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Review

Economic evaluation of psychological treatments for common mental disorders in low- and middle-income countries: a systematic review

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Abstract

Common mental disorders (CMDs) constitute a major public health and economic burden on low- and middle-income countries (LMICs). Systematic reviews of economic evaluations of psychological treatments for CMDs are limited. This systematic review examines methods, reports findings and appraises the quality of economic evaluations of psychological treatments for CMDs in LMICs. We searched a range of bibliographic databases (including PubMed, EconLit, APA-PsycINFO and Cochrane library) and the African Journals Online (AJoL) and Google Scholar platforms. We used a pre-populated template to extract data and the Drummond & Jefferson checklist for quality appraisal. We present results as a narrative synthesis. The review included 26 studies, mostly from Asia (12) and Africa (9). The majority were cost-effectiveness analyses (12), some were cost-utility analyses (5), with one cost–benefit analysis or combinations of economic evaluations (8). Most interventions were considered either cost-effective or potentially cost-effective (22), with 3 interventions being not cost-effective. Limitations were noted regarding appropriateness of conclusions drawn on cost-effectiveness, the use of cost-effectiveness thresholds and application of 'societal' incremental cost-effectiveness ratios to reflect value for money (VfM) of treatments. Non-specialist health workers (NSHWs) delivered most of the treatments (16) for low-cost delivery at scale, and costs should reflect the true opportunity cost of NSHWs' time to support the development of a sustainable cadre of health care providers. There is a 4-fold increase in economic evaluations of CMD psychological treatments in the last decade over the previous one. Yet, findings from this review highlight the need for better application of economic evaluation methodology to support resource allocation towards the World Health Organization recommended first-line treatments of CMDs. We suggest impact inventories to capture societal economic gains and propose a VfM assessment framework to guide researchers in evaluating cost-effectiveness.

Keywords: Common mental disorders, psychological treatment, economic evaluation, low- and middle-income countries

Introduction

Common mental disorders (CMDs) defined here such as depressive, anxiety and substance use disorders (SUDs) are highly prevalent in low- and middle-income countries (LMICs). It is projected that by 2030, CMDs led by depressive disorders will be among the top three causes of disability globally (Mathers and Loncar, 2006). These conditions present a major public health challenge in LMICs, where they are largely untreated and co-occur with other high burden conditions such as human immunodeficiency virus (HIV), diabetes, hypertension (Ngo *et al.*, 2013) and newly emerging conditions such as Coronavirus Disease 2019 (COVID-19) (Kola, 2020; Cénat *et al.*, 2021). The economic burden of untreated CMDs is carried by both the health system and broader society (Knapp and Wong, 2020). Robust economic evaluations are required to support decisions about whether to invest in World Health Organization (WHO)-recommended first-line psychological treatments (WHO/UNHCR, 2015) in LMICs, where there are few additional resources to allocate to mental health. However, few studies have reviewed

Key messages

This review synthesizes the literature on economic evaluations of psychological treatments for common mental disorders (CMDs) in low- and middle-income countries (LMICs). Key messages from the review are:

- Most psychological treatments for CMDs in LMICs were either cost-effective or potentially cost-effective.
- However, inconsistencies in study designs in current research make it difficult to draw such conclusions on value for money. This may contribute to health sector investment inertia and compromise the allocation of public health resources to the detriment of these interventions. Rigorous application of economic evaluation methods may provide better information to support health sector decision-making.
- Methods incorporating demand-side cost-effectiveness thresholds for societal incremental cost-effectiveness ratios accompanied by impact inventories need to be explored in order to account for the wider economic gains to society associated with these treatments.
- Staff costs should reflect the true opportunity cost of non-specialist health workers' time to encourage a fair remuneration policy that supports development of a sustainable cadre of health care providers.

economic evaluations of psychological treatments for CMDs in LMICs. One previous review examined the cost-effectiveness of mental health prevention, promotion and treatment interventions for different types of CMDs in LMICs (Levin and Chisholm, 2016). Most other reviews of economic evaluations of psychological treatments for CMDs have included mainly high-income country evidence, typically focusing on a single CMD condition, non-specialist health worker (NSHW) staffing models and mobile/online service delivery (Byford and Bower, 2002; Churchill *et al.*, 2002; Barrett *et al.*, 2005; Bosmans *et al.*, 2008; Cowell *et al.*, 2010; van Steenbergen-weijenburg *et al.*, 2010; Zimovetz *et al.*, 2012; van Ginneken *et al.*, 2013; Brettschneider *et al.*, 2015; Donker *et al.*, 2015; Grochtdreis *et al.*, 2015; Ophuis *et al.*, 2017; Singla *et al.*, 2017; Ahern *et al.*, 2018; Camacho and Shields, 2018; von der Warth *et al.*, 2020; Buntrock *et al.*, 2021; Mitchell *et al.*, 2021). Methodological challenges raised in these reviews include unclear identification of study perspective, lack of differentiation between health care and broader welfare system costs, limited scope of costs and poor reporting on productivity losses—factors contributing to unreliable cost-effectiveness estimates (Bosmans *et al.*, 2008; Krol *et al.*, 2011; Grochtdreis *et al.*, 2015; von der Warth *et al.*, 2020; Mitchell *et al.*, 2021). The different perspectives of an economic evaluation include patient, provider or societal perspectives. The analysis for a provider perspective includes costs incurred by the provider (health or other providers). A patient perspective considers opportunity costs to patients and household and societal impacts not born by the provider. A societal perspective includes both provider and patient costs.

To improve the policy relevance and comparability of results, these prior reviews proposed that studies report both clinical or natural unit outcomes (e.g. CMD-specific measures) and multi-attribute outcome measures such as quality-adjusted life years (QALYs) and disability-adjusted life years (DALYs) (Byford and Bower, 2002; van Steenbergen-weijenburg *et al.*, 2010; Grochtdreis *et al.*, 2015; Ahern *et al.*, 2018; Camacho and Shields, 2018). These prior reviews also noted the importance of relevant interpretation of the incremental cost-effectiveness ratio (ICER) in relation to an appropriate cost-effectiveness threshold (CET) (Grochtdreis *et al.*, 2015). The ICER is the ratio of incremental costs to incremental outcomes, whilst the CET is an estimate of the maximum value that an ICER can take for a new intervention to be potentially cost-effective. Reviewers also recommended evaluating treatments over longer time horizons (i.e. the time frame over which intervention-associated outcomes and costs are assessed) given CMDs are often chronic and recurring, with evidence of ICER estimates changing over time (Knapp and Wong, 2020; von der Warth *et al.*, 2020).

It is not clear whether these methodological concerns are applicable for LMICs. Previous LMIC reviews have broadly examined economic evidence focusing on a wide range of prevention and treatment interventions (Levin and Chisholm, 2016; Knapp and Wong, 2020). A review on the cost-effectiveness and affordability of these interventions noted the paucity of economic evidence from intervention trials in LMICs and highlighted this as an impediment to country-level resource allocation for mental health services generally (Levin and Chisholm, 2016). A recent scenario analysis of global mental health economics also highlighted the dearth of cost-effectiveness evidence for psychosocial treatments using NSHW in LMICs (Knapp and Wong, 2020). Cubillos *et al.* (2021) noted that integrating behavioural health services in LMICs yielded findings of cost-effectiveness or even cost savings when a societal perspective was adopted and improved access to care when increased funding was directed towards first-line psychological treatments.

Here, we add to these previous broad reviews (Levin and Chisholm, 2016; Knapp and Wong, 2020) by focusing on psychological treatments of CMDs and providing a granular examination of the methods applied in economic evaluations in LMICs to inform future research in this field. We use a novel, Value for Money (VfM) Assessment Framework (VfMAF) to aid the narrative synthesis of evaluation findings. The main objective of our review is to summarize methods and outcomes of economic evaluations of psychological treatments for CMDs in LMICs and appraise the quality of published studies. Through this review, we hope to highlight gaps and inform the choice of methods to be used in future economic evaluations of these interventions. To our knowledge, this is the first methodological review of economic evaluations of psychological treatments for CMD in LMICs.

Materials and methods

The protocol for this review was registered with the international prospective register of systematic reviews PROSPERO (PROSPERO, registration number CRD42020185277). Methods used in the review have been previously published (Mutyambizi-Mafunda *et al.*, 2021) and are only briefly presented here. Results are reported in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis

(PRISMA) guidelines (Page *et al.*, 2021); see PRISMA checklist in Additional File 2. This review is informed by the guidelines for reviews of economic evaluations published by the Cochrane Collaboration for Reviews and Centre for Reviews and Dissemination (Akers *et al.*, 2009).

Eligibility criteria

To be eligible for inclusion, a study had to be an economic evaluation of a psychological treatment for a CMD in an LMIC country as per the World Bank June 2019 categories (World Bank, 2019). We included studies that only offered psychological treatment (mental health treatments using cognitive or behavioural approaches) and where psychological treatment was the primary therapy and pharmacotherapy was used as an adjunctive treatment. Treatments focused exclusively on providing pharmacotherapy were excluded. For the purposes of this review, we used an operational definition of CMDs that includes depressive disorders (major depressive disorder and dysthymia), anxiety disorders [generalized anxiety disorder, panic disorder, phobias, social anxiety disorder, obsessive-compulsive disorder and post-traumatic stress disorder (PTSD)] and SUDs [alcohol use disorders (AUDs) and drug use disorders] (Steel *et al.*, 2014; World Health Organization, 2014; Chibanda *et al.*, 2015; Singla *et al.*, 2017; World Health Organization, 2017). Where multiple neuropsychiatric conditions were considered in a study, we only considered the results for CMD conditions as defined. We included full economic evaluations where costs and outcomes are presented for the intervention and a comparator [cost-effectiveness analyses (CEAs), cost-consequence analyses, cost-utility analyses (CUAs), and cost–benefit analyses (CBAs)]. These included all types of economic evaluation studies using primary data collected from patients. Whilst it is common for economic evaluations to include secondary data (e.g. on unit costs or disability weights), modelled studies based entirely on secondary data were excluded given that the breadth of these studies generally prevents an in-depth understanding of key methods.

Information sources and literature search strategy

The development of our search strategy is described in (Mutyambizi-Mafunda *et al.*, 2021) and is included in Additional File 1. We conducted the literature search in March 2020, with updates in July 2020, March 2021 and a final update in December 2021. We included studies that were published up to June 2021. We searched five commonly used biomedical and social science databases: PubMed (including Medline), EbscoHost (APA-PsycINFO, EconLit, Cumulative Index to Nursing and Allied Health Literature), Scopus (including EMBASE), Web of Science and Cochrane Library (Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials), and the Africa-Wide Information, AJoL and Google Scholar platforms. In addition, we searched the National Health Service (NHS) Economic Evaluation Database and Database of Abstracts Reviews and Effects and hand searched the CEA Registry for additional studies.

