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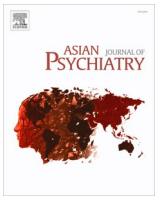

Understanding the costs and economic impact of mental disorders in South Asia: A systematic review

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ABSTRACT

Background: Mental disorders remain the most significant contributor to years lived with disability in South Asia, yet governmental health expenditure on mental health in South Asia remains very low with limited strategic policy development. To strengthen the case for action it is important to better understand the profound economic costs associated with poor mental health. *Methods:* We conducted a systematic review on the costs of all mental disorders, as well as intentional self-harm and suicide, in the World Bank South Asia Region. Ten global and South Asian databases as well as grey literature sources were searched. *Results:* 72 studies were identified, including 38 meeting high quality criteria for good reporting of costs. Of these, 27 covered India, five Pakistan, four Nepal and three Bangladesh and Sri Lanka. Most studies focused on depressive disorders (15), psychoses (14) and harmful alcohol use (7); knowledge of economic impacts for other conditions was limited. Profound economic impacts within and beyond health care systems were found. In 15 of 18 studies which included productivity losses to individuals and/or carers, these costs more than outweighed costs of health care. *Conclusion:* Mental disorders represent a considerable economic burden, but existing estimates are conservative as they do not consider long-term impacts or the full range of conditions. Modelling studies could be employed covering longer time periods and more conditions. Clear distinctions should be reported between out-of-pocket and health system costs, as well as between mental health service-specific and physical health-related costs.

1. Background

Mental disorders remain the most significant contributor to years lived with disability in the World Bank-defined region of South Asia (Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, Sri Lanka). Self-harm is the second leading cause of death for 15–49 year olds in the region (Institute for Health Metrics and Evaluation, 2023). These conditions have profound economic consequences. Up to 63 % of mental disorders have their onset in childhood, adolescence, and young adulthood (Solmi et al., 2022), with immediate costs related to

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educational disruption and need for intervention from health and welfare agencies (McDaid et al., 2020, Fatori et al., 2018). Over the life course, studies indicate most costs occur outside health care systems (Arias et al., 2022, Olesen et al., 2012, Yerramilli and Bipeta, 2012), including reduced participation in paid work, self-employment, and voluntary activities.

Poor mental health has been associated with decades of lower life expectancy in high-income countries (Liu et al., 2017, Nordentoft et al., 2013). Risk factors for premature death from mental disorders such as poor continuity of care, and neglect of physical health monitoring, are likely greater in low- and middle-income countries in South Asia (Zavala et al., 2020). Much of the costs of poor mental health are also likely borne by people living with mental health conditions and their families, given limited access to publicly funded health care and social welfare safety nets, increasing risks of catastrophic costs for families. Further, poor mental health literacy increases stigma and reduces engagement in evidence-based management(Mathias et al., 2018, Petersen et al., 2017, Chase et al., 2018), with studies from South Asia specifically highlighting exclusion from marriage and competitive employment, physical abuse, as well as being treated differently and with a lack of respect (Koschorke et al., 2017, Koschorke et al., 2014).

Despite these adverse impacts, the proportion of governmental health expenditure on mental health in South Asia is notably poor; being as low as 0·04 % in Pakistan, 0·2 % in Bhutan and Nepal (World Health Organization, 2020), and 0·8 % in India(India Mental Health Observatory, 2021). Strategic policy development is limited; for example, no stand-alone policy for mental health exists at national level in Pakistan and Nepal (World Health Organization, 2020), with little protected funding for mental health in most South Asian countries (World Health Organization, 2020).

To strengthen the case for investing in actions for better mental health, it is important to better understand the profound economic costs associated with poor mental health. One previous systematic review of the costs of mental disorders worldwide only included one study from South Asia (Christensen et al., 2020). To address this gap, we undertook a systematic review on the breadth of these costs in South Asia.

2. Methods

This systematic review aimed to identify studies examining costs of all mental disorders (ICD-10 F00 – F99), as well as intentional self-harm and suicide (ICD-10 ×60-X84), for countries in the World Bank South Asia Region. The review was registered with PROSPERO (CRD42021284323); there were no protocol deviations.

