while 45.6% did not meet the WHO recommendations for physical activity. These behaviours exacerbate the burden of cardiometabolic and other chronic health conditions, further highlighting the need for targeted health promotion interventions.

6. Intervention feasibility and effectiveness

Tailored interventions such as smoking cessation programs (IMPACT 4S) and culturally adapted BEACON demonstrated high feasibility, acceptability and engagement in LMIC settings. For example, the smoking cessation programme showed an 87% session attendance rate and good adherence to pharmacotherapy despite challenges posed by the COVID-19 pandemic. The BEACON intervention also showed promising engagement, with 76% of participants completing at least one session and 55% completing all six sessions.

7. Policy gaps and opportunities

A systematic policy analysis for Pakistan revealed significant gaps in the recognition and management of multimorbidity. Most policy documents reviewed did not explicitly address mental-physical multimorbidity, and mental health policies were often separate from those addressing NCDs. However, emerging opportunities were identified, such as the establishment of provincial NCD units and the potential for task-shifting approaches to integrate mental health care into primary health services.

8. Capacity-building and stakeholder engagement

The programme trained over 200 healthcare workers and more than 50 researchers in applied health research, strengthening regional capacity for addressing mental-physical multimorbidity. Stakeholder engagement, including co-design workshops and policy forums, highlighted the importance of community involvement and multisectoral collaboration in designing and delivering interventions. For example, training non-specialist health workers to deliver BA and other interventions was shown to be feasible and cost-effective.

9. Economic impact of mental illness

Findings from a systematic review on the economic burden of mental disorders in South Asia highlight the high indirect costs associated with lost productivity and out-of-pocket expenses for individuals and caregivers. Most studies focused on depressive disorders and psychoses, with limited data on other conditions. These findings support the urgent need for policy action to address financial barriers and expand mental health service coverage.

10. Core outcome sets for multimorbidity research

The development of COS for trials on multimorbidity prevention and treatment in LMICs is a significant contribution to standardising research in this field. Outcomes such as quality of life, adherence to treatment

and out-of-pocket expenditure were prioritised, ensuring future research aligns with the needs of patients, caregivers and healthcare providers.

Discussion

Our programme provides critical insights into the burden of mental and physical multimorbidity in South Asia. Mental and physical multimorbidity is highly prevalent, with our findings indicating a significant co-occurrence of depression and anxiety with NCDs such as diabetes and hypertension. The reported prevalence rates of depression (40%) and anxiety (29%) among individuals with NCDs align with prior global findings, such as a meta-analysis, which demonstrated that depression substantially exacerbates the burden of chronic illnesses.⁸⁴

Our findings also highlight the disproportionate cardiometabolic risks faced by individuals with SMI, including schizophrenia and bipolar disorder. Our systematic reviews and meta-analyses confirm that obesity prevalence in individuals with SMI is nearly three times higher than in the general population, consistent with findings from studies in HICs.¹ These disparities underline the interplay of biological, psychosocial and healthcare factors that exacerbate health inequities in this population. The higher prevalence of obesity among women with SMI, particularly those with schizophrenia, corroborates findings by Álvarez-Jiménez *et al.* who have previously noted gender-specific vulnerabilities to weight gain linked to psychotropic medications and sociocultural factors.⁸⁵

A notable gap identified by our research programme is the underdetection and undertreatment of physical health conditions among individuals with SMI. Surveys conducted in Bangladesh, India and Pakistan revealed that over 70% of participants with conditions like diabetes, hypertension and hypercholesterolaemia were undiagnosed, with only half of those diagnosed receiving treatment. This finding is consistent with observations on the 'failure of parity' between mental and physical health services globally.⁸⁶ The lack of adequate tobacco cessation and weight management advice further underscores unacceptable deficiencies in addressing modifiable risk factors.

Limitations

The findings of this programme should be interpreted in light of several limitations. Much of the work comprised exploratory and feasibility studies rather than large-scale definitive evaluations, meaning conclusions about effectiveness, cost-effectiveness and scalability remain

tentative. Many epidemiological estimates were derived from cross-sectional data, which cannot establish causal relationships or capture changes over time. In addition, facility-based recruitment, whether from mental health centres, NCD clinics, or TB services, limits representativeness, as people who do not access care, especially those in rural and underserved communities, remain under-represented. Some participant groups were unevenly sampled, such as men in the smoking cessation trial and women in NCD services, and several feasibility studies involved small samples with significant attrition, further constraining generalisability.

The COVID-19 pandemic imposed further challenges, disrupting recruitment, delaying study timelines and necessitating a shift from in-person to remote or hybrid intervention delivery. While this demonstrated adaptability, it may have affected engagement, fidelity and data quality. Objective measures, such as CO monitoring for smoking cessation, could not always be implemented, and reliance on self-reported outcomes such as tobacco use, diet and physical activity introduces recall bias.

Finally, structural and health system constraints in South Asia limited the scope of what could be achieved. Fragmented service delivery, workforce shortages, stigma and lack of integrated information systems restricted the capacity to embed interventions within routine care. While policy analyses identified opportunities for integration, evidence uptake at the system level was not tested, and the sustainability of task-shifted approaches remains uncertain without long-term investment. These factors collectively highlight the need for larger, longitudinal and system-level research to strengthen the evidence base for integrated care and ensure that interventions are scalable, sustainable and equitable.

Equality, diversity and inclusion

Considerations of equality, diversity and inclusion (EDI) were central to the design and conduct of this programme. The countries included in this research (Bangladesh, India and Pakistan) share some common demographic and cultural features, but they also differ markedly in terms of health system structures, socioeconomic contexts and population health needs. Even within each country, there is substantial diversity across regions, languages, ethnic groups, religions and socioeconomic strata, all of which influence the prevalence of multimorbidity, access to care and acceptability of interventions. We sought to account for this diversity by involving a wide range of stakeholders, including patients, carers, community representatives and healthcare providers, in

the adaptation and co-design of interventions to ensure cultural relevance and inclusivity.

Nonetheless, it is important to acknowledge that findings from facility-based populations cannot fully capture the experiences of all groups, particularly those from rural, marginalised or underserved communities, who may face additional barriers to accessing health services. Gender differences also emerged across studies, for example in patterns of tobacco use, obesity and help-seeking behaviours, underlining the need for gender-sensitive approaches to prevention and treatment. While interventions such as BA and smoking cessation support were adapted to local contexts and showed promise, further research is required to explore their acceptability and effectiveness across different cultural, socioeconomic and demographic groups.

Overall, our findings are likely to be transferable across South Asian LMICs that share comparable challenges of multimorbidity, stigma, fragmented health systems and resource constraints. However, the diversity between and within countries means that implementation strategies must be tailored to local contexts, with particular attention to reaching disadvantaged groups. Embedding EDI considerations in future research will be essential for developing scalable interventions that not only improve health outcomes but also contribute to equity in access to mental and physical health care.

Implications for policy and practice

These results emphasise the urgent need for a paradigm shift in policy and healthcare delivery, particularly in LMICs, to adopt integrated care models that address both mental and physical health conditions concurrently.

Integrated care models tested in this research provide promising pathways to mitigate some of the identified challenges of multimorbidity in NCD, TB and SMI populations. The integration of BA for depression into NCD clinics, the implementation of a depression care pathway within TB services and smoking cessation counselling in SMI services yielded encouraging outcomes,⁸⁷ with high engagement and acceptability among patients. Such findings mirror evidence from HICs, where integrated care, stepped care and collaborative care models have shown significant efficacy in improving mental health outcomes alongside chronic disease management.⁸⁸ However, the adaptation and scaling of these interventions in LMICs will require careful consideration of contextual factors, including resource constraints, cultural norms and stigma associated with mental illness.