Study selection

Two authors independently completed title and abstract screening for all references selected. The two authors resolved disagreements through discussion and then proceeded with the independent full-text screening of selected articles. Other authors resolved any disagreements on studies to be included in the final synthesis.

Data extraction and synthesis

A pre-populated and standardized data extraction form in Microsoft Excel® was used for data extraction. The first author completed the data extraction form, and checks for completeness and accuracy were done by the second reviewer. These data extraction forms are summarized and presented as supplementary materials (Tables S1–S6). The VfMAF is presented in Table 2 with an explanation of how researchers can use it. This framework was applied to review studies and used to synthesize findings (see Table 3).

Quality assessment

The quality of the selected studies was assessed using the standard criteria published in Drummond and Jefferson's (1996) 35-item checklist. The quality assessment is presented in supplementary materials (Table S5). Figure 2 details the number of studies for which a score of yes/no/not appropriate/not clear was given for each checklist question.

Results

We identified 4962 references of which 26 met the inclusion criteria for the review (see Figure 1) (PRISMA flow diagram). The most common reason for exclusion was the absence of a full economic evaluation ($n = 3409$). Other reasons for exclusion included not being an LMIC study ($n = 265$) or not evaluating a CMD treatment ($n = 246$).

Study context

Details of the general characteristics and study context of reviewed studies are available in Table S1 (supplementary materials) and are summarized in Table 1.

Country and setting

The majority of studies were published between 2010 and 2021 (21/26), four times the number published between 2003 and 2009. Included studies were mainly from Asia (12; India, Pakistan, Vietnam and China) and Africa (9; Kenya, Nigeria, South Africa, Sierra Leone and Uganda). There were a few studies conducted in South America (3) and the Balkans (2). A number of studies used data from the same trial, namely the Counselling for Alcohol Problems (Nadkarni *et al.*, 2016; 2017) and the Health Activity Programme trials (Patel *et al.*, 2017; Weobong *et al.*, 2017), whilst one study (Siskind *et al.*, 2010) used data from a previous trial (Araya *et al.*, 2006). Most studies were conducted in primary health centres in the publicly funded health service. Evaluations on treatments for PTSD/functional impairment were conducted in humanitarian or post-conflict contexts. Home visits were a feature unique to AUD (Moraes *et al.*, 2010) and perinatal depression interventions (Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Lund *et al.*, 2020).

Intervention

The majority of economic evaluations were based on randomized control trials (RCTs) (23/26) with three using trial cohort

Table 1. Overview of general characteristics of reviewed studies

Study characteristics	Number of studies identified (%)
Year of publication	
2003–9	5 (19)
2010–21	21 (81)
CMD condition	
Depressive disorders	14(54)
AUD	6 (23)
Depressive and anxiety disorders	5 (19)
Multiple CMDs (e.g. depression & AUD)	1(4)
Study & treatment approach	
Trial based	
Psychological treatment only	19 (73)
Psychological & pharmacological treatment	4 (15)
Trial cohort	
Psychological treatment only	2 (8)
Psychological & pharmacological treatment	1 (4)
Comparator selected	
Usual care (UC)/ enhanced UC/conventional care/improvement to UC/standard of care	17 (65)
Another intervention (includes another intervention and UC)	6 (23)
Base case/no treatment	3 (12)
Provider	
Non-specialist health care providers (task-sharing/stepped care/collaborative care)	16 (62)
Paraprofessionals	2 (8)
Nurse and/or allied health workers	3 (12)
Trained multi/inter disciplinary medical professionals only	3 (12)
Not specified	2(8)
Psychological treatment delivery	
Individual	17(65)
Blended (Individual and group)	2 (8)
Group	7 (27)
Country	
Brazil	1 (4)
Chile	2 (8)
China	1 (4)
India	8 (30)
Kenya	1 (4)
Kosovo	1 (4)
Nigeria	3 (11)
Pakistan	2 (8)
Romania	1 (4)
Sierra Leone	1 (4)
South Africa	2 (8)
Uganda	2 (8)
Vietnam	1(4)
Setting	
Primary care clinic (rural and/or urban)	14 (53)
Hospital outpatient	3 (12)
Home and/or health centre	5 (19)
Standalone intervention out of health system	2 (8)
Not specified/not clear	2 (8)

data (3/26) (Siskind *et al.*, 2008; 2010; Galárraga *et al.*, 2017). Most interventions targeted depressive disorders (14/26) and AUDs (6/26), with the others focused on depressive and anxiety disorders (5/26) or other combinations of CMDs (1/26). Most interventions for depressive and anxiety disorders used psychological treatments only (14/19), with only five studies combining psychological and pharmacological treatments (5/19). AUD interventions were all psychological treatments (6/6). NSHWs delivered most (16/26) of the treatments across a mix of organizational staffing models (task-sharing, stepped and collaborative care). Paraprofessional, allied and medically trained health professionals were used in eight studies (Patel *et al.*, 2003; Araya *et al.*, 2006; Sava *et al.*, 2009; Moraes *et al.*, 2010; Galárraga *et al.*, 2017; Chang *et al.*, 2018; Blackburn *et al.*, 2021; Sun *et al.*, 2021). Two studies did not specify provider details (Siskind *et al.*, 2008; 2010).

Treatment type, intensity and duration

The types of treatment varied considerably. Psychological treatments involved a variety of therapies including Behavioural Activation (3/26), Cognitive Behavioural Therapy (2/26), Interpersonal Therapy (2/26), Motivational Interviewing (1/26), Problem Solving Therapy (3/26), psychoeducation (1/26) and various blends of these therapies (12/26), and some were unclear or unspecified (2/26). Individualized treatments were the most evident (17/26), followed by group treatments (7/26). A few blended individual and group treatments (2/26).

Although inconsistently reported, duration and intensity of treatment tended to vary widely according to the condition being treated and setting. Number of sessions ranged from a minimum of 4 (Nadkarni *et al.*, 2016; 2017; 2019) to a maximum of 23 (Sava *et al.*, 2009) for individual treatments, a minimum of 6 (McBain *et al.*, 2016) and maximum of 9 (Araya *et al.*, 2006) for group treatments and a minimum of 14 (Sikander *et al.*, 2019) and a maximum of 24 (Moraes *et al.*, 2010) for combined treatments. Up to 23 individual psychotherapy sessions were reported for interventions addressing major depressive disorder (Sava *et al.*, 2009), 16 for perinatal depression (Gureje *et al.*, 2019a) and 10 for anxiety disorders (Chang *et al.*, 2018). The maximum number of sessions across all types of treatments was 24 for an AUD intervention (Moraes *et al.*, 2010). Percentage completing the treatments ranged from 42% to 100%, with most reporting treatment completion rates above 75% (Supplementary Materials Table S2).

Time spent with the health care provider ranged from 30 to 90 min per session. PTSD treatments delivered to war afflicted populations by professional providers in the Balkans (Chang *et al.*, 2018) reported the longest sessions. Frequency of treatment over the intervention period ranged from weekly (Chang *et al.*, 2018; Hamdani *et al.*, 2020; Lund *et al.*, 2020) to fortnightly (Patel *et al.*, 2003; Nadkarni *et al.*, 2017; Adewuya *et al.*, 2019; Gureje *et al.*, 2019a). Duration of treatment ranged from a minimum of 4 weeks (brief treatments for AUDs) (Nadkarni *et al.*, 2016; 2017; Dwommoh *et al.*, 2018) up to a maximum of 12 months (perinatal depression) (Fuhr *et al.*, 2019). Three studies provided booster sessions, two as part of the treatment programme (Sava *et al.*, 2009; Adewuya *et al.*, 2019) and the other where the booster sessions were modelled in a separate study (Siskind *et al.*, 2008).

Economic evaluation methods

Details of the economic evaluation methods applied in the reviewed papers are presented in Supplementary materials Tables S2–S4. We present these results following the order of the Drummond and Jefferson's (1996) 35-item checklist (Figure 2), summarizing key points not all items on the list.

Perspective

The study perspective was clearly stated in most papers (18/26). The perspective was unclear or inferred through a

Table 2. Value for money assessment framework[a]

Cost-effectiveness plane (Figure 3)	Cost	Effectiveness	Consider for investment? Yes/no/maybe, reason	Natural units/multi-attribute outcomes	Perspective of costs: (health care provider/societal)	ICER: health sector/societal	Threshold applicable (Y/N)	Threshold to apply: demand side (WTP)/supply side (MP health system)	Include in VfM discussions [Yes (Y)/No (N)]
Quadrant I (North East)	More	Better	Maybe, improves health	Natural	Health care provider	Health sector ICER	N		N
					Societal	Societal ICER	N		N
				Multi-attribute	Health care provider	Health sector ICER	Y	Supply side	Y
					Societal	Societal ICER	Y	Demand side	Y
Quadrant II (South East)	Less	Better	Yes, lower costs & better health	Natural	Health care provider	Health sector ICER	N		Y
					Societal	Societal ICER	N		Y
				Multi-attribute	Health care provider	Health sector ICER	N		Y
					Societal	Societal ICER	N		Y
Quadrant III (South West)	Less	Worse	Maybe, lower costs	Natural	Health care provider	Health sector ICER	N		N
					Societal	Societal ICER	N		N
				Multi-attribute	Health care provider	Health sector ICER	Y	Supply side	Y
					Societal	Societal ICER	Y	Demand side	Y
Quadrant IV (North West)	More	Worse	No, more costs & worse health						

OVERVIEW: Interventions can be considered for investment review when they improve health; this may be associated with an investment of resources or cost savings (QI and QII). Interventions that cost less with relatively poorer health outcomes may also be considered for investment review due to associated cost savings; the comparative health effects will influence decision-making (QIII). Interventions that cost more with worse health outcomes should not be considered for investment review (QIV). The question of whether a potential investment provides VfM ideally needs to be addressed in the context of multi-attribute outcomes compared against appropriate thresholds. Where interventions are cost saving to the health sector (QII), VfM is indicated whether ICERs are based on natural or multi-attribute outcomes. There is no VfM discussion possible where an intervention costs more that the next best alternative and yields worse outcomes (QIV). In any other potential investment scenario, policymakers need to be equipped with information on multi-attribute outcomes and appropriate thresholds in order to appraise VfM. Recent discussion around thresholds suggests that VfM appraisal should be made in comparison to thresholds that assess either health sector opportunity costs, i.e. representing supply-side constraints or demand-side thresholds reflecting societal WTP for health gains (Culyer, 2016; Vallejo-Torres *et al.*, 2016; Thokala *et al.*, 2018). A healthy body of work exists around valuing demand-side thresholds using societal or individual preference-based willingness to pay studies or value for statistical life conversions (Shiroiwa *et al.*, 2010; Nimdet *et al.*, 2015; Ryen and Svensson, 2015; Gloria *et al.*, 2021). Demand-side thresholds may be more conceptually appropriate thresholds for appraising cost-effectiveness using societal ICERs. Heuristic thresholds such as the WHO 1–3× multiple of GDP per capita (World Health Organization, 2001) although widely used in economic evaluations in LMIC settings and in many of the studies in this review are now being questioned (Bertram *et al.*, 2016; Leech *et al.*, 2018; Thokala *et al.*, 2018).