2.1. Search strategy

Ten global and South Asian databases (MEDLINE, EMBASE, Global Health, PsycINFO (all Ovid), Index Medicus for South-East Asia Region (WHO IMSEAR), PakMediNet and the Core Collection (Web of Science) were searched between inception and October 2021. Searches were developed by an Information Specialist based on previously published strategies that included mental, behavioural, and neurodevelopmental disorders (Mishu et al., 2021) and focused on 'South Asia' (Uphoff et al., 2019). The search was peer-reviewed by a second Information Specialist using the PRESS checklist (McGowan et al., 2016). The ELDIS database at the Institute of Development Studies, WHO Institutional Repository for Information Sharing (IRIS) and the World Bank Open Knowledge Repository (https://openknowledge.worldbank.org/) were also searched for relevant unpublished reports. Data were also extracted from comparator groups in economic evaluations of interventions addressing poor mental health, where comparators represented no intervention or care as usual. The search strategy combined multiple terms related to mental disorders or self-harm, as well as economic costs. There were no language restrictions (see Appendix 1 for full search strategies).

2.2. Inclusion and exclusion criteria

Studies reporting any aspect of economic costs for any mental health condition (ICD-10 F00 – F99), or intentional self-harm and suicide (ICD-10 ×60-X84) in the World Bank South Asia region (Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, Sri Lanka) were included. Eligible costs included health and other sector costs of mental disorders, indirect costs such as lost productivity from paid work and unpaid activities, such as household work and volunteering, both for people with lived experience of mental disorders and their informal carers, as well as broader costs, such as impacts of discrimination and poorer quality of life.

2.3. Data screening

Results were imported into Endnote, duplicate records removed using the AUHE EndNote deduplication guide (Wright, 2016) and remaining records imported into COVIDENCE. Title, abstracts, and subsequently full texts of papers, were independently screened by two reviewers. Disagreements were resolved through discussion and, if necessary, input from a third reviewer. Reference lists of included papers were also searched.

2.4. Quality appraisal

The 12-items of the cost and background information-specific sections of the Consensus on Health Economic Criteria checklist were used to appraise quality of costing studies (Evers et al., 2005). We equally weighted each criterion. All quality checks were completed by one reviewer, and verified by a second, with disagreements resolved through discussion.

2.5. Data analysis

A narrative synthesis was conducted, with findings organised by broad disorder groupings. Results were reported in line with the Criteria for Cost (-Effectiveness) Review Outcomes (CiCERO) checklist (Mandrik et al., 2021) (see Appendix 2). Extracted information included country, population characteristics, study design, perspective, and key components of costing analysis, timeframe, and summary economic findings. All costs were converted to purchasing power parity (PPP) adjusted 2022 International Dollars using International Monetary Fund (IMF) implied PPP conversion rates and the IMF World Economic Outlook GDP Deflator Index (nternational Monetary Fund, 2022). We also report original currency values and price years in supplementary tables (Appendices 8–11).

3. Results

Fig. 1 shows a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) diagram (Page et al., 2021). Initially 6913 records were identified. Once duplicates were removed there were 4980 records, of which 73 papers covering 72 studies met inclusion criteria. (See Appendix 3 for full details of studies and Appendix 4 for full-text exclusions with reasons). Overall, the mean quality score for papers was 62 % (range 100–8 %) (Appendix 5). In Tables 1–4 we focus on the 38 papers with quality scores of 67 % or more, grouped by conditions covered: depressive disorders, psychoses, alcohol use, and all other disorders (See Appendix 6 for an overview of all studies in the review and Appendix 7 for summary results of the remaining papers).

3.1. Overview

Twenty-seven studies cover costs in India (Chisholm et al., 2000, Chisholm et al., 2016, Chisholm et al., 2020, Fuhr et al., 2019, Lund et al., 2019, Patel et al., 2007, Patel et al., 2017, Pati et al., 2020, Rao