Stigma remains a pervasive barrier to mental healthcare access, as noted in our qualitative findings; its role in delaying help-seeking behaviours and exacerbating health disparities has been previously described.⁸⁹ Public awareness campaigns and community-based interventions are essential to normalising mental health care and fostering supportive environments for individuals with multimorbidity. Additionally, training healthcare workers in task-shifting approaches has emerged as a viable strategy to address workforce shortages in LMICs. Patel *et al.* demonstrated the feasibility and effectiveness of task-shifting in delivering mental health interventions in resource-limited settings,⁹⁰ a finding corroborated by our feasibility studies and capacity-building initiatives.

Targeted health promotion interventions addressing modifiable risk behaviours, such as tobacco use and physical inactivity, are another critical area we identified. The high prevalence of these behaviours among individuals with SMI exacerbates the burden of chronic illnesses. Similar high rates of physical inactivity among people with SMI have been reported globally, linking inactivity to poorer physical and mental health outcomes.⁹¹ The WHO has long advocated integrating health promotion into routine care for chronic conditions.

Implications for research

Future research should focus on evaluating the effectiveness, cost-effectiveness and scalability of interventions demonstrated in this study, such as BA and smoking cessation programs. While the feasibility of these interventions has been established, high-quality RCTs are necessary to assess long-term outcomes and inform policy decisions. Furthermore, there is still an urgent need for robust epidemiological studies to elucidate the prevalence, natural history and determinants of mental-physical multimorbidity in South Asia. Such data are essential to guiding resource allocation and developing targeted interventions.

Implementation science also plays a pivotal role in bridging the gap between evidence and practice. Understanding the barriers and facilitators to implementing integrated care models, as well as testing strategies to optimise equitable uptake, is critical for scaling up interventions in LMICs. Digital health technologies, for example, offer promising avenues for delivering remote care, particularly in settings with limited access to physical health facilities.⁹²

Lastly, the development of COS for multimorbidity research, as demonstrated in this study, represents a

significant step toward standardising research in this field. By prioritising outcomes such as quality of life, adherence to treatment and out-of-pocket expenditure, future studies can enhance comparability and facilitate evidence synthesis, ultimately driving improvements in health outcomes for individuals with multimorbidity.⁷⁹

Conclusion

Our research underscores the substantial burden of mental-physical multimorbidity in South Asia and highlights the potential of integrated care models to address these challenges effectively. By prioritising mental health within healthcare systems, addressing modifiable risk factors and fostering community engagement, LMICs can improve health outcomes, reduce healthcare costs and promote equity. Future efforts should focus on evaluating and scaling up interventions, addressing data gaps and strengthening implementation science to ensure sustainable and impactful solutions for mental and physical multimorbidity in LMICs.

Additional information

Author contribution statement

The NIHR Global Health Research Group IMPACT in South Asia ([Appendix 1](#)) collectively contributed to this work. All members of the Consortium reviewed and approved the final manuscript.

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ARK Foundation, Bangladesh: Rumana Huque

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Research team

ARK Foundation, Bangladesh: Asiful Haidar Chowdhury

Institute of Psychiatry, Pakistan: Nida Afsheen, Faiza Aslam, Humaira Khalid

International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B): Nabila Ashraf, Nantu Chakma

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Community panels

NIMHANS

ARK

IoP

KMU

Administration team

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Data-sharing statement

The data sets generated and/or analysed during the current programme are not publicly available due to participant confidentiality and restrictions under local and institutional ethics approvals in Bangladesh, India and Pakistan. Deidentified data may be made available from the corresponding author on reasonable request, subject to appropriate data-sharing agreements, institutional approvals and compliance with ethical and information governance requirements. Requests for data should outline the purpose and proposed use and will be reviewed by the study team and relevant institutional ethics committees.

Ethics statement

We sought ethics approvals for all studies from the Department of Health Sciences, University of York, UK.

- IMPACT 4S: HSRGC/2019/346/D, 5 July 2019
- BEACON: HSRGC/2020/418/B; 27 November 2020
- IMPACT SMI Survey: HSRGC-3/17, March 2017
- COSMOS: HSRGC/2020/409/D, 2 October 2020
- Depression care integration in tuberculosis services: HSRGC/2020/418/D, 18 January 2021

In addition, for each study, we obtained approval from a national-level ethics committee in the country where the study was taking place. Approvals were obtained from the following committees:

- The Centre for Injury Prevention and Research, Bangladesh
 - IMPACT SMI Survey: CIPRB/ERC/2OI 8/003, January 2018
- Ethical Review Committee, icddr,b, Bangladesh
- The Institute Ethics Committee, National Institute of Mental Health and Neurosciences, India;
 - IMPACT 4S: 20 August 2019
 - IMPACT SMI Survey: BEH.SC.DIV 20/19, May 2019
 - BEACON: NIMHANS/EC [BEH. SC.DIV.] 22nd MEETING/2OI9, 3 February 2020
 - Depression care integration in tuberculosis services, NIMHANS/28th IEC (BEH.SC.DIV.)/2020–1, 18 March 2021
- The Health Ministry Screening Committee, India
 - IMPACT 4S: 2019-7975, 19 February 2020
 - IMPACT SMI Survey: HMSC12/18, September 2018
 - BEACON: 2020-9330, 12 June 2020
- The National Bioethics Committee, Pakistan.
 - IMPACT 4S: 4-87/NBC-434-Amend/21/1508, 10 December 2019
 - IMPACT SMI Survey: 4-18/NBC-413/19
- Institutional Research and Ethics Forum of Rawalpindi Medical University
 - IMPACT 4S: R-48/RMU, 24 August 2019.
- Khyber Medical University Pakistan
 - Depression care integration in tuberculosis services: Dir/KMU-EB/IPHSS/MM-001

In all studies involving human participants, we obtained informed consent using trained researchers. Written and verbal information was provided about the study. Participants were free to withdraw consent without stating a reason. All study procedures complied with legislation and guidance for good practice governing the participation in research of people who may lack capacity [Mental Capacity Act (UK) 2005]. Participants did not receive financial inducements to participate, but where relevant, travel costs were provided, and small tokens of appreciation.

Information governance statement

The University of York is committed to handling all personal information in line with the UK Data Protection Act (2018) and the General Data Protection Regulation (EU GDPR) 2016/679. Under the Data Protection legislation, the University of York is the Data Controller for this research. You can find out more about how we handle personal data, including how to exercise your individual rights and the contact details for our Data Protection Officer here: www.york.ac.uk/records-management/dp/.

All research activities were conducted in compliance with relevant national and institutional research governance frameworks in Bangladesh, India and Pakistan and in accordance with the University of York's governance requirements as the lead institution. Ethical approval was obtained from relevant institutional review boards in each participating country and the UK, and all studies were registered as required. Data collection adhered to established principles of confidentiality, data minimisation and secure storage. All participant data were deidentified before analysis, and access was restricted to authorised members of the research team. Information governance processes complied with the General Data Protection Regulation (GDPR) and with local legal and ethical standards in each study country.

Official Development Assistance (ODA) statement

This research was funded by the NIHR (Award ref: 17/63/130) using UK international development funding from the UK Government to support global health research. The focus of the programme was on Bangladesh, India and Pakistan, which are all LMICs eligible for ODA. The research directly addresses the burden of mental and physical multimorbidity in these settings, with the primary aim of generating evidence, developing interventions and strengthening local research capacity to improve health outcomes. Findings are therefore intended to benefit people living in ODA-eligible countries, with relevance for service development, policy, and future research in these contexts.