(continued)

Table 2. (Continued)

DETAILED EXPLANATION: *Quadrant I:* if the results of the analysis show that the intervention under consideration is more costly and more effective than the comparator, then such an intervention could be considered for investment if the additional outcomes are achieved at a reasonable additional cost (i.e. if the ICER < CET). If outcomes used are natural outcomes, e.g. PHQ-9 scores or depression-free days (DFDs), which are widely used as outcomes for depression remission, then irrespective of the perspective or scope of costs (provider or societal), a threshold is difficult to apply, and the results are then limited in their usefulness in VfM discussions. However, when multi-attribute outcomes such as QALYs or DALYs are applied, then Value for Money can be considered. To assess VfM, ICERs need to be compared to a threshold. Although a threshold linked to a multiple of GDP is typical, such an approach has been widely critiqued as it is linked to an overestimation of the CET. An alternative is to compare the ICER to a supply-side CET reflecting the opportunity cost of marginal changes in health sector spending. This applies where the ICER is estimated from the provider perspective. Where a societal ICER is estimated (scope of costs extends to include patient direct and indirect costs), then comparison to a demand-side threshold reflecting society's willingness to pay (WTP) for a gain in functioning could be considered. *Quadrant II:* reflects a scenario where the intervention is cost saving, i.e. costs less and improves health. Irrespective of the outcomes applied, such a result can be used in VfM discussions as it represents an increase in health and a resource saving. *Quadrants III & IV:* these quadrants represent results where interventions are less effective than the comparator implying a health 'loss'. The result in *QIII* indicates an intervention that costs less but also results in a loss in outcomes relative to a comparator. Such interventions may be included in VfM disinvestment discussions using multi-attribute outcomes in comparison to a CET. The result in QIV implies the health 'loss' would require an investment of resources and cannot be included in a VfM discussions.
SUMMARY: Cost-saving interventions that improve health represent VfM and should be reviewed for investment and possible inclusion in a universal package of care. Interventions that cost more but generate negative outcomes relative to the comparator indicate a loss in health and should not be included in any VfM and investment discussions. Interventions that are less costly and less effective or more costly and more effective than their comparators need to be reviewed in comparison to other interventions using outcomes such as DALYs/QALYs. To make a VfM assessment a comparison, it then needs to be made against an appropriate CET (QI, invest provided that the ICER < CET; QIII, disinvest provided that the ICER < CET). Although progress is being made in some countries (Edoka and Stacey, 2020), the challenge in many LMIC is the absence of local CETs (Bertram *et al.*, 2016; Leech *et al.*, 2018). Woods *et al.* (2016) provide good approximations for now. We apply the VfMAF to review studies in Table 3.

[a]Value for Money Assessment in Mental Health: The positive externalities that accrue to other sectors of society due to investment of public health resources in high burden mental health conditions were widely discussed in the included studies. CMDs are a significant contributor to burden of disease and lost productivity justifying a societal perspective to capture the savings accruing to patients and households from investment in psychological treatments. However, some studies apply a societal perspective in the ICER and then conclude the intervention is cost-effective or cost saving, without comparing to an appropriate CET. A supply-side CET provides an estimation of the opportunity cost of health system spending on the margin [marginal productivity (MP) of health system] where health outcomes are measured using DALYs or QALYs. This threshold can therefore only be compared to an ICER that summarizes costs from the provider perspective and outcomes measured as QALYs or DALYs. If ICER < CET, the intervention is potentially cost-effective. This raises questions around the application of the societal ICER as a tool to assess VfM when the CET is based on the MP of resources used in the health sector. Given these considerations, we propose a VfMAF as a useful decision-making tool to support public health researchers and policymakers to translate cost-effectiveness research into policy.
How to use the VfMAF: The aim of this tool is to help researchers report on VfM. Once the ICER is estimated, it can be placed in the appropriate quadrant. The next step is deciding whether the intervention can be considered for investment. If yes, the next step is to examine whether a CET is applicable. This depends on the type of health outcome and costing perspective taken when calculating the ICER. For ICERs in Quadrant II, a threshold does not need to be applied to determine VfM as the result indicates health gain at reduced cost. Where a threshold can be applied, a decision must then be made about the type of CET (supply side/demand side). VfM can then be discussed once a threshold is determined.

Table 3. VfMAF applied to review CEA studies

Author (Year), treatment delivery model	Broad cost categories	Health outcome measure(s) for economic evaluation/economic evaluation type	Cost-effectiveness estimate (headline)[a]	Consider for investment review (I.R.) (yes, no, maybe)/quadrant	Perspective	Threshold applicable (yes/no)	Threshold to apply: demand side (WTP)/supply side (MP health system)	Include in VfM discussions (yes, no)
1. Adewuya *et al.* (2019) Delivery model: collaborative stepped care lay health workers as providers	• Intervention • Patient	Natural unit:- PHQ-9 depression scores (symptoms of depression)/CEA	mCSC intervention: N35.19 gained per unit improvement on PHQ-9	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Health system	No/ natural unit outcomes, Quadrant I result	N/A—natural unit outcome	VfM (no) - uses natural outcome, Quadrant I result
2. Araya *et al.* (2006) Delivery model: Stepped care using non-medical health workers (social workers and nurses)	• Health system	Natural unit:- DFDs measured using Hamilton depression scale/CEA	Stepped care improvement: additional cost = 10 855 pesos Additional effect = 50.4 DFDICER: 216 pesos per extra DFD	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Health system	No/ natural unit outcomes, Quadrant I result	N/A—natural unit outcome	VfM (no) - uses natural outcome, Quadrant I result
3. Blackburn *et al.* (2021) Delivery model: intervention uses paraprofessionals	• Health service • Patient direct & time	Multi-attribute: - QALYs gained/ CUA	Brief Intervention: USD525 per QALY gained	I.R. (yes) - health gain associated with lower cost/ Quadrant II	Modified societal	No/ QALY outcome, Quadrant II result	N/A—Quadrant II result	VfM (yes) - uses QALYs, Quadrant II result
4. Buttorff *et al.* (2012) Delivery model: task-sharing, collaborative/stepped care treatment model delivered by lay health workers	• Health system • Time costs for subjects & families	Natural unit:- Psychiatric symptom score- Complete or partial days worked Multi-attribute:- QALY (generated from disability scores)/CEA, CUA	Description: 'less costly more effective….'	I.R. (yes) - health gain associated with lower cost/ Quadrant II	Health system & Societal (total costs) (headline)	No/QALY outcome, Quadrant II result	N/A—Quadrant II result	VfM (yes) - uses QALYs, Quadrant II result
5. Chang *et al.* (2018) Delivery model: medically trained providers	• Intervention/programme delivery • Societal: patient and family costs, productivity costs	Natural unit: -PTSD, depression and anxiety outcomes; Multi-attribute: - QALYs/ CEA, CUA	Intervention cost per QALY €10 508	I.R. (maybe)- health gain associated with additional cost/Quadrant I	Societal perspective	Yes/QALY outcome, Quadrant I result	Demand side (WTP): since quadrant I result when ICER is from a QALY outcome and societal costs	VfM (yes) - uses QALY outcome, Quadrant I result However, the intervention did not represent VfM as ICER was above the threshold applied in the report

(continued)

Table 3. (Continued)

Author (Year), treatment delivery model	Broad cost categories	Health outcome measure(s) for economic evaluation/economic evaluation type	Cost-effectiveness estimate (headline)[a]	Consider for investment review (I.R.) (yes, no, maybe)/quadrant	Perspective	Threshold applicable (yes/no)	Threshold to apply: demand side (WTP)/supply side (MP health system)	Include in VfM discussions (yes, no)
6. Dwommoh *et al.* (2018) Delivery model: task-sharing using lay counsellors as providers	• Provider costs • Patient costs	Natural unit: - ASSIST scores/ CEA	MI-problem solving therapy intervention: US$131 per unit reduction in ASSIST score	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Provider& societal (total costs) (headline)	No/natural unit outcomes, Quadrant I result	N/A—natural unit outcome	VfM (no) - uses natural outcome, Quadrant I result
7. Fuhr *et al.* (2019) Delivery model: task-sharing using 'peers' as providers	• Health system • Societal: health system costs plus time & productivity costs	Natural unit:- Symptom severity using PHQ-9 and remission PHQ-9 <5, 6 months after child birth/CEA	Cost per unit improvement in PHQ-9 score at 6 months after child birth $ −93.53 (societal)	I.R (yes) - health gain associated with lower cost/ Quadrant II	Health system& societal (headline)	No/natural unit outcomes, Quadrant II results	N/A—natural unit outcomes	VfM (yes) - uses natural outcome, Quadrant II result
8. Gureje *et al.* (2019a) (EXPONATE) Delivery model: task-sharing using PCMP as NSHW	• Health system	Natural unit:- Depression remission using Edinburgh Postnatal Depression Scale (EPDS) <6/CEA	Extra cost per one-point improvement on EPDS with HIT compared to LIT was Naira −653 (at 6 months)	I.R. (yes) - health gain associated with lower cost/ Quadrant II	Health services (inferred)	No/natural unit outcomes, Quadrant II results	N/A—natural units outcome, Quadrant II result	VfM (yes) - uses natural outcome, Quadrant II result
9. Gureje *et al.* (2019b) (STEPCARE) Delivery model: stepped care using lay health workers	• Health service • Patient: time and travel cost for service uptake	Natural unit: - PHQ-9 depression remission-WHODAS functional status/CEA	Reduction in cost per one-point improvement on the PHQ-9 stepped care compared to control: @ 12 months N40727 (US$272)	I.R. (yes)- health gain associated with lower cost/ Quadrant II	Health service inferred by use of service cost in ICER	No/natural unit outcomes, Quadrant II results	N/A—natural units & also Quadrant II	VfM (yes) - uses natural outcome, Quadrant II result
10. Hamdani *et al.* (2020) Delivery model: Task-sharing using lay health workers	• Health care, related services & Intervention delivery • Patient & family costs	Natural unit:- Primary: Symptoms of anxiety & depression: Hospital Anxiety and Depression Scale (HADS)/CEA	Mean cost per unit score improvement in HADS total PKR 588 (USD 6)	I.R. (maybe)—health gain associated with additional cost/ Quadrant I	Health care provider	No/natural unit outcomes, Quadrant I results	N/A—natural unit outcome	VfM (no) - uses natural outcome, Quadrant I result