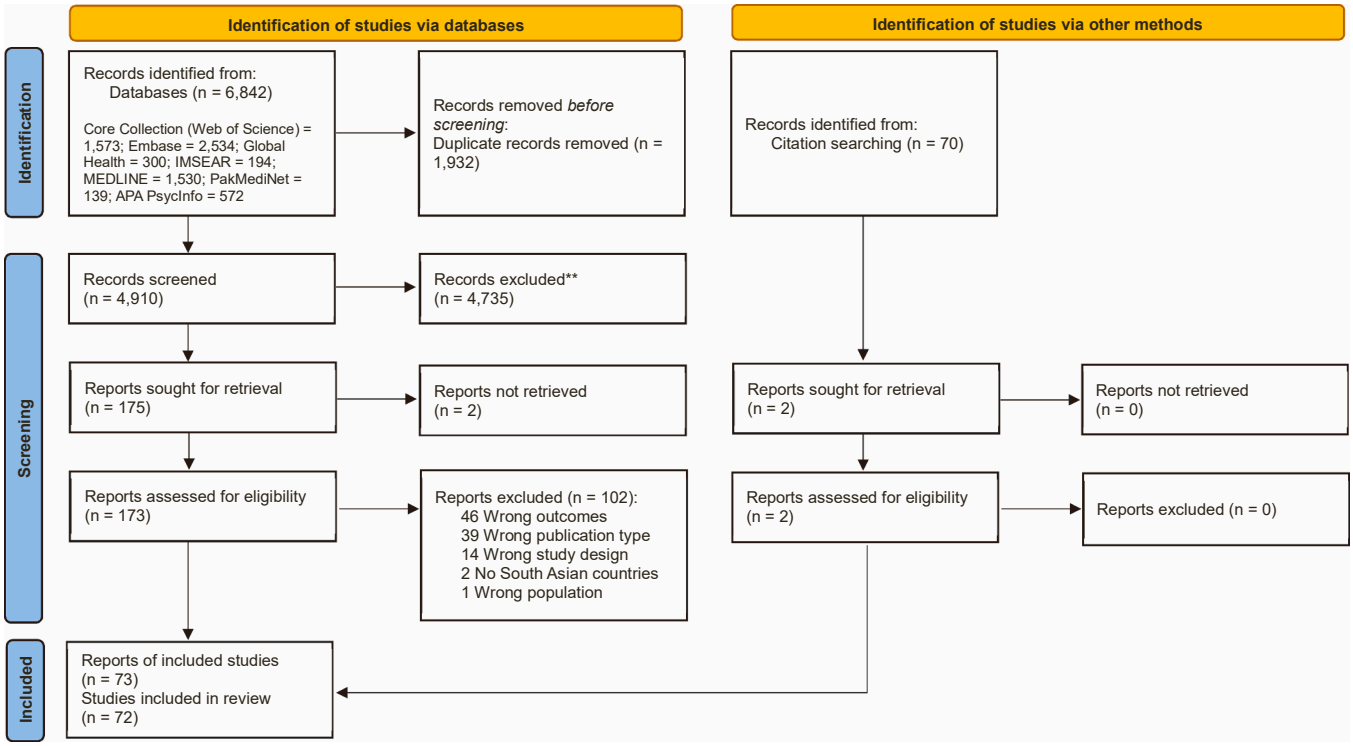

Fig. 1. PRISMA flow diagram. *From:* Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372.n71. doi: 10·1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/.

et al., 2017, Weobong et al., 2017, Grover et al., 2005, Kothari et al., 2013, Raykar et al., 2016, Sharma et al., 2006, Somaiya et al., 2014a, Somaiya et al., 2014b, Verma et al., 2021, Nadkarni et al., 2017b, Nadkarni et al., 2017a, Nadkarni et al., 2019, Karande et al., 2019a, Karande et al., 2019b, Poduri, 2016, Rao and Bharath, 2013, Thakkar et al., 2013, Thakkar et al., 2014, Yadav et al., 2021), followed by Pakistan (5) (Chisholm et al., 2000, Hamdani et al., 2020, Malik and Khan, 2016, Faruqi et al., 2020, Sikander et al., 2019), Nepal (4) (Chisholm et al., 2016, Chisholm et al., 2020, Lund et al., 2019, Rajan et al., 2020), Bangladesh (3) (Hossain et al., 2020, Rahman et al., 2020, Verma et al., 2017) and Sri Lanka(3) (de Silva et al., 2012, Ahrensberg et al., 2019, Ranaweera et al., 2018). Study sample sizes ranged from 10 (Faruqi et al., 2020) to 131,666 (Poduri, 2016). Three studies only included men (Nadkarni et al., 2019, Nadkarni et al., 2017a, Nadkarni et al., 2017b), and three only women (Hossain et al., 2020, Patel et al., 2007, Fuhr et al., 2019). Nine costing estimates were extracted from care as usual/no intervention control groups of randomised controlled trials (RCTs) (Fuhr et al., 2019, Hamdani et al., 2020, Patel et al., 2017, Sikander et al., 2019, Weobong et al., 2017, Kothari et al., 2013, Nadkarni et al., 2019, Nadkarni et al., 2017a, Nadkarni et al., 2017b), and eight from model-based estimates (Chisholm et al., 2016, Malik and Khan, 2016, Raykar et al., 2016, Ranaweera et al., 2018, Ahrensberg et al., 2019, Poduri, 2016, Rao and Bharath, 2013, Yadav et al., 2021), with the remaining 21 being observational studies (Chisholm et al., 2000, Chisholm et al., 2020, Hossain et al., 2020, Lund et al., 2019, Patel et al., 2007, Pati et al., 2020, Rajan et al., 2020, Rao et al., 2017, de Silva et al., 2012, Grover et al., 2005, Sharma et al., 2006, Somaiya et al., 2014a, Somaiya et al., 2014b, Verma et al., 2021, Faruqi et al., 2020, Karande et al., 2019a, Karande et al., 2019b, Rahman et al., 2020, Thakkar et al., 2014, Thakkar et al., 2013, Verma et al., 2017).