Disclosure of interests

Full disclosure of interests: Completed ICMJE forms for all authors, including all related interests, are available in the toolkit on the NIHR Journals Library report publication page at <https://doi.org/10.3310/NSHD9987>.

Primary conflicts of interest: We endeavour to obtain ICMJE disclosure of interest forms for all named authors. In this case, we have been unable to obtain these forms for every author. Please contact the corresponding author if you have any queries.

The authors declare no competing interests in relation to this work. David Shiers is an expert advisor to the NICE Centre for Guidelines; all views expressed are personal and do not represent those of NICE. No other financial or non-financial interests that could be perceived to influence the submitted work are declared.

Department of Health and Social Care disclaimer

This publication presents independent research commissioned by the National Institute for Health and Care Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, MRC, NIHR Coordinating Centre, the Global

Health Research programme or the Department of Health and Social Care.

This synopsis was published based on current knowledge at the time and date of publication. NIHR is committed to being inclusive and will continually monitor best practice and guidance in relation to terminology and language to ensure that we remain relevant to our stakeholders.

Study registrations

- Investigating physical comorbidity in people with severe mental illness in South Asia: ISRCTN88485933; 3 June 2019.
- Smoking cessation support for people with severe mental illness in South Asia: ISRCTN34399445; 9 January 2020.
- BEACON trial registration number: CTRI/2020/05/025048; 6 May 2020.

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For more information about this research, please view the award page (www.fundingawards.nihr.ac.uk/award/17/63/130).

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List of supplementary material

Report Supplementary Material 1 Non-communicable diseases and common mental disorders in Pakistan: a policy analysis and recommendations

Report Supplementary Material 2 Poster: research capacity strengthening – reflections from a NIHR Global Health Research Group

Report Supplementary Material 3 Report: bringing mental and physical health together – translating research into policy

Report Supplementary Material 4 Community engagement and involvement in research: a training manual

Supplementary material can be found on the NIHR Journals Library article page (<https://doi.org/10.3310/NSHD9987>).

Supplementary material has been provided by the authors to support the article and any files provided at submission will have been seen by peer reviewers, but not extensively reviewed. Any supplementary material provided at a later stage in the process may not have been peer reviewed.

The supplementary materials (which include but are not limited to related publications, patient information leaflets and questionnaires) are provided to support and contextualise the publication. Every effort has been made to obtain the necessary permissions for reproduction, to credit original sources appropriately, and to respect copyright requirements. However,

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List of abbreviations

BA	behavioural activation
BEACON	Behavioural Activation for Comorbid Depression in Non-communicable Disease
CAP	Community Advisory Panel
CEI	community engagement and involvement
CMD	common mental disorder
COS	core outcome sets
EDI	equality, diversity and inclusion
EQ-5D-5L	EuroQol-5 Dimensions, five-level version
EUC	enhanced usual care
GAD-7	Generalised Anxiety Disorder-7
HIC	high-income country
IMPACT	Improving Outcomes in Mental and Physical Multimorbidity and Developing Research Capacity
IoP	Institute of Psychiatry
KP	Khyber Pakhtunkhwa
LMIC	low- and middle-income country
NCD	non-communicable disease
NIHR	National Institute for Health and Care Research
NIMHANS	National Institute of Mental Health and Neurosciences
PHQ	Patient Health Questionnaire
PHQ-9	Patient Health Questionnaire-9 items
PPI	patient and public involvement
RCT	randomised controlled trial
SF-12	Short Form questionnaire-12 items
SMI	severe mental illness
TB	tuberculosis
WHO	World Health Organization

References

- 1 Firth J, Siddiqi N, Koyanagi A, Siskind D, Rosenbaum S, Galletly C, et al. The Lancet Psychiatry Commission: a blueprint for protecting physical health in people with mental illness. *Lancet Psychiatry* 2019;**6**:675–712. [https://doi.org/10.1016/S2215-0366\(19\)30132-4](https://doi.org/10.1016/S2215-0366(19)30132-4)
- 2 The Academy of Medical Sciences. *Multimorbidity: A Priority for Global Health Research*. London: The Academy of Medical Sciences; 2018.
- 3 Arokiasamy P, Uttamacharya U, Jain K, Biritwum RB, Yawson AE, Wu F, et al. The impact of multimorbidity on adult physical and mental health in low- and middle-income countries: what does the study on global ageing and adult health (SAGE) reveal? *BMC Med* 2015;**13**:178. <https://doi.org/10.1186/s12916-015-0402-8>
- 4 Liu NH, Daumit GL, Dua T, Aquila R, Charlson F, Cuijpers P, et al. Excess mortality in persons with severe mental disorders: a multilevel intervention framework and priorities for clinical practice, policy and research agendas. *World Psychiatry* 2017;**16**:30–40. <https://doi.org/10.1002/wps.20384>
- 5 Chan JKN, Wong CSM, Or PCF, Chen EYH, Chang WC. Risk of mortality and complications in patients with schizophrenia and diabetes mellitus: population-based cohort study. *Br J Psychiatry* 2021;**219**:375–82. <https://doi.org/10.1192/bjp.2020.248>
- 6 Holt RIG, de Groot M, Golden SH. Diabetes and depression. *Curr Diab Rep* 2014;**14**:491. <https://doi.org/10.1007/s11892-014-0491-3>
- 7 World Health Organization. *Management of Physical Health Conditions in Adults with Severe Mental Disorders*. 2018. URL: <https://apps.who.int/iris/bitstream/handle/10665/275718/9789241550383-eng.pdf?ua=1> (accessed 7 November 2018).
- 8 Wainberg ML, Scorza P, Shultz JM, Helpman L, Mootz JJ, Johnson KA, et al. Challenges and opportunities in global mental health: a research-to-practice perspective. *Curr Psychiatry Rep* 2017;**19**:28. <https://doi.org/10.1007/s11920-017-0780-z>
- 9 Pizzol D, Trott M, Butler L, Barnett Y, Ford T, Neufeld SA, et al. Relationship between severe mental illness and physical multimorbidity: a meta-analysis and call for action. *BMJ Ment Health* 2023;**26**:e300870. <https://doi.org/10.1136/bmjment-2023-300870>
- 10 Halstead S, Sartorius N, Every-Palmer S, Siddiqi N, de Girolamo G, Siskind D, Warren N. Physical multimorbidity and mental illness: a global challenge. *Aust N Z J Psychiatry* 2024;**58**:293–6. <https://doi.org/10.1177/00048674241235587>