(continued)

Table 3. (Continued)

Author (Year), treatment delivery model	Broad cost categories	Health outcome measure(s) for economic evaluation/economic evaluation type	Cost-effectiveness estimate (headline)[a]	Consider for investment review (I.R.) (yes, no, maybe)/quadrant	Perspective	Threshold applicable (yes/no)	Threshold to apply: demand side (WTP)/supply side (MP health system)	Include in VfM discussions (yes, no)
11. Lund *et al.* 2020 Delivery model: task-sharing using non-specialist community health workers	• Health service costs • Patient & caregiver: time (opportunity) costs	Natural unit: - Primary: HAMD score /CEA	US$31.86 annual cost, no difference in HAMD score	I.R. (no)—worse health, more costly/Quadrant IV	Societal	No/Quadrant IV	N/A—Quadrant IV	VfM (no) Do not consider for investment
12. McBain *et al.* (2016) Delivery model: task-shifting using community health workers	• Intervention delivery costs • Participant opportunity costs	Multi-attribute: - QALYs/CUA	$7260 per QALY gained	I.R. (maybe)—health gain associated with additional cost/Quadrant I	Societal	Yes/QALY outcome, Quadrant I result	Demand side (WTP): since quadrant I result when ICER is from a QALY outcome and societal costs	VfM (yes) - uses QALY outcome, Quadrant I result However, the intervention did not represent VfM as ICER was above the threshold applied in the report
13. Moraes *et al.* (2010) Delivery model: medical model using medically trained providers	• Health service costs • Productivity costs	Natural unit: alcohol abstinence/CEA	R$4260 (USD 1852) per abstinent case at end of treatment	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Societal	No/natural unit outcomes, Quadrant I results	N/A—natural unit outcome	VfM (no) - uses natural outcome, Quadrant I result
14. Nadkarni *et al.* (2016) Delivery model: task-sharing using lay counsellors	• Intervention costs (programme delivery) • Patient costs: time costs, productivity losses for patients & their families	Natural unit:—Remission AUDIT < 8 Multi-attribute: - QALY scores/CEA, CUA	Cost per remission: $217 (headline)	I.R. (maybe)—health gain associated with additional cost/ Quadrant I	Health care provider (headline) & societal perspective	No/natural unit outcomes, Quadrant I results	N/A—natural units outcome QI	VfM (no) - uses natural outcome, Quadrant I result (headline result is remission) QALY reported but no significant difference in QALY scores
15. Nadkarni *et al.* (2017) Delivery model: task-sharing using lay counsellors	• Health system costs • Patient & family time costs	Natural unit: AUDIT remission, recovery Multi-attribute: QALY derived from WHO-DAS transformation/CEA, CUA	I$-134 per remission @ 12 months	I.R. (yes) - health gain associated with lower cost/ Quadrant II	Health system (headline) & societal	No/Quadrant II result	N/A—Quadrant II result	VfM (yes) - uses natural outcome, Quadrant II result
16. Nadkarni *et al.* (2019) Delivery model: task-sharing using lay counsellor	• Health services costs & Intervention costs • Societal: includes time costs to service users & families	Natural unit: Remission (AUDIT)/CEA	ICER values not reported but presents mean costs and outcomes. Looking at difference in costs and outcomes over the two arms—interventions costs more and has health gain over control	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Health care provider & Societal (headline)	No/natural unit outcomes, Quadrant I result	N/A—natural unit outcome	VfM (no) - uses natural outcome, Quadrant I result

(continued)

Table 3. (Continued)

Author (Year), treatment delivery model	Broad cost categories	Health outcome measure(s) for economic evaluation/economic evaluation type	Cost-effectiveness estimate (headline)[a]	Consider for investment review (I.R.) (yes, no, maybe)/quadrant	Perspective	Threshold applicable (yes/no)	Threshold to apply: demand side (WTP)/supply side (MP health system)	Include in VfM discussions (yes, no)
17. Nakimuli-Mpungu *et al.* (2020) Delivery model: task-sharing using lay health workers	• Health service & programme	Multi-attribute: DALYs/ CUA	US$13.0 per DALY averted	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Health care provider	Yes/DALY outcome, Quadrant I results	Supply side (MP of health system): since Quadrant I result when ICER is from a DALY outcome and health sector costs	VfM (yes) - uses DALYs averted, Quadrant I result
18. Patel *et al.* (2003) Delivery model: trained medical personnel	• Aggregated health care costs • Aggregated patient & family costs	Natural units:Primary psychiatric morbidity using Revised Clinical Interview Schedule (CISR) score/CEA	Description: intervention has lower cost but worse outcome (health care cost)	I.R. (maybe) - worse health at lower cost/Quadrant III	Health care provider (headline) & societal	No/natural unit outcomes, Quadrant III results	N/A—Quadrant III	VfM (no) Uses a natural outcome, Quadrant III ICER results
19. Patel *et al.* (2017) Delivery model: Task-sharing using lay counsellor	• Health system & intervention delivery costs • Productivity costs: time costs to service users & families	Multi-attribute: QALYs (from transformation of WHODAS scores); Natural: Depression severity: Beck Depression Inventory (BDI-II); remission from depression PHQ-9/CUA, CEA	Cost per QALY gained at 3 months ($) Health system perspective $9333	I.R. (maybe) - health gain associated with additional cost/ Quadrant I	Health care provider (headline) and societal	Yes/QALY outcome, Quadrant I result	Supply side (MP of health system): since Quadrant I result when ICER is from a QALY outcome and health sector costs	VfM (yes) - uses QALYs gained, Quadrant I result
20. Sava *et al.* (2009) Delivery model: trained medical providers	• Health care cost • Client cost: time in sessions & transportation	Natural units:DFDs (calculated from BDI scores), Multi-attribute: QALYs/CEA, CUA	Median $/QALY gained: REBT: $2120/QALYG, CT: $2342/QALYG	I.R. (maybe) - health gain associated with additional cost/ Quadrant I	Societal (inferred)	Yes/Quadrant I result	Demand side (WTP): since quadrant I result when ICER is from a QALY outcome and societal costs	VfM (yes) - uses QALYs gained, Quadrant I result
21. Sikander *et al.* (2019) Delivery model: task-sharing using 'volunteer peers'	• Health system costs & Intervention programme delivery • Societal costs: health system costs plus time and productivity costs of participants & family members	Natural units:Symptom severity using PHQ-9 and remission PHQ-9 <5, 6 months after child birth/CEA	Cost per unit improvement in PHQ-9 score: 3–6 months after child birth $9.11(societal)	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Health care provider and societal (headline)	No/natural unit outcomes, Quadrant I results	N/A—natural unit outcome & quadrant I ICER	VfM (no) - uses natural outcome, Quadrant I result
22. Siskind *et al.* (2008) Delivery model: not reported	• Health service costs • Treatment costs	Multi-attribute: QALYs gained/ CUA	ICER for Group Interpersonal Therapy with boosters—I$1150 per QALY	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Provider perspective (inferred)	Yes/QALY outcome, Quadrant I	Supply side (MP of health system): since Quadrant I result when ICER is from a QALY outcome and health sector costs	VfM (yes) - uses QALY outcome, Quadrant I result

(continued)

Table 3. (Continued)

Author (Year), treatment delivery model	Broad cost categories	Health outcome measure(s) for economic evaluation/economic evaluation type	Cost-effectiveness estimate (headline)[a]	Consider for investment review (I.R.) (yes, no, maybe)/quadrant	Perspective	Threshold applicable (yes/no)	Threshold to apply: demand side (WTP)/supply side (MP health system)	Include in VfM discussions (yes, no)
23. Siskind *et al.* (2010) Delivery model: stepped Care using non-medical health workers (social workers) and nurses	• Intervention costs	Multi-attribute: QALYs gained/ CUA	ICER for Stepped Care I$468 per QALY	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Health system (inferred)	Yes/QALY outcome, Quadrant I	Supply side (MP of health system): since Quadrant I result when ICER is from a QALY outcome and health sector costs	VfM (yes) - uses QALY outcome, Quadrant I result
24. Sun *et al.* (2021) Delivery model: trained allied health workers (nurse and social workers)	• Health system costs: health service utilization & programme intervention costs • Patient costs: patient & family transport & productivity costs	Natural units:MDD case averted Multi-attribute: QALYs/CEA, CUA	QALY ICERs:—Societal perspective (Total costs): USD5979 per QALY	I.R. (maybe) - health gain associated with additional cost/Quadrant I	Societal (total costs) (headline) & health care perspective	Yes/QALY outcome, Quadrant I	Demand side (WTP): since quadrant I result when ICER is from a QALY outcome and societal costs	VfM (yes) - uses QALY outcome, Quadrant I result
25. Weobong *et al.* (2017) Delivery model: task-sharing using lay counsellors	• Health system & intervention costs • Productivity costs—time costs for patients & accompanying family members	Multi-attribute: QALYs (from transformation of WHODAS scores) Natural unit: Depression remission: from depression PHQ-9/CUA, CEA	Health system perspective: $-1721 per QALY gained at 12 months. Quadrant II	I.R. (yes) - health gain associated with lower cost/ Quadrant II	Health care system perspective (headline) & societal	No/Quadrant II result	N/A—Quadrant II result	VfM (yes) - uses QALYs, Quadrant II result

[a]In applying this framework, we used headline results where multiple cost-effectiveness estimates and perspectives were presented.