Fifteen studies covered periods of more than 6 months and up to one year (Chisholm et al., 2016, Pati et al., 2020, Rajan et al., 2020, Sikander et al., 2019, Weobong et al., 2017, Raykar et al., 2016, Somaiya et al., 2014a, Somaiya et al., 2014b, Nadkarni et al., 2019, Nadkarni et al., 2017a, Karande et al., 2019a, Karande et al., 2019b, Poduri, 2016, Rao and Bharath, 2013, Yadav et al., 2021), while 22 studies were for six months or less (Chisholm et al., 2000, Chisholm et al., 2020, Fuhr et al., 2019, Hamdani et al., 2020, Hossain et al., 2020, Lund et al., 2019, Malik and Khan, 2016, Patel et al., 2007, Patel et al., 2017, Rao et al., 2017, de Silva et al., 2012, Grover et al., 2005, Kothari et al., 2013, Sharma et al., 2006, Verma et al., 2021, Nadkarni et al., 2017b, Ahrensberg et al., 2019, Faruqi et al., 2020, Rahman et al., 2020, Thakkar et al., 2014, Thakkar et al., 2013, Verma et al., 2017). Only one study looked at costs beyond one year (Ranaweera et al., 2018). Fourteen studies only included hospital costs (Malik and Khan, 2016, Chisholm et al., 2020, de Silva et al., 2012, Grover et al., 2005, Kothari et al., 2013, Somaiya et al., 2014a, Somaiya et al., 2014b, Verma et al., 2021, Ranaweera et al., 2018, Faruqi et al., 2020, Thakkar et al., 2014, Thakkar et al., 2013, Verma et al., 2017, Yadav et al., 2021), with 21 including community as well as hospital-based health care costs (Fuhr et al., 2019, Hamdani et al., 2020, Patel et al., 2017, Sikander et al., 2019, Weobong et al., 2017, Rajan et al., 2020, Pati et al., 2020, Lund et al., 2019, Patel et al., 2007, Chisholm et al., 2000, Raykar et al., 2016, Sharma et al., 2006, Nadkarni et al., 2019, Nadkarni et al., 2017a, Nadkarni et al., 2017b, Ahrensberg et al., 2019, Karande et al., 2019a, Karande et al., 2019b, Poduri, 2016, Rahman et al., 2020, Rao and Bharath, 2013). Three looked at community health care costs only (Chisholm et al., 2016, Hossain et al., 2020, Rao et al., 2017). Eighteen included productivity losses to individuals and/or carers (Chisholm et al., 2000, Patel et al., 2007, Sikander et al., 2019, Weobong et al., 2017, Patel et al., 2017, Fuhr et al., 2019, Malik and Khan, 2016, de Silva et al., 2012, Grover et al., 2005, Somaiya et al., 2014a, Somaiya et al., 2014b, Verma et al., 2017, Sharma et al., 2006, Rao and Bharath, 2013, Poduri, 2016, Karande et al., 2019a, Karande et al., 2019b).

3.2. *Depressive disorders*

15 studies examined the costs of depressive disorders (Table 1). As Table 1 indicates ten of these reported costs in India, four in Nepal and Pakistan and one in Bangladesh. Eight were observational studies, five

Table 1
Cost of depressive disorders in South Asian Countries.