- 11 NIHR. NIHR Global Health Research Group: *Improving Outcomes in Mental and Physical Multimorbidity and Developing Research Capacity (IMPACT) in South Asia at the University of York*. n.d. URL: <https://fundingawards.nihr.ac.uk/award/17/63/130> (accessed 17 January 2025).
- 12 NIHR Global Health Research Group *IMPACT in South Asia 2018-2022*. IMPACT South Asia. n.d. URL: www.impactsouthasia.com/impact-group/ (accessed 17 January 2025).
- 13 Vidyasagaran AL, McDaid D, Faisal MR, Nasir M, Muliya K, Thekkumkara S, et al. Prevalence of mental disorders in South Asia: a systematic review of reviews. *Glob Ment Health* 2023;10:e78. <https://doi.org/10.1017/gmh.2023.72>
- 14 Gautham MS, Gururaj G, Varghese M, Benegal V, Rao GN, Kokane A, et al.; NMHS Collaborators Group*. The National Mental Health Survey of India (2016): prevalence, socio-demographic correlates and treatment gap of mental morbidity. *Int J Soc Psychiatry* 2020;66:361–72. <https://doi.org/10.1177/0020764020907941>
- 15 Yu YH, Luo W, He MX, Yang X, Liu B, Guo Y, et al. Household poverty in people with severe mental illness in rural China: 1994–2015. *BJPsych Open* 2020;6:e111. <https://doi.org/10.1192/bjo.2020.95>
- 16 Smith J, Stevens H, Lake AA, Teasdale S, Giles EL. Food insecurity in adults with severe mental illness: a systematic review with meta-analysis. *J Psychiatr Ment Health Nurs* 2024;31:133–51. <https://doi.org/10.1111/jpm.12969>
- 17 Afzal M, Siddiqi N, Ahmad B, Afsheen N, Aslam F, Ali A, et al. Prevalence of overweight and obesity in people with severe mental illness: systematic review and meta-analysis. *Front Endocrinol* 2021;12:769309.
- 18 Khan BA, Khalid H, Siddiqi N, Aslam F, Ayesha R, Afzal M, et al. Prevalence of underweight in people with severe mental illness: systematic review and meta-analysis. *Mental Health Sci* 2023;1:10–22. <https://doi.org/10.1002/mhs2.7>
- 19 Afzal M, Siddiqi N, Zavala G, Holt R, Aslam F, Koly KN, et al. Prevalence of obesity, overweight and underweight in people with severe mental illness: systematic review. *PROSPERO* 2024. URL: www.crd.york.ac.uk/PROSPERO/view/CRD42020200380 (accessed 17 January 2025).
- 20 Rajan S, Mitchell A, Zavala GA, Podmore D, Khali H, Chowdhury AH, et al. Tobacco use in people with severe mental illness: findings from a multi-country survey of mental health institutions in South Asia. *Tob Induc Dis* 2023;21:1–13. <https://doi.org/10.18332/tid/174361>
- 21 Zavala GA, Prasad-Muliyala K, Aslam F, Barua D, Haidar A, Hewitt C, et al.; IMPACT team. Prevalence of physical health conditions and health risk behaviours in people with severe mental illness in South Asia: protocol for a cross-sectional study (IMPACT SMI survey). *BMJ Open* 2020;10:e037869. <https://doi.org/10.1136/bmjopen-2020-037869>
- 22 Zavala GA, Haidar-Chowdhury A, Prasad-Muliyala K, Appuhamy K, Aslam F, Huque R, et al.; IMPACT Research Team. Prevalence of physical health conditions and health risk behaviours in people with severe mental illness in South Asia: multi-country cross-sectional survey. *BJPsych Open* 2023;9:e43. <https://doi.org/10.1192/bjo.2023.12>
- 23 Appuhamy KK, Podmore D, Mitchell A, Ahmed HU, Ashworth M, Boehnke JR, et al. Risk factors associated with overweight and obesity in people with severe mental illness in South Asia: cross-sectional study in Bangladesh, India, and Pakistan. *J Nutr Sci* 2023;12:e116. <https://doi.org/10.1017/jns.2023.100>
- 24 Lecrubier Y, Sheehan D, Weiller E, Amorim P, Bonora I, Harnett Sheehan K, et al. The Mini International Neuropsychiatric Interview (MINI). A short diagnostic structured interview: reliability and validity according to the CIDI. *Eur Psychiatry* 1997;12:224–31. [https://doi.org/10.1016/S0924-9338\(97\)83296-8](https://doi.org/10.1016/S0924-9338(97)83296-8)
- 25 Bonita R, Winkelmann R, Douglas K, de Courten M. The WHO STEPwise Approach to Surveillance (STEPS) of Non-communicable Disease Risk Factors. In McQueen D, Puska P, editors. *Global Behavioral Risk Factor Surveillance*. Dordrecht: Kluwer Academic/Plenum; 2003. pp. 9–22.
- 26 Rafique I, Saqib MAN, Munir MA, Qureshi H, Rizwanullah, Khan SA, et al. Prevalence of risk factors for noncommunicable diseases in adults: key findings from the Pakistan STEPS survey. *East Mediterr Health J* 2018;24:33–41.
- 27 Tripathy JP, Thakur JS, Jeet G, Chawla S, Jain S. Alarming high prevalence of hypertension and pre-hypertension in North India – results from a large cross-sectional STEPS survey. *PLOS ONE* 2017;12:e0188619. <https://doi.org/10.1371/journal.pone.0188619>
- 28 World Health Organization Noncommunicable Diseases and Mental Health Cluster. *WHO STEPS Surveillance Manual: The WHO STEPwise Approach to Chronic Disease Risk Factor Surveillance*. Geneva: World Health Organization; 2005.
- 29 Faqir S, Afaq S, Shakoore H, Ayub A, Khan Z, Arsh A, et al. South Asia's Silent Struggle: People with Severe Mental Illness Suffer High Burden of Physical Illness. *The Mental Elf* 2023. URL: www.nationalelf-service.net/other-health-conditions/comorbidity/south-asias-silent-struggle-severe-mental-illness-patients-suffer-increased-burden-of-physical-illness/ (accessed 17 January 2025).