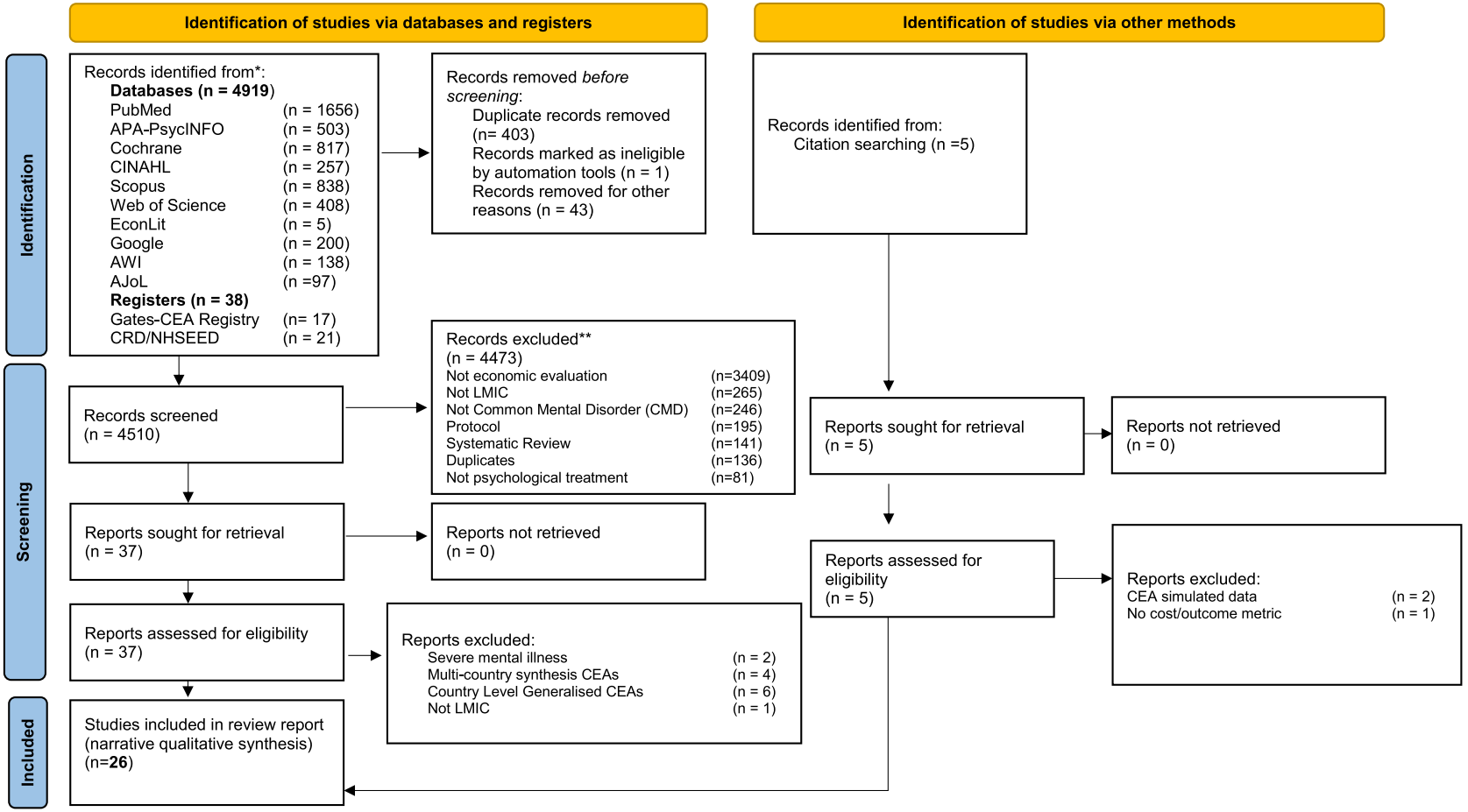

Figure 1. PRISMA 2020 flow diagram for new systematic reviews, which included searches of databases, registers and other sources

*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers). **If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools. From: Page *et al.*, 2021. For more information, visit: http://www.prisma-statement.org/.

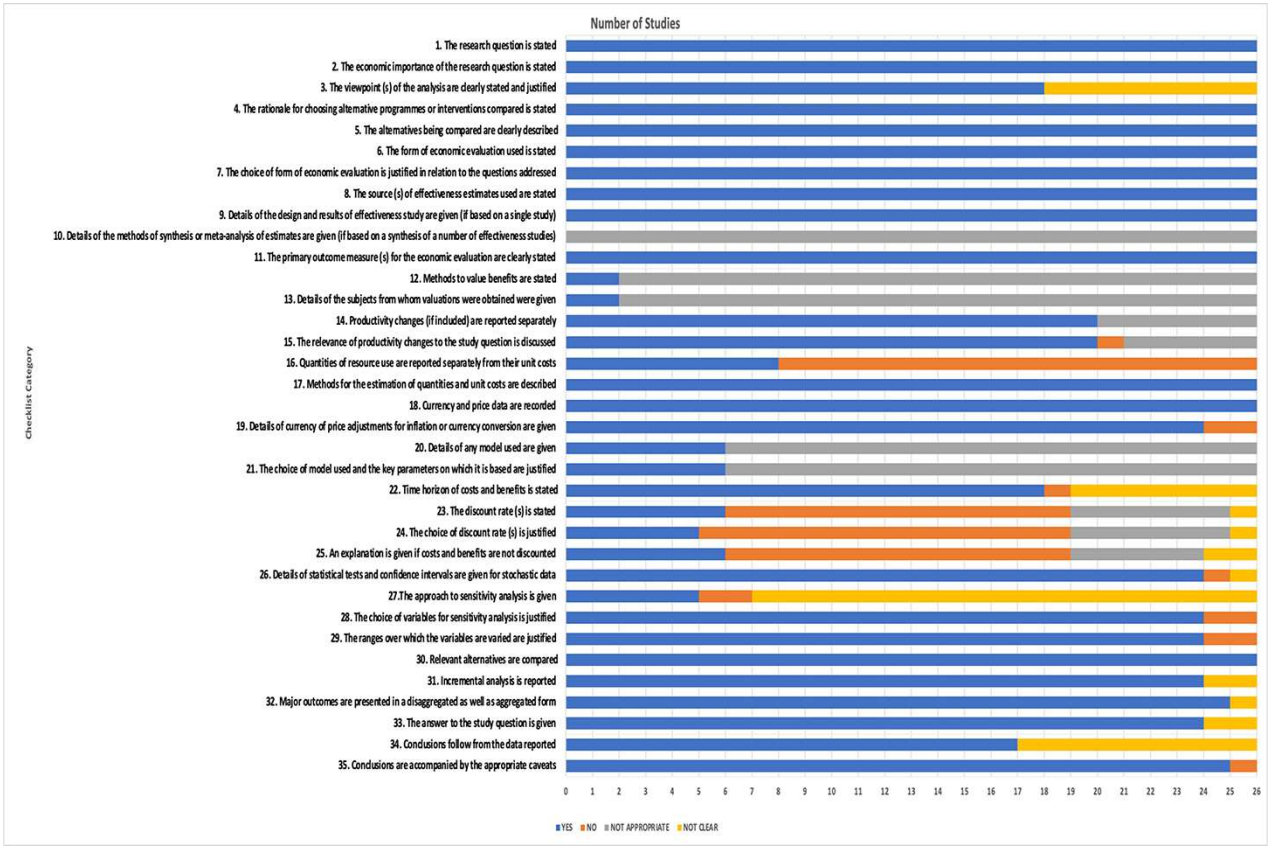

Figure 2. Quality assessment of included studies

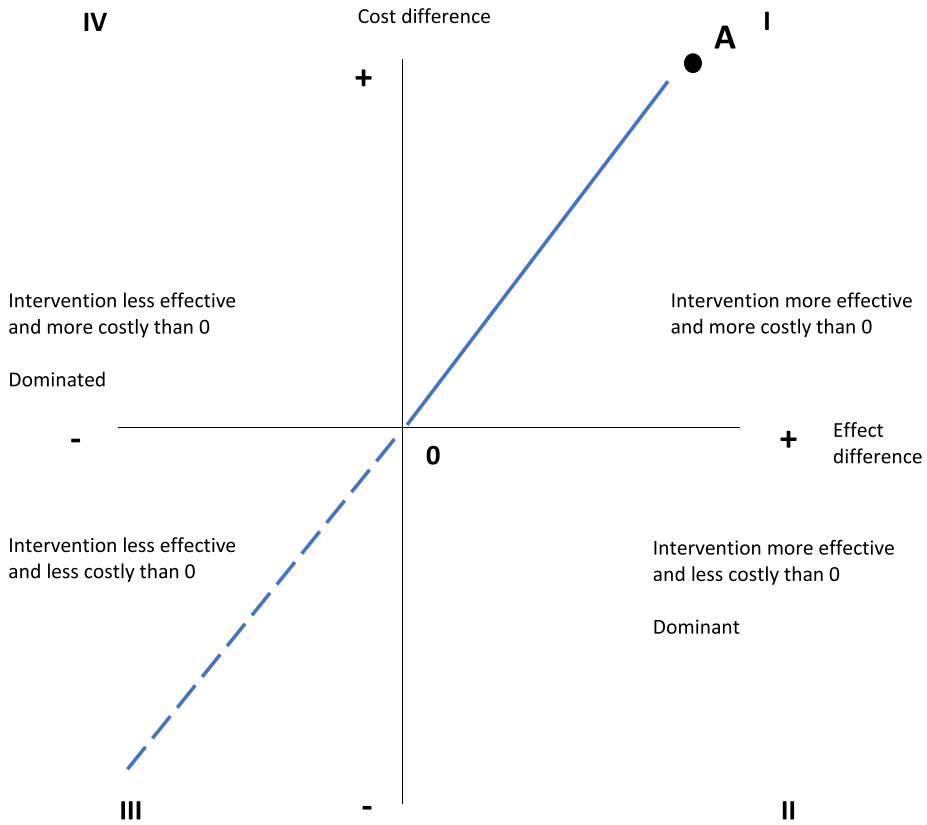

Figure 3. Cost-effectiveness plane (Black, 1990). Adapted from Drummond *et al.* 2015, page 55.

description of the type of cost data collected in the remaining papers (8/26) (Patel *et al.*, 2003; Siskind *et al.*, 2008; 2010; Sava *et al.*, 2009; Buttorff *et al.*, 2012; Adewuya *et al.*, 2019; Gureje *et al.*, 2019a; 2019b). Three of the eight studies that did not explicitly state the perspective were effectiveness studies with economic evaluation as an 'add-on' in the paper (3/26) (Adewuya *et al.*, 2019; Gureje *et al.*, 2019a; 2019b). A provider perspective was exclusively applied in 3 of the 18 studies that stated the perspective (Araya *et al.*, 2006; Hamdani *et al.*, 2020; Nakimuli-Mpungu *et al.*, 2020). Nine of the 18 studies that stated the perspective reported both provider and societal perspectives (Nadkarni *et al.*, 2016; 2017; 2019; Patel *et al.*, 2017; Weobong *et al.*, 2017; Dwommoh *et al.*, 2018; Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Sun *et al.*, 2021). Six studies adopted a societal perspective exclusively (6/18) (Moraes *et al.*, 2010; McBain *et al.*, 2016; Galárraga *et al.*, 2017; Chang *et al.*, 2018; Lund *et al.*, 2020; Blackburn *et al.*, 2021) including the two studies reporting CBA results. There were no studies that only reported a patient perspective (Table S2).