Study ID, Rating, Specific mental health condition covered & study design	Countries, Study setting & Population	Cost duration/ Original Currency/ Price year	Description of cost incurred		Mean cost per case (PPP $Int 2022)	Monthly cost per case (PPP $Int 2022)
Chisholm et al. (2000); 75 % Depression and dysthymia; anxiety disorder; adjustment and somatoform disorder; neurasthenia Prospective longitudinal observational study	India and Pakistan, Community, Hospital N=253 (2 sites in India=120, Pakistan=133); Male=57 (22·5 %); Ages 16–30=86 (34·0 %), 31–45=87 (34·0 %), 46–60=80 (31·6 %)	1 month INR, PKR 1999	Direct primary and secondary medical	India, site1&2: Pakistan, site1&2:	$24·13 & $35·52 $79·63 & $92·10	$24·13 & $35·52 $79·63 & $92·10
			Indirect (informal care, travel time, lost work opportunities)	India, site1&2: Pakistan, site1&2:	$72·40 & $82·27 $347·27 & $355·07	$72·40 & $82·27 $347·27 & $355·07
Chisholm et al. (2016); 67 % Depression Modelling study	India and Nepal, Community People with depression, estimate: Sehore, India=19,423; Chitwan, Nepal=8126	12 months USD 2008	Direct primary medical	India Nepal	$22·85 $37·04	$1·91 $3·33
Chisholm et al. (2020); 75 % Depression Prospective longitudinal observational study	India and Nepal, Community, Hospital India: N=258; Male=99 (38·4 %); Ages 16–25=59 (22·9 %), 26–35=68 (26·4 %), 36–50=97 (37·6 %), 51+=34 (13·2 %) Nepal: N=129; Male=19 (14·7 %); Ages 16–25=17 (13·2 %), 26–35=68 (29·1 %), 36–50=97 (32·6 %), 51+=35 (27·1 %)	3 months USD 2015	Direct secondary medical and non-medical (travel costs/ waiting time)	India Nepal	$5·26 $10.94	$1·79 $3·65
Fuhr et al. (2019);92 % Perinatal depression RCT	India, Community, hospital N=140 women in enhanced usual care group; Mean age=25·3	6 months USD 2015	Direct primary and secondary: admission & ambulatory Direct primary and secondary: ambulatory Indirect (productivity losses for individuals and families)		$127·93 $119·55 $255.36	$21·32, $19·93 $42·26
Hamdani et al. (2020); 67 % Depression and/or anxiety RCT	Pakistan, Community, Hospital N=174 in enhanced usual care group; Age and gender not reported	3 months PKR 2016	Direct primary and secondary: admission Direct primary and secondary: ambulatory		$10·47 $83·30	$3·49 $27·75
Hossain et al. (2020); 83 % Postpartum depression Retrospective cross-sectional observational study	Bangladesh, Community N=591 women, including 307 with depression; Mean age=25·6	1 month BDT NR	Direct primary medical Direct non-medical (transport and accommodation)		$26.61 $3.39	$26.61 $3.39
Lund et al. (2019); 83 % Depression Retrospective cross-sectional observational study	India and Nepal, Community Households in Sehore, India having people with depression=252; Male=49·0 %; Mean age=40·1; Chitwan, Nepal=159; Male=12·7 %; Mean age=40·6	1 month USD 2015	Direct primary and secondary medical (out-of-pocket payments)	India Nepal	$4·93 $2·90	$4·93 $2·90
Malik and Khan (2016); 83 % Major depressive disorder Retrospective observational and modelling study	Pakistan, Hospital N=1882 (1042 with MDD); Male=1039 (55·2 %); Ages <10=53 (2·8 %), 10–20=234 (12·4 %), 20–30=499 (26·5 %), 30–40=431 (22·9 %), 40–50=334 (17·7 %), 50–60=156 (8·3 %), 60+=175 (9·3 %)	7 days (admission) 49 days (ambulatory) PKR 2006	Direct secondary admission Direct secondary ambulatory Indirect (productivity losses for individuals and informal carers) admission Indirect (productivity losses for individuals and informal carers) ambulatory		$1815·20 $307·46 $3068·40 $1007·67	N/A $188·28 N/A $616·89
Patel et al. (2007); 75 % Depressive disorder (incl. comorbid anxiety disorder) Retrospective cross-sectional observational study	India, Community, Hospital N=164 women aged 18–50 with depressive disorders	1 month INR NR	Direct primary and secondary Indirect (productivity losses and informal care)		$5·60 $13·08	$5·60 $13·08
Patel et al. (2017); 92 % Depression RCT	India, Community, hospital N=248 in enhanced usual care group; Male=57 (23·0 %); Mean age=42·6	3 months USD 2015	Direct primary and secondary: admission Direct primary and secondary: ambulatory Indirect (productivity losses for individuals and families)		$25·09, $51·32, $204·15	$8·36 $17·11 $68·05
Pati et al. (2020); 67 % Mood (affective) disorder Retrospective cross-sectional observational study	India, Community, Hospital N=500 adults (254 with mood disorder); Male=261 (52·0 %); Mean age=39·8	12 months INR NR	Direct primary and secondary medical (OOP) medicines Direct primary and secondary medical (OOP) diagnostics Direct non-medical (travel)		$70·92 $221·79 $66·71	$5·91 $18·48 $5·56
Rajan et al. (2020); 83 % Depression Retrospective cross-sectional observational study	Nepal, Community, hospital N=80; Male=25 (31·2 %); Mean age=45·9	12 months USD 2013	Direct primary and secondary medical (OOP) admission Direct primary and secondary medical (OOP) ambulatory		$63·30 $74·75	$5·28 $6·24
Rao et al. (2017); 67 % Depression; generalised anxiety Prospective observational study	India, Community N=455; Male=161 (35·4 %); Modal age=51–60	24 weeks INR NR	Direct primary medical (cost of medicines): Fluoxetine Escitalopram Sertraline Desvenlafaxine		$116·82 $139·13 $139·44 $192·95	$19·45 $23·18 $23·24 $32·19