- 30 Uphoff EP, Newbould L, Walker I, Ashraf N, Chaturvedi S, Kandasamy A, *et al.*; NIHR Global Health Research Group – IMPACT. A systematic review and meta-analysis of the prevalence of common mental disorders in people with non-communicable diseases in Bangladesh, India, and Pakistan. *J Glob Health* 2019;**9**:020417. <https://doi.org/10.7189/jogh.09.020417>
- 31 Downes MJ, Brennan ML, Williams HC, Dean RS. Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open* 2016;**6**:e011458. <https://doi.org/10.1136/bmjopen-2016-011458>
- 32 Dsouza CV, Kandasamy A, Zainab R, Shriyan C, Shanker V, Jennings H, *et al.* Depression and NCDs: Unveiling the Need for Integrated Care in Southern India's Health Clinics [in press].
- 33 Hussain S, Habib A, Singh A, Akhtar M, Najmi AK. Prevalence of depression among type 2 diabetes mellitus patients in India: a meta-analysis. *Psychiatry Res* 2018;**270**:264–73. <https://doi.org/10.1016/j.psychres.2018.09.037>
- 34 McDaid D, Wright J, Nasir M, Siddiqi N, Vidyasagar AL, Huque R, *et al.* The incidence and prevalence of mental disorders in South Asia: a systematic review of reviews. *PROSPERO* 2024:CRD42021282957. URL: www.crd.york.ac.uk/prospere/display_record.php?ID=CRD42021282957 (accessed 17 January 2025).
- 35 McDaid D, Vidyasagar AL, Nasir M, Walker S, Wright J, Muliya KP, *et al.* Understanding the costs and economic impact of mental disorders in South Asia: a systematic review. *Asian J Psychiatr* 2024;**102**:104239. <https://doi.org/10.1016/j.ajp.2024.104239>
- 36 McDaid D, Wright J, Nasir M, Siddiqi N, Vidyasagar AL, Walker S, *et al.* Understanding the costs and economic impacts of mental disorders in South Asia. *PROSPERO* 2021:CRD42021284323. URL: www.crd.york.ac.uk/prospere/display_record.php?ID=CRD42021284323 (accessed 17 January 2025).
- 37 Teasdale SB, Samaras K, Wade T, Jarman R, Ward PB. A review of the nutritional challenges experienced by people living with severe mental illness: a role for dietitians in addressing physical health gaps. *J Hum Nutr Diet* 2017;**30**:545–53. <https://doi.org/10.1111/jhn.12473>
- 38 Peckham E, Brabyn S, Cook L, Tew G, Gilbody S. Smoking cessation in severe mental ill health: what works? An updated systematic review and meta-analysis. *BMC Psychiatry* 2017;**17**:252. <https://doi.org/10.1186/s12888-017-1419-7>
- 39 Boniface S, Malet-Lambert I, Coleman R, Deluca P, Donoghue K, Drummond C, Khadjesari Z. The effect of brief interventions for alcohol among people with comorbid mental health conditions: a systematic review of randomized trials and narrative synthesis. *Alcohol* 2018;**53**:282–93. <https://doi.org/10.1093/alcalc/agx111>
- 40 Cabassa LJ, Ezell JM, Lewis-Fernández R. Lifestyle interventions for adults with serious mental illness: a systematic literature review. *Psychiatr Serv* 2010;**61**:774–82. <https://doi.org/10.1176/ps.2010.61.8.774>
- 41 Zavala GA, Todowede O, Mazumdar P, Aslam F, Choudhury AH, Jarde A, *et al.* Effectiveness of interventions to address obesity and health risk behaviours among people with severe mental illness in low- and middle-income countries (LMICs): a systematic review and meta analysis. *Glob Ment Health (Camb)* 2022;**9**:264–73. <https://doi.org/10.1017/gmh.2022.21>
- 42 Wu RR, Zhao JP, Jin H, Shao P, Fang MS, Guo XF, *et al.* Lifestyle intervention and metformin for treatment of antipsychotic-induced weight gain: a randomized controlled trial. *JAMA* 2008;**299**:185–93. <https://doi.org/10.1001/jama.2007.56-b>
- 43 Cook BL, Wayne GF, Kafali EN, Liu Z, Shu C, Flores M. Trends in smoking among adults with mental illness and association between mental health treatment and smoking cessation. *JAMA* 2014;**311**:172–82. <https://doi.org/10.1001/jama.2013.284985>
- 44 De Hert M, Correll CU, Bobes J, Cetkovich-Bakmas M, Cohen D, Asai I, *et al.* Physical illness in patients with severe mental disorders. I. Prevalence, impact of medications and disparities in health care. *World Psychiatry* 2011;**10**:52–77. <https://doi.org/10.1002/j.2051-5545.2011.tb00014.x>
- 45 Mazumdar P, Zavala G, Aslam F, Muliya KP, Chaturvedi SK, Kandasamy A, *et al.* IMPACT smoking cessation support for people with severe mental illness in South Asia (IMPACT 4S): a protocol for a randomised controlled feasibility trial of a combined behavioural and pharmacological support intervention. *PLOS ONE* 2023;**18**:e0287185. <https://doi.org/10.1371/journal.pone.0287185>
- 46 Skivington K, Matthews L, Simpson SA, Craig P, Baird J, Blazeby JM, *et al.* A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *BMJ* 2021;**374**:n2061. <https://doi.org/10.1136/bmj.n2061>
- 47 Aslam F, Zavala G, Mazumdar P, Sadananda R, Thomson H, Muliya KP, *et al.* Adaptation process of a culturally tailored smoking cessation intervention

- for people with severe mental illness in South Asia: IMPACT 4S. *Nicotine Tob Res* 2025;**28**:36–45. <https://doi.org/10.1093/ntr/ntaf191>
- 48 Gilbody S, Peckham E, Bailey D, Arundel C, Heron P, Crosland S, *et al.* Smoking cessation for people with severe mental illness (SCIMITAR+): a pragmatic randomised controlled trial. *Lancet Psychiatry* 2019;**6**:379–90. [https://doi.org/10.1016/S2215-0366\(19\)30047-1](https://doi.org/10.1016/S2215-0366(19)30047-1)
 - 49 Boeckmann M, Nohavova I, Dogar O, Kralikova E, Pankova A, Zvolska K, *et al.*; TB & Tobacco Project Consortium. Protocol for the mixed-methods process and context evaluation of the TB & Tobacco randomised controlled trial in Bangladesh and Pakistan: a hybrid effectiveness–implementation study. *BMJ Open* 2018;**8**:e019878. <https://doi.org/10.1136/bmjopen-2017-019878>
 - 50 Sebastian M, Krishnan D, Dhingra M, Zutshi A, Benegal V, Murthy P. *Tobacco Use: A Smart Guide*. Bangalore: Tobacco Cessation Centre, NIMHANS; 2007.
 - 51 Escoffery C, Lebow-Skelley E, Udelson H, Böing EA, Wood R, Fernandez ME, Mullen PD. A scoping study of frameworks for adapting public health evidence-based interventions. *Transl Behav Med* 2019;**9**:1–10. <https://doi.org/10.1093/tbm/ibx067>
 - 52 Haq BU, Aslam F, Mazumdar P, Reddy S, Sarfraz M, Murthy NS, *et al.* Feasibility of remote delivery of a smoking cessation intervention for people with severe mental illness: a telephone consultation. [published online ahead of print September 11 2024]. *Global Health Res* 2024. <https://doi.org/10.3310/MWRX6801>
 - 53 Sarkar BK, West R, Arora M, Ahluwalia JS, Reddy KS, Shahab L. Effectiveness of a brief community outreach tobacco cessation intervention in India: a cluster-randomised controlled trial (the BABEX Trial). *Thorax* 2017;**72**:167–73. <https://doi.org/10.1136/thoraxjnl-2016-208732>
 - 54 Hertzog MA. Considerations in determining sample size for pilot studies. *Res Nurs Health* 2008;**31**:180–91. <https://doi.org/10.1002/nur.20247>
 - 55 Teare MD, Dimairo M, Shephard N, Hayman A, Whitehead A, Walters SJ. Sample size requirements to estimate key design parameters from external pilot randomised controlled trials: a simulation study. *Trials* 2014;**15**:264. <https://doi.org/10.1186/1745-6215-15-264>
 - 56 Eldridge SM, Lancaster GA, Campbell MJ, Thabane L, Hopewell S, Coleman CL, Bond CM. Defining feasibility and pilot studies in preparation for randomised controlled trials: development of a conceptual framework. *PLOS ONE* 2016;**11**:e0150205. <https://doi.org/10.1371/journal.pone.0150205>
 - 57 Badekar A, Rajalu BM, Muliya KP, Sharma P, Chand PK, Murthy P. Prevalence and severity of tobacco use and access to tobacco cessation among tertiary care psychiatric in-patients in India. *Indian J Psychiatry* 2022;**64**:572–8. https://doi.org/10.4103/indianjpsychiatry.indianjpsychiatry_405_22
 - 58 Ijaz S, Davies P, Williams CJ, Kessler D, Lewis G, Wiles N. Psychological therapies for treatment-resistant depression in adults. *Cochrane Database Syst Rev* 2018;**2018**:CD010558. <https://doi.org/10.1002/14651858.CD010558.pub2>
 - 59 Ee C, Lake J, Firth J, Hargraves F, de Manincor M, Meade T, *et al.* An integrative collaborative care model for people with mental illness and physical comorbidities. *Int J Ment Health Syst* 2020;**14**:83. <https://doi.org/10.1186/s13033-020-00410-6>
 - 60 Anwar N, Kuppili PP, Balhara YPS. Depression and physical noncommunicable diseases: the need for an integrated approach. *WHO South-East Asia J Public Health* 2017;**6**:12–7. <https://doi.org/10.4103/2224-3151.206158>
 - 61 Zavala GA, Jennings HM, Afaq S, Alam A, Ahmed N, Aslam F, *et al.* Effectiveness and implementation of psychological interventions for depression in people with non-communicable diseases in South Asia: systematic review and meta-analysis. *Int J Mental Health* 2023;**52**:260–84. <https://doi.org/10.1080/00207411.2023.2202431>
 - 62 Egede LE. Failure to recognize depression in primary care: issues and challenges. *J Gen Intern Med* 2007;**22**:701–3. <https://doi.org/10.1007/s11606-007-0170-z>
 - 63 Uphoff E, Pires M, Barbui C, Barua D, Churchill R, Ekers D, *et al.* Behavioural activation therapy for depression in adults with non-communicable diseases. *Cochrane Database Syst Rev* 2020;**8**:CD013461. <https://doi.org/10.1002/14651858.CD013461.pub2>
 - 64 World Health Organization. *WHO Global NCD Action Plan 2013–2020*. Geneva: WHO; 2013.
 - 65 Commonwealth Secretariat. *A Systems Framework for Healthy Policy*. London: Commonwealth Secretariat; 2016.
 - 66 Zainab R, Kandasamy A, Bhat NA, Dsouza CV, Jennings H, Jackson C, *et al.* Behavioral activation for comorbid depression in people with noncommunicable disease in india: protocol for a randomized controlled feasibility trial. *JMIR Res Protoc* 2023;**12**:e41127. <https://doi.org/10.2196/41127>
 - 67 Bartholomew LK, Parcel GS, Kok G. Intervention mapping: a process for developing theory- and evidence-based health education programs. *Health Educ Behav* 1998;**25**:545–63. <https://doi.org/10.1177/109019819802500502>