Type of economic evaluation

Half of the studies reviewed were CEAs (12/26) (Patel *et al.*, 2003; Araya *et al.*, 2006; Moraes *et al.*, 2010; Dwommoh *et al.*, 2018; Adewuya *et al.*, 2019; Fuhr *et al.*, 2019; Nadkarni *et al.*, 2019; Sikander *et al.*, 2019; Gureje *et al.*, 2019a; 2019b; Hamdani *et al.*, 2020; Lund *et al.*, 2020), five were CUAs (Siskind *et al.*, 2008; 2010; McBain *et al.*, 2016; Nakimuli-Mpungu *et al.*, 2020; Blackburn *et al.*, 2021) and some were a combination of CEA and CUA (7/26) (Sava *et al.*, 2009; Buttorff *et al.*, 2012; Nadkarni *et al.*, 2016; 2017; Weobong *et al.*, 2017; Blackburn *et al.*, 2021; Sun *et al.*, 2021). Only one study presented a standalone CBA (Galárraga *et al.*, 2017), whilst one study presented CEA, CUA results and a partial CBA (Chang *et al.*, 2018) (Table S2).

Measures of effectiveness

Studies reported a wide range of outcome measures, the most common being the Patient Health Questionnaire-9 (PHQ-9) as a measure of symptom severity and remission (10/26) (Nadkarni *et al.*, 2016; 2017; 2019; Patel *et al.*, 2017; Weobong *et al.*, 2017; Adewuya *et al.*, 2019; Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Gureje *et al.*, 2019b; Hamdani *et al.*, 2020). This outcome was applied in the economic analysis in all but one of the studies where it was measured (Nadkarni *et al.*, 2019). Economic evaluations using the cost-utility methodology mostly used QALYs as their effectiveness measure (11/26) (Siskind *et al.*, 2008; 2010; Sava *et al.*, 2009; Buttorff *et al.*, 2012; McBain *et al.*, 2016; Nadkarni *et al.*, 2016; Patel *et al.*, 2017; Weobong *et al.*, 2017; Chang *et al.*, 2018; Blackburn *et al.*, 2021; Sun *et al.*, 2021). The QALY measure was estimated through transformation of the WHO Disability Assessment Schedule (WHODAS) score in a number of studies (Buttorff *et al.*, 2012; McBain *et al.*, 2016; Nadkarni *et al.*, 2016; 2017; Patel *et al.*, 2017; Weobong *et al.*, 2017) and from the Beck Depression Inventory score in one study (Sava *et al.*, 2009). DALYs averted were used in one CUA (Nakimuli-Mpungu *et al.*, 2020). Other measures used as economic evaluation outcomes are captured in Table S2.

The standalone CBA reported HIV incidence, labour force productivity (LFP) and household productivity (HP) as outcomes for the evaluation (Galárraga *et al.*, 2017). Both these clinical and productivity outcomes were linked to changes in alcohol abstinence and HIV disease transmission due to the intervention. Averted provider costs were used to attach an economic value to the clinical outcome, whilst monthly minimum wage listings and mean hourly wages were used to value LFP and HP, respectively. The partial CBA also used labour productivity as the outcome and used average self-reported monthly wages for valuation (Supplementary Materials Table S2).

Productivity costs

Productivity costs capturing the opportunity costs of an 'individual's time not spent in productive work activity' (Culyer, 2014) were reported across a wide spectrum ranging from the opportunity costs of a patient's time, sometimes including caregiver and guardians' time costs, to the full suite of costs including income and job losses. Of the studies that reported including productivity costs (20/26) (Patel *et al.*, 2003; 2017; Sava *et al.*, 2009; Moraes *et al.*, 2010; Buttorff *et al.*, 2012; McBain *et al.*, 2016; Nadkarni *et al.*, 2016; 2017; 2019; Galárraga *et al.*, 2017; Weobong *et al.*, 2017; Chang *et al.*, 2018; Dwommoh *et al.*, 2018; Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Gureje *et al.*, 2019b; Hamdani *et al.*, 2020; Lund *et al.*, 2020; Blackburn *et al.*, 2021; Sun *et al.*, 2021), four reported adopting the Human Capital Approach (Weisbrod, 1961; Johannesson, 1996) to value a patient's time (Weobong *et al.*, 2017; Chang *et al.*, 2018; Fuhr *et al.*, 2019; Sikander *et al.*, 2019). Different daily wage rates based on participants' skill categories were detailed in 5 of the 20 studies (Nadkarni *et al.*, 2016; Weobong *et al.*, 2017; Chang *et al.*, 2018; Fuhr *et al.*, 2019; Sikander *et al.*, 2019), whilst 2 studies allocated the unskilled minimum wage rate to the unemployed in their patient sample (Buttorff *et al.*, 2012; Galárraga *et al.*, 2017) (Table S3).

Costing/methods for collecting and estimating resource use

Most studies described how costs were collected although the extent to which this was done varied with most only listing broad cost categories or referring to trial or protocol papers for more detail.

The Client Socio-Demographic and Services Receipt Inventory (Chisholm *et al.*, 2000) adapted for different settings/health conditions was widely used to capture service use data and unit costs (14/26) (Patel *et al.*, 2003; 2017; Buttorff *et al.*, 2012; Nadkarni *et al.*, 2016; 2017; 2019; Weobong *et al.*, 2017; Adewuya *et al.*, 2019; Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Gureje *et al.*, 2019a; 2019b; Hamdani *et al.*, 2020; Lund *et al.*, 2020). Few studies disaggregated the quantities of resources used and unit costs (5/26) (Siskind *et al.*, 2008; Sava *et al.*, 2009; Galárraga *et al.*, 2017; Dwommoh *et al.*, 2018; Hamdani *et al.*, 2020). Unit costs were reported for staff costs in two studies (Fuhr *et al.*, 2019; Sikander *et al.*, 2019) and health care visits in another (Lund *et al.*, 2020). The majority of studies reported mean and total costs by broad cost category in the manuscript or technical appendices (Table S3). Most studies reported on supervision costs (21/26). Only a few reported expenditures on training of facility staff not directly linked to intervention delivery (2/26) (Adewuya *et al.*, 2019; Nakimuli-Mpungu *et al.*, 2020) and capacity development and monitoring and evaluation (1/26) (Chang *et al.*, 2018). Some papers presented summary line items of mean costs per person for intervention costs as a whole and other

health services used based on unit costs without detailing what was included in the unit cost estimation. The intervention cost line item and costs of health services used would then be combined and named 'health systems costs' (8/26) (Buttorff *et al.*, 2012; Nadkarni *et al.*, 2016; 2017; 2019; Patel *et al.*, 2017; Weobong *et al.*, 2017; Fuhr *et al.*, 2019; Sikander *et al.*, 2019) (Table S3). Some studies reported cost savings due to reductions in health care utilization (Nadkarni *et al.*, 2017; Weobong *et al.*, 2017; Fuhr *et al.*, 2019).

The excluded costs reported included: training doctors—considered part of continuing medical education for all doctors (Araya *et al.*, 2006), establishment costs (Chang *et al.*, 2018), research costs (Dwommoh *et al.*, 2018), rental of community facilities or hospital room for programme delivery because these were provided for free (Galárraga *et al.*, 2017) and medication as an out of pocket expense paid by patients (Sava *et al.*, 2009) or supplied by the hospital (Galárraga *et al.*, 2017). Screening was discussed in some studies as an activity conducted by researchers without further clarity on how the costs were addressed in the evaluation (Gureje *et al.*, 2019a; 2019b), whilst other studies defined screening expenses as a research cost and explicitly excluded them (Araya *et al.*, 2006). Some studies reported that lay workers were remunerated through small incentives of a financial nature or as gifts in kind (Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Nakimuli-Mpungu *et al.*, 2020); it was not clear whether compensation of these volunteer lay workers included in the cost analyses presented in technical appendices was based on the value of the incentives given. Cost drivers were generally not well discussed (Table S3).

Price year, currency unit and choice of discount rate

The price year and currency unit used were generally well reported. Reporting on discount rate applied was inconsistent, with many studies not clearly reporting a discount rate (13/26) (Patel *et al.*, 2003; 2017; Sava *et al.*, 2009; Moraes *et al.*, 2010; Nadkarni *et al.*, 2016; 2017; 2019; Weobong *et al.*, 2017; Adewuya *et al.*, 2019; Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Gureje *et al.*, 2019a; 2019b). This is likely due to time horizons of less than or equal to 1 year. When a discount rate was reported, the same rate (3%) was generally reported for both costs and outcomes (Table S2).

Time horizon and modelling approach

Although follow-up periods for trial-based interventions were reported quite consistently, time horizons were not. Researchers may have assumed that reporting trial follow-up would sufficiently indicate the time horizon of the economic evaluation. The shortest time horizon for trial-based CEA studies was 3 months (Nadkarni *et al.*, 2016; Patel *et al.*, 2017; Hamdani *et al.*, 2020) and longest was 18 months (Chang *et al.*, 2018). The standalone CBA study reported a 6-year time horizon as the base case (Galárraga *et al.*, 2017). Trial cohort studies reported time horizons clearly; the longest horizon used was lifetime (Siskind *et al.*, 2008; 2010) and the shortest was 6 years (Galárraga *et al.*, 2017). Modelling approaches were well reported in the trial cohort studies (3/3), but only three trial-based studies (3/23) (McBain *et al.*, 2016; Dwommoh *et al.*, 2018; Blackburn *et al.*, 2021) reported applying an analytical modelling approach (Table S2).

Sensitivity analysis

Almost all the studies assessed the impact of uncertainty in study parameters such as costs, outcomes and discount rate using sensitivity analysis. Detailed descriptions of the type of methods used (deterministic vs probabilistic) were minimal. A number of studies reported testing the robustness of cost-effectiveness results through bootstrapping ICER estimates to derive confidence intervals and generate cost-effectiveness acceptability curves (14/26) (Patel *et al.*, 2003; 2017; Araya *et al.*, 2006; Buttorff *et al.*, 2012; Nadkarni *et al.*, 2016; 2017; 2019; Weobong *et al.*, 2017; Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Gureje *et al.*, 2019a; 2019b; Hamdani *et al.*, 2020; Lund *et al.*, 2020; Sun *et al.*, 2021) (Supplementary Materials Table S4).

Narrative synthesis of economic evaluation evidence

The narrative synthesis highlights key points arising from the summary of studies reporting CEA and CUA results (25/26) (Table S6). Of the two included studies that report on CBA results, one reported CEA/CUA and a partial CBA, whilst the other reported a full CBA only. The CBA results are given separate attention in this narrative synthesis due to the differences between CBA versus CEA/CUA (Galárraga *et al.*, 2017; Chang *et al.*, 2018). The VfMAF (Table 3) and Table S6 (Supplementary Materials) summarize key parameters contributing to cost-effectiveness conclusions reported in the CEA/CUA studies. The VfMAF (Table 3) summarizes cost categories, health outcome measures and perspectives reported in the economic evaluation; then determines whether the intervention can be considered for investment and whether thresholds are applicable; suggests possible thresholds to use and finally provides an assessment on whether VfM can be concluded.