(continued on next page)

Table 1 (*continued*)

Study ID, Rating, Specific mental health condition covered & study design	Countries, Study setting & Population	Cost duration/ Original Currency/ Price year	Description of cost incurred	Mean cost per case (PPP $Int 2022)	Monthly cost per case (PPP $Int 2022)
			Duloxetine	$212·40	$35·42
			Amitriptyline	$295·98	$49·34
			Clomipramine	$744·44	$124·10
Sikander et al. (2019); 100 % Perinatal depression RCT	Pakistan, Community, Hospital N=287 pregnant women in enhanced usual care group; Mean age = 27·3	From third trimester to 6 months post birth PKR & USD 2015	Direct primary and secondary care: community health services	$123·29	$22·35
			Direct primary and secondary care: hospital outpatient	$74·76	$8·31
			Direct primary and secondary care: admissions	$286·96	$52·03
			Indirect: productivity losses of women and other family members	$176·88	$32·07
Weobong et al. (2017); 83 % Depression RCT	India, Community, hospital N=248 in enhanced usual care group; Male=57 (23·0 %); Mean age=42·6	12 months USD 2015	Direct primary and secondary: admission	$45·62	$3·80
			Direct primary and secondary: ambulatory	$282·85	$23·57
			Indirect: productivity losses for individuals and families	$736·77	$61·39

Key: Bangladesh Taka (BDT), Indian Rupees (INR), Pakistan Rupees (PKR), United States Dollar (USD), Not Reported (NR), Not Applicable (NA), Out-of-Pocket Payments (OOP)

RCTs and two modelling studies. Seven studies included costs of productivity losses from work, both for people with depression, as well as for informal family carers.

Our review identified three studies on costs of perinatal depression. In the control group in a trial of a peer-delivered psychological intervention for 140 women who screened positive for depression in India, short-term health system costs were similar to productivity losses for families over the first six months post-birth, $41·25 and $42·26 (Fuhr et al., 2019). In a similar study in Pakistan (Sikander et al., 2019), in contrast, direct health care costs were more than double productivity losses, $82·69 versus $32·07. Another study in rural Bangladesh reported depressed mothers had significantly greater mean monthly health-service related out-of-pocket costs compared to non-depressed mothers, $30 versus $18·70 ($p<0·002$), mainly driven by medication costs (Hossain et al., 2020).

For major depressive disorder, where studies incorporated both broad costs to health care systems, as well as productivity losses to individuals and their families, typically more than 70 % of total costs lay outside of the health care. For example, mean productivity losses constituted 73 % and 76 % of total costs of depression at 3 (Patel et al., 2017) and 12 month (Weobong et al., 2017) follow up for community dwelling adults in India. In Pakistan, 77 % of costs to hospital outpatients with major depressive disorder were due to productivity losses (Malik and Khan, 2016).