- 68 Bernal G, Rodriguez MMD. *Cultural Adaptations: Tools for Evidence-Based Practice with Diverse Populations*. Washington, DC: American Psychological Association; 2015.
- 69 Wright J, Mazumdar P, Barua D, Lina S, Bibi H, Kanwal A, et al.; NIHR Global Health Research Group, IMPACT. Integrating depression care within NCD provision in Bangladesh and Pakistan: a qualitative study. *Int J Ment Health Syst* 2020;**14**:63. <https://doi.org/10.1186/s13033-020-00399-y>
- 70 Jarde A, Siqueira N, Afaq S, Naz F, Irfan M, Tufail P, et al. Addressing TB multimorbidity in policy and practice: an exploratory survey of TB providers in 27 high-TB burden countries. *PLOS Glob Public Health* 2022;**2**:e0001205. <https://doi.org/10.1371/journal.pgph.0001205>
- 71 Nava-Ruelas R, Jarde A, Elsey H, Siddiqi K, Todowede O, Zavala G, Siddiqi N. Pharmacological and psychological interventions for depression in people with tuberculosis. *Cochrane Database Syst Rev* 2021;**4**:CD014848. <https://doi.org/10.1002/14651858.CD014848>
- 72 Nava-Ruelas R, Todowede O, Siddiqi N, Elsey H. Approaches to deliver depression care and understanding barriers and facilitators to implementation in people with tuberculosis in LMICs: a systematic review. *Global Health Res* 2024. <https://doi.org/10.3310/GRWH1425>
- 73 Afaq S, Ayub A, Faisal MR, Nisar Z, Zala, Rehman A, et al. Depression care integration in tuberculosis services: a feasibility assessment in Pakistan. *Health Expect* 2024;**27**:e13985. <https://doi.org/10.1111/hex.13985>
- 74 ESSENCE. *Seven Principles for Strengthening Research Capacity in Low- and Middle-Income Countries: Simple Ideas in a Complex World*. Geneva: ESSENCE on Health Research; 2014.
- 75 Cook N, Siddiqi N, Twiddy M, Kenyon R. Patient and public involvement in health research in low and middle-income countries: a systematic review. *BMJ Open* 2019;**9**:e026514. <https://doi.org/10.1136/bmjopen-2018-026514>
- 76 Nguyen H, Manolova G, Daskalopoulou C, Vitoratou S, Prince M, Prina AM. Prevalence of multimorbidity in community settings: a systematic review and meta-analysis of observational studies. *J Comorb* 2019;**9**:2235042X19870934. <https://doi.org/10.1177/2235042X19870934>
- 77 Chowdhury SR, Das DC, Sunna TC, Beyene J, Hossain A. Global and regional prevalence of multimorbidity in the adult population in community settings: a systematic review and meta-analysis. *eClinicalMedicine* 2023. <https://doi.org/10.1016/j.eclinm.2023.101860>
- 78 Schünemann HJ, Tunis S, Nieuwlaat R, Wiercioch W, Baldeh T. Controversy and debate series on core outcome sets: the SOLAR (Standardized Outcomes Linking Across StakeholderS) system and hub and spokes model for direct core outcome measures in health care and its relation to GRADE. *J Clin Epidemiol* 2020;**125**:216–21. <https://doi.org/10.1016/j.jclinepi.2020.05.007>
- 79 Williamson PR, Altman DG, Blazeby JM, Clarke M, Devane D, Gargon E, Tugwell P. Developing core outcome sets for clinical trials: issues to consider. *Trials* 2012;**13**:132. <https://doi.org/10.1186/1745-6215-13-132>
- 80 Boehnke JR, Rana RZ, Kirkham JJ, Rose L, Agarwal G, Barbui C, et al. Development of a core outcome set for multimorbidity trials in low/middle-income countries (COSMOS): study protocol. *BMJ Open* 2022;**12**:e051810. <https://doi.org/10.1136/bmjopen-2021-051810>
- 81 Vidyasagaran AL, Ayesha R, Boehnke JR, Kirkham J, Rose L, Hurst JR, et al.; COSMOS collaboration. Core outcome sets for trials of interventions to prevent and to treat multimorbidity in adults in low and middle-income countries: the COSMOS study. *BMJ Glob Health* 2024;**9**:e015120. <https://doi.org/10.1136/bmjgh-2024-015120>
- 82 Williamson PR, Altman DG, Bagley H, Barnes KL, Blazeby JM, Brookes ST, et al. The COMET Handbook: version 1.0. *Trials* 2017;**18**:280. <https://doi.org/10.1186/s13063-017-1978-4>
- 83 Prinsen CAC, Vohra S, Rose MR, Boers M, Tugwell P, Clarke M, et al. How to select outcome measurement instruments for outcomes included in a 'Core Outcome Set' – a practical guideline. *Trials* 2016;**17**:449. <https://doi.org/10.1186/s13063-016-1555-2>
- 84 Moussavi S, Chatterji S, Verdes E, Tandon A, Patel V, Ustun B. Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *Lancet (London, England)* 2007;**370**:851–8. [https://doi.org/10.1016/S0140-6736\(07\)61415-9](https://doi.org/10.1016/S0140-6736(07)61415-9)
- 85 Álvarez-Jiménez M, Hetrick SE, González-Blanch C, Gleeson JF, McGorry PD. Non-pharmacological management of antipsychotic-induced weight gain: systematic review and meta-analysis of randomised controlled trials. *Br J Psychiatry* 2008;**193**:101–7. <https://doi.org/10.1192/bjp.bp.107.042853>
- 86 Thornicroft G. Physical health disparities and mental illness: the scandal of premature mortality. *Br J Psychiatry* 2011;**199**:441–2. <https://doi.org/10.1192/bjp.bp.111.092718>
- 87 Muliyala KP, Thirthalli J. Services to address tobacco use should be integral part of rehabilitation of persons

with severe mental illnesses. *J Psychosoc Rehabil Ment Health* 2022;**9**:127–30. <https://doi.org/10.1007/s40737-022-00284-6>