Studies reported a number of cost-effectiveness outcomes including: cost-effective (and cost saving) (9/25) (Sava *et al.*, 2009; Moraes *et al.*, 2010; Siskind *et al.*, 2010; Buttorff *et al.*, 2012; Adewuya *et al.*, 2019; Sikander *et al.*, 2019; Gureje *et al.*, 2019a; Nakimuli-Mpungu *et al.*, 2020; Sun *et al.*, 2021), more effective and more costly (1/25) (Hamdani *et al.*, 2020), potentially cost-effective (7/25) (Araya *et al.*, 2006; Siskind *et al.*, 2008; Nadkarni *et al.*, 2016; 2019; Dwommoh *et al.*, 2018; Gureje *et al.*, 2019b; Blackburn *et al.*, 2021), cost-effective and (potentially) cost saving when a societal perspective is used (4/25) (Nadkarni *et al.*, 2017; Patel *et al.*, 2017; Weobong *et al.*, 2017; Fuhr *et al.*, 2019), higher cost worse outcome (1/25) (Patel *et al.*, 2003) and not cost-effective (3/25) (McBain *et al.*, 2016; Chang *et al.*, 2018; Lund *et al.*, 2020). One study reported that the intervention was not cost-effective overall but noted that distributional analysis indicated cost-effectiveness for those who were more unwell (upper quartile of mental health symptom severity) at baseline (McBain *et al.*, 2016) (Supplementary Materials Table S6).

Where economic evaluation results were compared to a CET, this was either presented as a multiple of gross domestic product (GDP) [or gross national product (GNP)] per capita for the country (7/25) (Siskind *et al.*, 2008; 2010; Moraes *et al.*, 2010; McBain *et al.*, 2016; Chang *et al.*, 2018; Nakimuli-Mpungu *et al.*, 2020; Sun *et al.*, 2021) or a willingness to pay threshold linked to a monthly minimum wage in the local currency or US dollars (USD) (Nadkarni *et al.*, 2016; 2019; Gureje *et al.*, 2019b; Hamdani *et al.*, 2020)

(4/25). Four studies discussed both types of thresholds (Buttorff *et al.*, 2012; Nadkarni *et al.*, 2017; Patel *et al.*, 2017; Weobong *et al.*, 2017). A commonly used CET in economic evaluation is 1–3 three times GDP per capita as cited in the WHO Commission on Macroeconomics and Health (World Health Organization, 2001) and was the threshold used for appraising VfM in several studies (Siskind *et al.*, 2008; 2010; Moraes *et al.*, 2010; Buttorff *et al.*, 2012; McBain *et al.*, 2016; Nadkarni *et al.*, 2017; Patel *et al.*, 2017; Weobong *et al.*, 2017; Chang *et al.*, 2018; Nakimuli-Mpungu *et al.*, 2020; Sun *et al.*, 2021). However, the validity of this practise is now being questioned (Bertram *et al.*, 2016; Leech *et al.*, 2018; Thokala *et al.*, 2018). Recent literature suggests the use of either 'supply-side' thresholds, reflecting the opportunity cost of health care spending on the margin, or 'demand-side' thresholds, reflecting societal willingness to pay for a gain in functioning (Culyer, 2016; Vallejo-Torres *et al.*, 2016; Thokala *et al.*, 2018). Cross-country estimates of CETs for QALYs (Woods *et al.*, 2016) and DALYs (Ochalek *et al.*, 2018) based on health sector opportunity costs are a recent advancement. Although one study in this review indicated using current literature to determine the CET (Blackburn *et al.*, 2021), it is not clear whether the ICERs were compared to the aforementioned thresholds.

Study results were compared to a range of benchmarks or implicit thresholds across different perspectives. A number of studies reported conclusions on VfM when outcomes in natural units were applied in calculating the ICER (Adewuya *et al.*, 2019; Nadkarni *et al.*, 2019; Sikander *et al.*, 2019). Economic evaluation guidance suggests that recommendations of VfM require outcomes to be measured as QALYs or DALYs in CUA or monetized in CBA (Husereau *et al.*, 2013). If cost savings are reported, then conclusions can be made about VfM irrespective of the outcome used (Nadkarni *et al.*, 2017; Fuhr *et al.*, 2019; Gureje *et al.*, 2019a; 2019b). Of the studies reporting a societal ICER, all but three aligned this to a multi-attribute outcome measure in assessing VfM (Moraes *et al.*, 2010; Fuhr *et al.*, 2019; Sikander *et al.*, 2019). Interestingly, a number of studies based an implicit demand-side threshold on estimates of minimum wages (Buttorff *et al.*, 2012; Nadkarni *et al.*, 2016; 2019; Patel *et al.*, 2017; Weobong *et al.*, 2017). In one example, the same threshold (minimum wage for the region) was applied for both the health system and societal perspectives showing a greater likelihood of cost-effectiveness under the societal perspective when productivity losses were included (Nadkarni *et al.*, 2017) (Table 3 and Supplementary Materials Table S6).

In some instances where studies were conducted from a health system and societal perspective, the clinical outcomes were compared to the monthly minimum wage of an unskilled labourer and the QALY outcome compared to a GDP per capita threshold in discussing cost-effectiveness (Buttorff *et al.*, 2012; Nadkarni *et al.*, 2017). In other instances where the perspective was inferred, ICERs using clinical outcomes (PHQ-9, and WHODAS) were compared to local and USD currency amounts without a source for the threshold (Gureje *et al.*, 2019b). The ICER was compared to a minimum monthly wage in one study using a provider perspective (Hamdani *et al.*, 2020), and in another, the monthly wage of an unskilled manual worker was the threshold for both provider and societal perspectives (Buttorff *et al.*, 2012; Nadkarni *et al.*, 2019).

In addition to the above inconsistencies on the use of the CET, other limitations were noted on the calculation of the ICERs. For example, in one instance, the conclusion 'demonstrated cost-effectiveness with cost savings' appears to have been arrived at through a comparison of the average costs within each comparator rather than through an incremental approach to estimating an ICER across comparators (Adewuya *et al.*, 2019). When the standard ICER approach is applied in this case, the result suggests that the intervention requires an investment of resources to yield a healthy outcome. Cost savings described as reductions in health service costs over time were reported in another study where the intervention cost more than the comparator at each time point (Gureje *et al.*, 2019b). Another study had societal ICER sensitive to outcomes (indicating potential health loss) but suggested the intervention was 'cost-effective' with potential cost savings due to reduced health care and productivity losses in the societal perspective (Fuhr *et al.*, 2019).

A large number of the CEA studies were evaluations of interventions testing the use of NSHW as providers (16/25) (Buttorff *et al.*, 2012; McBain *et al.*, 2016; Nadkarni *et al.*, 2016; 2017; 2019; Patel *et al.*, 2017; Weobong *et al.*, 2017; Dwommoh *et al.*, 2018; Adewuya *et al.*, 2019; Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Gureje *et al.*, 2019a; 2019b; Hamdani *et al.*, 2020; Lund *et al.*, 2020; Nakimuli-Mpungu *et al.*, 2020). NSHWs were remunerated or 'volunteers/peers' receiving stipends (3/25) (Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Nakimuli-Mpungu *et al.*, 2020). The low market wages of these volunteers especially in low employment rural contexts were a product of the country settings, where employment prospects were minimal and 'gifts' for work were acceptable, and the altruistic aspect of the work was also reported as sufficient compensation. For example, a country-level health sector compensation policy of USD3 per month for community health workers was noted in one study, in contrast to the value of voluntary time that was estimated at approximately USD199 per month (Nakimuli-Mpungu *et al.*, 2020). This absence of financial renumeration contributed to affordability, i.e. interventions were evaluated as 'cheap' or 'low cost' (Fuhr *et al.*, 2019; Sikander *et al.*, 2019). For interventions where lay staff were 'volunteers or peers', the low cost of delivery also contributed to cost-effectiveness conclusions. The context specificity of the cost-effectiveness estimates in these low employment rural or urban contexts was noted.

Neither of the studies that reported CBA results (Galárraga *et al.*, 2017; Chang *et al.*, 2018) used empirical methods such as contingent valuation or discrete choice experiments to measure willingness to pay when valuing health outcomes (Drummond *et al.*, 2015). Instead, these studies monetized outcomes using the Human Capital Approach (Johannesson, 1996). The standalone CBA used a benefit-to-cost ratio > unity as the decision rule for determining whether the intervention had a positive return on investment (Galárraga *et al.*, 2017). For the partial CBA (Chang *et al.*, 2018), the measure of intervention efficiency was the time taken to get an economic return on the social investment, namely the time taken for costs of the intervention to equal benefits expressed as accumulated monthly increases in income. The CUA results for this study showed that the intervention was not cost-effective (using the WHO 3×GDP decision rule); however, a

net economic benefit after a period of 4–5 years was reported for the partial CBA analysis.

Discussion

We found a marked increase in economic evaluations of psychological treatments in LMIC over the past two decades. CEA is still the predominant evaluation method used. Although included studies reported an array of cost-effectiveness conclusions, most psychological treatments of CMDs were cost-effective or potentially cost-effective. Only three were not cost-effective. The reported results, the quality assessment checklist and the VfMAF, in general, point to the utility of adopting these interventions.