The remaining studies were more limited in scope. Two studies focused on health care related costs only, reported an association between deteriorating mental health and cost. In surveys of cohorts of 258 and 129 community-dwelling adults with depression in India and Nepal (Chisholm et al., 2020) worsening mental health functioning was associated with significantly higher healthcare costs. A survey of community-dwelling people with depression in rural Nepal indicated that as depressive symptoms measured using the PHQ-9 increased, mean monthly out-of-pocket health system costs, including traditional healing, also increased (Rajan et al., 2020). Monthly community and hospital costs for adults with depression and/or anxiety disorders in a conflict-affected region of Pakistan at $31·20 were much greater than costs reported in India or Nepal (Hamdani et al., 2020).

3.3. Psychosis and related conditions

13 studies reported costs of psychosis/schizophrenia or bipolar disorder (Table 2). 11 covered India, three Nepal, with one each in Pakistan and Sri Lanka. Nine studies were observational, three modelling and one an RCT.

Six of the seven studies reported that productivity losses from both people living with these mental health conditions and/or their informal carers accounted for the majority of costs. In two Indian observational studies productivity losses accounted for 78 % and 63 % of mean monthly costs for schizophrenia of $103·81 (Somaiya et al., 2014b) and $142·58 (Grover et al., 2005) respectively. Productivity costs, as well as increased household expenditure, accounted for 64 % of monthly costs for people with bipolar disorder in an Indian observational study (Somaiya et al., 2014b). Another small observational study for adults with treatment-resistant schizophrenia in India, found monthly productivity losses to individuals and their carers accounted for 47 % of $637·68 monthly costs (Verma et al., 2021). Private hospital outpatients with psychotic disorders in Pakistan productivity losses accounted for 72 % of total monthly costs of $880·77 (Malik and Khan, 2016). One Indian study on out-of-pocket costs for individuals receiving community-based health care for either psychosis or bipolar disorder (Sharma et al., 2006) reported productivity losses for informal carers to be the largest cost component but no mean cost estimate was provided. A study of people with schizophrenia who attended a tertiary care psychiatry unit in Sri Lanka (de Silva et al., 2012) also reported productivity losses to be the principal cost, but the time period covered was unclear.

The remaining studies were more limited in scope and detail to specific aspects of health care costs. They included a modelling study of community and hospital treatment for people with schizophrenia in India (Raykar et al., 2016) and both a modelling and observational study for a package of community-based care for psychosis in India and in Nepal (Chisholm et al., 2016, Chisholm et al., 2020). In all cases health care costs were lower than those reported in studies that also included productivity losses, with monthly costs ranging from $3.07 to $15.20. One study focused solely on six-week medication costs for 112 people in India (Kothari et al., 2013), and two others on monthly out-of-pocket costs for households of people with psychosis in India (Lund et al., 2019, Pati et al., 2020).

3.4. Alcohol use disorders

Seven studies in Table 3 report costs of alcohol use disorder, six in India, three in Nepal and one in Sri Lanka. Three were RCTs, two observational and two modelling studies. Four of these studies included

Table 2
Cost of psychotic disorders in South Asian Countries.