- 88 Katon WJ, Lin EHB, Korff MV, Ciechanowski P, Ludman EJ, Young B, et al. Collaborative care for patients with depression and chronic illnesses. *N Engl J Med* 2010;**363**:2611–20. <https://doi.org/10.1056/NEJMoa1003955>
- 89 Corrigan PW, Druss BG, Perlick DA. The impact of mental illness stigma on seeking and participating in mental health care. *Psychol Sci Public Interest* 2014;**15**:37–70. <https://doi.org/10.1177/1529100614531398>
- 90 Patel V, Weiss HA, Chowdhary N, Naik S, Pednekar S, Chatterjee S, et al. Effectiveness of an intervention

led by lay health counsellors for depressive and anxiety disorders in primary care in Goa, India (MANAS): a cluster randomised controlled trial. *Lancet* 2010;**376**:2086–95. [https://doi.org/10.1016/S0140-6736\(10\)61508-5](https://doi.org/10.1016/S0140-6736(10)61508-5)

- 91 Vancampfort D, Firth J, Schuch FB, Rosenbaum S, Mugisha J, Hallgren M, et al. Sedentary behavior and physical activity levels in people with schizophrenia, bipolar disorder and major depressive disorder: a global systematic review and meta-analysis. *World Psychiatry* 2017;**16**:308–15. <https://doi.org/10.1002/wps.20458>
- 92 Naslund JA, Aschbrenner KA, Marsch LA, Bartels SJ. The future of mental health care: peer-to-peer support and social media. *Epidemiol Psychiatr Sci* 2016;**25**:113–22. <https://doi.org/10.1017/S2045796015001067>

Appendix 1 Members of NIHR Global Health Research Group IMPACT in South Asia

Arun Kandasamy, Fiona Stanley Hospital, Australia. <https://orcid.org/0000-0003-0569-6409>

Asiful Chowdhury, ARK Foundation, Bangladesh

Rumana Huque, ARK Foundation, Bangladesh

Aliya Naheed, International Centre for Diarrhoeal Disease Research, Bangladesh. <https://orcid.org/0000-0002-6016-5603>

Nantu Chakma, International Centre for Diarrhoeal Disease Research, Bangladesh. <https://orcid.org/0000-0003-4535-9503>

Mir Nabila Ashraf, International Centre for Diarrhoeal Disease Research, Bangladesh. <https://orcid.org/0000-0002-8908-3273>

Zauraiz Lone, German Cancer Research Center, Heidelberg, Germany. <https://orcid.org/0000-0003-0443-073X>

Santosh K Chaturvedi, National Institute of Mental Health and Neurosciences (NIMHANS), India. <https://orcid.org/0000-0002-3675-1389>

Pratima Murthy, National Institute of Mental Health and Neurosciences (NIMHANS), India. <https://orcid.org/0000-0002-7738-9670>

Geetha Desai, National Institute of Mental Health and Neurosciences (NIMHANS), India. <https://orcid.org/0000-0002-6903-1054>

Krishna Prasad Muliya, National Institute of Mental Health and Neurosciences (NIMHANS), India

Ajit Bhalchandra Dahale, National Institute of Mental Health and Neurosciences (NIMHANS), India

Gitanjali Narayanan, National Institute of Mental Health and Neurosciences (NIMHANS), India. <https://orcid.org/0000-0002-3201-2677>

Sukanya Rajan, National Institute of Mental Health and Neurosciences (NIMHANS), India. <https://orcid.org/0000-0003-1420-7670>

Rayeesa Zainab, National Institute of Mental Health and Neurosciences (NIMHANS), India. <https://orcid.org/0000-0002-4583-2025>

Nithyananda S, National Institute of Mental Health and Neurosciences (NIMHANS), India

Anoshmita Adhikari, National Institute of Mental Health and Neurosciences (NIMHANS), India

Chrishma Viola Dsouza, Centre for Chronic Disease Control (CCDC), India

Naseer Ahmad Bhat, Department of Psychology, Ashoka University, Sonapat Haryana-131029, India

Sadananda Reddy Annapally, O.P. Jindal Global University, India

Nida Afsheen, Rawalpindi Medical University (Institute of Psychiatry), Pakistan

Zaheen Amin, Rawalpindi Medical University (Institute of Psychiatry), Pakistan

Faiza Aslam, Rawalpindi Medical University (Institute of Psychiatry), Pakistan. <https://orcid.org/0000-0002-7847-7250>

Rubab Ayesha, Rawalpindi Medical University (Institute of Psychiatry), Pakistan. <https://orcid.org/0000-0002-5770-3407>

Najma Hayat, Rawalpindi Medical University (Institute of Psychiatry), Pakistan

Kousar Ishaq, Rawalpindi Medical University (Institute of Psychiatry), Pakistan

Humaira Khalid, Rawalpindi Medical University (Institute of Psychiatry), Pakistan

Asad Nizami, Rawalpindi Medical University (Institute of Psychiatry), Pakistan

Mariyam Sarfraz, Rawalpindi Medical University (Institute of Psychiatry), Pakistan

Muhammad Umar, Rawalpindi Medical University (Institute of Psychiatry), Pakistan

Baha Ul Haq, Quaid-i-Azam University, Islamabad, Pakistan. <https://orcid.org/0000-0002-9665-3609>

Ayaz Ali, Jhpiego Pakistan. <https://orcid.org/0000-0002-4142-8359>

David Shiers, Greater Manchester Mental Health NHS Trust, UK. <https://orcid.org/0000-0003-2531-5837>

David Ekers, Tees Esk and Wear Valleys NHS Trust, UK. <https://orcid.org/0000-0003-3898-3340>

Jan R Boehnke, University of Dundee, UK. <https://orcid.org/0000-0003-0249-1870>

Sreekanth Thekkumkara, University of Dundee, UK. <https://orcid.org/0000-0002-0004-5554>

Papiya Mazumdar, University of Leeds, UK. <https://orcid.org/0000-0002-3197-4698>

Richard Holt, University of Southampton, UK. <https://orcid.org/0000-0001-8911-6744>

Qirat Naz, University of South Wales, UK

Papreen Nahar, Brighton and Sussex Medical School, UK. <https://orcid.org/0000-0002-5817-8093>

Saima Afaq, University of York, UK. <https://orcid.org/0000-0002-9080-2220>

Rachel Churchill, University of York, UK. <https://orcid.org/0000-0002-1751-0512>

Mehreen Riaz Faisal, University of York, UK. <https://orcid.org/0000-0002-2725-572X>

Simon Gilbody, University of York, UK. <https://orcid.org/0000-0002-8236-6983>

Catherine Jackson, University of York, UK. <https://orcid.org/0000-0003-3181-7091>

Hannah Maria Jennings, University of York, UK. <https://orcid.org/0000-0002-8580-0327>

Rocio Nava-Ruelas, University of York, UK. <https://orcid.org/0000-0001-5890-7519>

Najma Siddiqi, University of York, UK. <https://orcid.org/0000-0003-1794-2152>

Kamran Siddiqi, University of York, UK. <https://orcid.org/0000-0003-1529-7778>

Eleonora Uphoff, University of York, UK. <https://orcid.org/0000-0002-9759-2502>

Aishwarya Lakshmi Vidyasagan, University of York, UK. <https://orcid.org/0000-0002-9858-0685>

Gerardo A Zavala, University of York, UK. <https://orcid.org/0000-0002-9825-8725>