A number of studies noted the modest effects of these treatments especially on changes in multi-attribute outcomes (e.g. QALYs). Consequently, in comparison to other treatments for high burden conditions in LMIC settings (e.g. treatment for HIV) (Culyer, 2016), these treatments may still indicate relatively modest cost-effectiveness profiles due to their effectiveness. Alternative outcome measures (De Neve *et al.*, 2020; Helliwell *et al.*, 2021) or use of multiple supply-side thresholds in LMIC health sector priority setting (Culyer, 2016) may help to address this challenge. Further analysis of the included studies suggests factors that may moderate the effectiveness, cost and thus the cost-effectiveness of psychological interventions for CMDs, which may be useful for informing policy. We noted that studies that included booster sessions all reported cost-effective conclusions (Siskind *et al.*, 2008; Sava *et al.*, 2009; Adewuya *et al.*, 2019; Blackburn *et al.*, 2021). The use of volunteers as NSHW providers resulted in ultra-low-cost programmes, which contributed to cost-effective conclusions (Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Nakimuli-Mpungu *et al.*, 2020). Most of the studies where delivery was task shifted to lay counsellors reported being cost-effective. Despite the eclectic evidence base, some consistent themes emerged from studies of interventions for post-partum depression. The results suggest that the moderate outcomes linked with task-shifted interventions delivered by lay counsellors for post-partum depression may be related to the number of sessions provided in the intervention. Authors suggested that more sessions or additional sessions (based on the needs of the patients aligned to the interim depression scores as the intervention progressed) may result in better health outcomes and cost-effectiveness profiles (Fuhr *et al.*, 2019; Sikander *et al.*, 2019; Lund *et al.*, 2020). Linked to this was a common observation noted by study authors that effectiveness (and therefore cost-effectiveness) may be related to the degree to which the intervention was tailored to the depression profile of the patient given the heterogeneity of post-partum depression profiles and resulting natural remission rates (Whiteford *et al.*, 2013). Interventions were more effective for patients with shorter duration of depression (Fuhr *et al.*, 2019) and higher baseline depression scores (Gureje *et al.*, 2019a; Lund *et al.*, 2020) and had greatest impact in the first 3 months after child birth (Fuhr *et al.*, 2019; Sikander *et al.*, 2019). Natural remission for mild/moderate depression was observed in all post-partum depression interventions, resulting in smaller incremental differences in outcomes with the comparator. These results indicate the need for perinatal depression interventions to match the risk profiles of the patients in order to maximize effectiveness and therefore cost-effectiveness. This is not only limited to post-partum depression, as a review study on PTSD also made this observation (McBain *et al.*, 2016). Taken together, these observations suggest that intervention architecture structured in a stepwise manner around patient needs, taking into account condition severity, delivered by well-trained NSHW may result in more pronounced outcomes, relatively affordable cost profiles and even better cost-effectiveness estimates to inform equitable resource allocation.

A key finding of this review is the inconsistencies in methods and reporting of VfM, including miscalculations of the ICER; comparison of ICERs in natural units to CETs; comparison of societal ICERs to CETs; use of incorrect CETs and VfM conclusions made without comparison to CET. The economic evaluation methodological literature (Husereau *et al.*, 2013) recommends as 'gold standard' reporting that the key metric for VfM determination would include an ICER calculated as the increment in provider costs divided by the increment in multi-attribute outcomes (QALYs or DALYs). This ICER would then be compared to a supply-side CET. If the ICERs were lower than the CET, the intervention would be potentially cost-effective and should be considered for investment. Investment decisions would be further strengthened by a consideration of the extent to which the intervention was able to avert patient costs, although these should not be included in an ICER that is compared to a supply-side CET. Including the societal perspective, by estimating changes in productivity costs may help to quantify the positive externalities to other sectors (e.g. education, social welfare, safety and security), resulting from health sector investments in psychological treatments and thus addressing the 'diagonal accounting' (Knapp and Wong, 2020) problem to some degree. The societal benefits evidenced in this review and others (Cubillos *et al.*, 2021) do not negate the challenges associated with the measurement of patient time (Koopmanschap *et al.*, 1995; Johannesson, 1996; Pritchard and Sculpher, 2000). In our review, most studies adopting a societal perspective used a Human Capital Approach or valued a patient's time at the minimum wage. The Panel on Cost-Effectiveness in Health and Medicine recommends the use of the national average wage when valuing patients' time (Weinstein *et al.*, 1996). In contexts where unemployment levels are high as is the case in many LMICs, such an approach may lead to inaccurate estimates of productivity costs. Consistent methods for valuing patient time and productivity costs in these contexts will contribute to the policy agenda for advancing mental health treatments as a developmental goal (Patel *et al.*, 2018).

Strengths and limitations of this review

This review accessed studies from a number of bibliographic and non-bibliographic sources; however, non-English studies were excluded. Although only a handful of non-English studies were identified, we may have excluded important evidence produced in other languages. Including studies written in languages other than English will strengthen future reviews. Another limitation was the inherent subjectivity in the application of the quality assessment checklist. In terms of strengths, this review provides a timely LMIC-focused examination of the current evidence and methods used in economic

evaluation of psychological treatments, thereby responding to calls for such evidence (Knapp and Wong, 2020). One of the fundamental challenges with economic evaluations of these interventions is that cost savings frequently do not accrue to the health system; we propose the use of demand-based CET and impact inventories to address to some degree the need for a whole of society approach to evaluation. We propose a VfMAF as a good practice guide for researchers reporting on cost-effectiveness of psychological treatments in LMIC.

Based on the findings of this review, we have a number of recommendations for researchers to improve the methodological rigour, quality and uptake of research in policy of economic evaluations of psychological treatments for CMDs in LMIC settings. We also make some recommendations for how policymakers can use the current evidence base.

Recommendations for future research

Given the aforementioned findings on reporting VfM, we propose a value assessment framework as a tool that can be used by researchers to improve the interpretation of economic evaluation results. Linked to this, we propose two alternative options for the inclusion of cost savings through reduced productivity costs. These are an important benefit to society accruing from psychological treatments, but there is a lack of consistency in how they are considered in VfM decision-making. Therefore, our first proposal to accommodate the societal perspective is that the societal ICER is compared to the minimum wage. This can be a useful datapoint as minimum wage figures are widely available in LMIC settings, but demand-side thresholds are not. Although this datapoint is context specific, if researchers use this as a standard approach, this may help with the generalizability, transferability and comparability of economic evaluation results across LMIC contexts.

Our second proposal towards the accommodation of the societal perspective is the inclusion of impact inventories alongside provider ICERs and supply-side CETs. The use of such inventories may also help to address the diagonal accounting problem, which has contributed to health sector underinvestment in mental health, especially first-line psychological treatments. Although impact inventories were suggested by the Second Panel on Cost-Effectiveness in Health and Medicine (Sanders *et al.*, 2016), their use appears to be limited. Impact inventories have been identified as useful for providing information to support multi-sectoral engagement (Remme *et al.*, 2017), and an extended impact inventory framework has been suggested to help multiple decision makers operationalize these inventories (Walker *et al.*, 2019).

Evidence from this review indicates that patient responsiveness to psychological treatment is linked to disease severity. We therefore recommend that researchers supplement CEA with budget impact analysis (Sullivan *et al.*, 2014), which will allow consideration of population-level numbers in need when assessing the affordability of implementing these interventions equitably at scale (Bilinski *et al.*, 2017).

In terms of other recommendations for researchers, we suggest more nuanced cost analysis especially of opportunity costs of NSHW time. This is essential as staff time is a central cost in the delivery of psychological treatments, and a large number of reviewed studies applied task-shifting or stepped care models, which are promoted by the WHO as an affordable way to expand first-line treatment for CMDs (WHO/UNHCR, 2015). To fund the development of a valued and sustainable cadre of health workers, opportunity costs applied in costing models need to reflect fair compensation for NSHWs that is aligned to a living wage. To advocate for better prioritization and resource allocation for mental health, many global mental health researchers have tested ultra-low-cost task-sharing models to persuade governments to invest in mental health. There is a danger that this may lead to inadequate compensation for NSHWs and governments failing to develop NSHW as formal health professionals (Sikander *et al.*, 2019). As the roles of NSHWs expands in LMICs (Jacobs *et al.*, 2020; Sorsdahl *et al.*, 2020) and implementation of task-sharing strategies for mental health delivery is accelerated by the COVID-19 pandemic (Kola, 2020), the nature, scope of work and remuneration for NSHW will need to be carefully managed.

Our final recommendation for improving research practise relates to the time horizon. We recommend that where possible time horizons be extended. Extending the time horizon may encourage the multi-sectoral dialogue needed to mitigate diagonal accounting (Knapp and Wong, 2020), which may arise from a mismatch in timing between investments in psychological treatments that happen in the short term and the medium- to long-term time frames needed to remedy the functional impairments underlying many CMDs. Benefits to other sectors may take even longer to manifest than health benefits. Evidence in the wider literature indicates that cost-effectiveness results can change over time (Knapp and Wong, 2020; von der Warth *et al.*, 2020). Bearing in mind the limited resources available for trial-based interventions, extending time beyond the most frequently observed horizons of 3 months to at least 12–18 months will not only improve the consistency of results but also the quality of data available for more robust modelling. Extending time horizons will also allow closer observation of averted health and societal costs and better inform multi-sectoral decision-making based on the results of these interventions.

Recommendations for policy and practice

First, we believe the current evidence provided in this systematic review supports greater investment in psychological treatments for CMDs in LMIC. Second, it is vital that policymakers in national Ministries of Health (for resource allocation and integration policies) and Finance (for financing policies) engage with researchers to articulate their informational needs for greater consideration of mental health investments. Lastly, we recommend that policymakers in the health system work with officials in interrelated sectors that experience the impact of poor mental health (e.g. social services or justice sectors) and begin using tools like impact inventories to establish what they would be willing to pay for their share of benefits accruing from health sector investments and co-operatively develop co-financing mechanisms

Abbreviations

AJoL: African Journals Online; AUD: alcohol use disorder; CBA: cost–benefit analysis; CEA: cost-effectiveness analysis; CET: cost-effectiveness threshold; CMD: common mental disorder; CUA: cost-utility analysis; DALY: disability-adjusted life year; DFDs: depression-free days; GDP: gross

domestic product; HIV: human immunodeficiency virus; HP: household productivity; HRQoL: health-related quality of life; ICER: incremental cost-effectiveness ratio; LFP: labour force productivity; LMIC: low- and middle-income country; MP: marginal productivity; NSHW: non-specialist health worker; PHC: primary health care; PHQ-9: Patient Health Questionnaire-9; PTSD: post-traumatic stress disorder; QALY: quality-adjusted life year; SUD: substance use disorder; USD: US dollar; VfM: value for money; VfMAF: value for money assessment framework; WHO: World Health Organization; WHODAS: WHO Disability Assessment Schedule; WTP: willingness to pay.

Supplementary data

Supplementary data are available at *Health Policy and Planning* online.

Data availability

Supplementary tables are available on the University of Cape Town's Library's online institutional data repository ZivaHub [zivahub.uct.ac.za], doi:10.25375/uct.19867798.

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Author contributor

V.M.-M., S.C., B.M. and C.L. made substantial contributions to the conception and design of the study. E.C. screened articles and checked extraction tables. The first draft of the manuscript was written by V.M.-M. and critically revised by V.M.-M., B.M., C.L. and S.C. for important intellectual content. All authors read and approved the final manuscript.

Reflexivity Statement

The authors include five females and one male and span multiple levels of seniority. Three of the authors are health economists including two early career researchers and the third with senior expertise in economic evaluation. The other three are public mental health specialists with extensive expertise in developing, implementing and evaluating mental health interventions including expertise in mental health systems financing. All authors have experience working in the Global South.

Ethics approval and consent to participate. Ethical approval for this type of study was not required by our institute.

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Consent for publication

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