Rusham Zahra, University of York, UK

Appendix 2 Studies for each objective

Publications	
Objective 1: Understanding the epidemiology and burden of mental and physical multimorbidity in LMICs	
Physical health and health risk behaviours in SMI	Prevalence of underweight in people with severe mental illness: systematic review and meta-analysis¹⁸ Prevalence of obesity, overweight and underweight in people with severe mental illness: systematic review¹⁹ Prevalence of overweight and obesity in people with severe mental illness: systematic review and meta-analysis¹⁷ Prevalence of physical health conditions and health risk behaviours in people with severe mental illness in South Asia: protocol for a cross-sectional study (IMPACT SMI survey)²¹ Prevalence of physical health conditions and health risk behaviours in people with severe mental illness in South Asia: multi-country cross-sectional survey²² Tobacco use in people with severe mental illness: findings from a multi-country survey of mental health institutions in South Asia²⁰ Risk factors associated with overweight and obesity in people with severe mental illness in South Asia: cross-sectional study in Bangladesh, India, and Pakistan²³ South Asia's silent struggle: people with severe mental illness suffer high burden of physical illness²⁹
The prevalence of CMDs in NCDs	The Lancet Psychiatry Commission: a blueprint for protecting physical health in people with mental illness¹ A systematic review and meta-analysis of the prevalence of common mental disorders in people with non-communicable diseases in Bangladesh, India, and Pakistan³⁰ Depression and NCDs: Unveiling the Need for Integrated Care in Southern India's Health Clinics³²
The prevalence and cost burden of mental illness	Prevalence of mental disorders in South Asia: a systematic review of reviews¹³ Understanding the costs and economic impact of mental disorders in South Asia: a systematic review³⁵
Objective 2: Developing evidence-based interventions to improve mental and physical multimorbidity	
Effectiveness of interventions to address obesity and health risk behaviours in SMI	Effectiveness of interventions to address obesity and health risk behaviours among people with severe mental illness in low- and middle-income countries (LMICs): a systematic review and meta analysis ⁴¹
Tobacco cessation in SMI	Adaptation Process of a Culturally Tailored Smoking Cessation Intervention for People with Severe Mental Illness in South Asia: IMPACT 4S⁴⁷ IMPACT smoking cessation support for people with severe mental illness in South Asia (IMPACT 4S): a protocol for a randomised controlled feasibility trial of a combined behavioural and pharmacological support intervention⁴⁵ Smoking cessation support for people with severe mental illness in South Asia: a randomised controlled feasibility trial⁴⁵ Services to Address Tobacco Use Should be Integral Part of Rehabilitation of Persons with Severe Mental Illnesses⁸⁷ Feasibility of remote delivery of a smoking cessation intervention for people with severe mental illness: a telephone consultation⁵²
Depression in NCDs	Effectiveness and implementation of psychological interventions for depression in people with non-communicable diseases in South Asia: systematic review and meta-analysis⁶¹ Behavioural activation therapy for depression in adults with non-communicable diseases⁶³ Non-communicable diseases and common mental disorders in Pakistan: a policy analysis and recommendations. Unpublished report, see Appendix 2

Publications	
Depression in TB services	Integrating depression care within NCD provision in Bangladesh and Pakistan: a qualitative study ⁶⁹
	Behavioral Activation for Comorbid Depression in People With Noncommunicable Disease in India: Protocol for a Randomized Controlled Feasibility Trial ⁶⁶
	Depression care integration in tuberculosis services: a feasibility assessment in Pakistan ⁷³
	Approaches to deliver depression care and understanding barriers and facilitators to implementation in people with tuberculosis in LMICs: a systematic review ⁷²
	Pharmacological and psychological interventions for depression in people with tuberculosis ⁷¹
Objective 3: Developing collaborations, tools and capacity to support mental and physical applied health research in LMICs	
	IMPACT strategy to develop mental and physical applied health research capacity in Bangladesh, India and Pakistan
	See Appendix 3 and poster in Report Supplementary Material 2 highlighting activities
	Patient and public involvement in health research in low and middle-income countries: a systematic review ⁷⁵
	Integrating CMD and NCD – WHO policy forum
	Unpublished report: see Report Supplementary Material 3
	Development of a core outcome set for multimorbidity trials in low/middle-income countries (COSMOS): study protocol ⁸⁰
	Core outcome sets for trials of interventions to prevent and to treat multimorbidity in adults in low and middle-income countries: the COSMOS study ⁸¹

Appendix 3 Capacity-strengthening plan

IMPACT programme

Plans for building capacity, plan for capacity assessments and measuring capacity strengthening

Our approach to capacity-building is informed by frameworks from the ESSENCE and CHEPSAA collaborations. It responds to, and is driven by, local needs for adequate capacity. In doing so, we have agreed the approach to capacity assessments and building which has been laid out in a background document.

The primary emphasis is on developing individual and team expertise (i.e. training and development), but some organisational and systems issues will also be addressed

where feasible and appropriate (e.g. staff support and research governance). The table summarises capacity needs identified by partners which drive planned capacity-building activities.

Our capacity-building approach is to utilise, where possible, available 'assets' from each partner or country (e.g. experienced staff for mentoring and training courses) to increase sustainable capacity work. Key capacity needs for implementing IMPACT, which cannot be met by these local assets, will be addressed at a Consortium level through integration of training courses within annual workshops, or organising targeted webinars. We will explore pooling resources with other NIHR GHR Groups working in the same geographical area to offer joint training where the identified training needs overlap.

TABLE 2 The capacity needs assessment and subsequent strategies

Level	Capacity competence and needs	How will it be addressed
Individual	Subject relevant knowledge and understanding: • Key topics (NCDs, mental health) • Context (policy environment, decision-makers' evidence preferences) Research skills in: 1. Study designs, methods a. Policy analysis SMI, CMD, NCDs b. Evidence syntheses, systematic reviews c. Epidemiology and statistics (<i>York, icddr, b</i>)^a d. Process evaluation e. Health economics (IoP) f. Trials and other intervention studies (<i>York and IoP</i>) 2. Communication and writing a. Academic papers b. Policy briefs c. Blogs, press releases, bulletins, website 3. Developing successful proposals to mobilise funding for research 4. Effective research governance a. financial management, reporting b. communication, monitoring and quality control 5. Effective leadership (<i>York</i>)	Tailored support within organisations/countries comprising: a. training (including webinars and on-the-job forms) b. mentoring by senior colleagues c. staff development schemes Consortium-level workshops (e.g. writeshops, developing PhD ideas) Staff exchange (e.g. on evidence syntheses, trials) Development of sustainable platforms and initiatives (e.g. open online access to materials from webinars and lectures)
Organisational	1. Recruitment and development of research fellows a. structured capacity assessments to inform tailored support b. protecting time within organisations for projects 2. Establish and/or improve structures a. research units research governance (NIMHANS) b. Institutional Ethics Review Boards for reviewing mental health research protocols (<i>icddr, b</i>) 3. Keeping up to date with (inter)national funders	• Activities within each partner, subject to resources • Cross-partner learning (e.g. funding call searches) • Engagement and collaboration within partner countries (e.g. with local champions)
System and network	1. Understanding research by decision-makers a. Effective research priority setting within local contexts 2. Improving the culture of evidence-driven policy and practice a. Making evidence informed decisions, including systematic policy change b. Improved pathways of translating research into policy and practice 3. Developing national and international research collaborations	• Research policy partnerships and exchange • Targeted skill development workshops • Using IMPACT as a platform to facilitate further collaborations

^a In brackets are organisations who emphasised and would particularly benefit from this capacity competence.