Study ID, Rating, Specific mental health condition covered & study design	Countries, Study setting & Population	Cost duration/ Original Currency/ Price year	Description of cost incurred		Mean cost per case (PPP $Int 2022)	Monthly cost per case (PPP $Int 2022)
Chisholm et al. (2016); 67 % Psychosis Modelling study	India and Nepal, Community People with psychosis, estimate: Sehore, India=4679; Chitwan, Nepal=1881	12 months USD 2008	Direct primary medical	India Nepal	$45·03 $232·70	$3·75 $19·64
Chisholm et al. (2020); 75 % Psychosis Prospective longitudinal observational study	India and Nepal, Community, Hospital India: N=39; Male=32 (63·2 %); Ages 16–25=5 (26·3 %), 26–35=6 (31·6 %), 36–50=6 (31·6 %), 51+=2 (10·5 %) Nepal: N=93; Male=49 (52·7 %); Ages 16–25=13 (14·0 %), 26–35=20 (21·5 %), 36–50=39 (41·9 %), 51+=21 (22·6 %)	3 months USD 2015	Direct secondary medical and non-medical (travel costs/ waiting time)	India Nepal	$9·21 $28·06	$3·07 $9·35
de Silva et al. (2012); 67 % Schizophrenia Retrospective cross-sectional observational study	Sri Lanka, Community, Hospital N=91; Male =42 (46·0 %). Ages 16–30=30 (33·0 %), 31–50=34 (37·0 %), 51–60=27 (30·0 %)	Per hospital visit for direct medical costs; unclear for other costs SLR NR	Direct (secondary) medical and non-medical Direct informal Indirect (productivity losses for individual and carer)		$14·83 $994·82 $4220·55	N/A N/A N/A
Grover et al. (2005); 75 % Schizophrenia Retrospective longitudinal observational study	India, Hospital N=50; Male=31 (62·0 %); Mean age=32·9	6 months INR 2004	Direct (secondary) medical Indirect (productivity losses to individuals and families and loans to pay for treatment)		$316·68; $538·84	$52·78 $89·80
Kothari et al. (2013); 75 % Schizophrenia RCT	India, Hospital N=112; Olanzapine Male=63·0 %; Mean age=25·7; Zotepine Male=61·0 %; Mean age=28·6	6 weeks INR NR	Direct secondary medical (cost of medicines) Olanzapine Direct secondary medical (cost of medicines) Zotepine		$6·20 $10·63	N/A N/A
Lund et al. (2019); 83 % Psychosis Retrospective cross-sectional observational study	India and Nepal, Community Households in Sehore, India having people with psychosis=31; Male=64·5 %; Mean age=39·8; Chitwan, Nepal=84; Male=50·0 %; Mean age=42·1	1 month USD 2015	Direct primary and secondary medical (OOP)	India Nepal	$2.98 $5·89	$2.98 $5·89
Malik and Khan (2016); 83 % Schizophrenia, schizotypal and delusional disorder Retrospective observational and modelling study	Pakistan, Hospital N=1882 (346 with schizophrenia); Male=1039 (55·2 %); Ages <10=53 (2·8 %), 10–20=234 (12·4 %), 20–30=499 (26·5 %), 30–40=431 (22·9 %), 40–50=334 (17·7 %), 50–60=156 (8·3 %), 60+=175 (9·3 %)	9·5 days (admission) 33 days (ambulatory) PKR 2006	Direct secondary admission Direct secondary ambulatory Indirect (productivity losses for individuals and informal carers): admissions Indirect (productivity losses for individuals and informal carers): ambulatory		$2460·35 $271·50 $5836·02 $697·20	N/A $246·93 N/A $633·84
Pati et al. (2020); 67 % Schizophrenia, schizotypal and delusional disorder Retrospective cross-sectional observational study	India, Community, Hospital N=500 adults (100 with Schizophrenia, schizotypal, and delusional Disorders); Male=261 (52·0 %); Mean age=39·8	12 months INR NR	Direct primary and secondary medical: (OOP) medicines Direct primary and secondary medical: diagnostics Direct primary and secondary medical: (travel)		$55·99 $114·44 $29·41	$4·67 $9.54 $2.45
Raykar et al. (2016); 75 % Schizophrenia Modelling study	India, Community, Hospital Hypothetical cohort of 1 million people	12 months USD 2012	Direct primary and secondary medical:Primary health centre Direct primary and secondary medical: Hospital Direct primary and secondary medical: Medications / Lab tests		$39·73 $118·06 $24·56	$3·31 $9·84 $2·05
Sharma et al. (2006); 67 % Schizophrenia Retrospective cross-sectional observational study	India, Community, Hospital N=95; aged between 18 and 60	1 month INR NR	Direct primary and secondary medical (OOP) outpatient service Direct primary and secondary medical (OOP) primary care Direct primary and secondary medical (OOP) traditional healer Direct primary and secondary medical (OOP) medications Direct non-medical (travel) costs: outpatient service Direct non-medical (travel) costs: primary care Direct non-medical (travel) costs: traditional healer Indirect: Productivity losses by primary caregiver		$0·00 $6·83 $57·07 $35·15 $8·04 $0·91 $58·76 $68·75 -$241·46	$0·00 $6·83 $57·07 $35·15 $8·04 $0·91 $58·76 $68·75 -$241·46
Sharma et al. (2006); 67 % Bipolar disorder Retrospective cross-sectional observational study	India, Community, Hospital N=22; aged between 18 and 60	1 month INR NR	Direct primary and secondary medical (OOP) outpatient service Direct primary and secondary medical (OOP) primary care Direct primary and secondary medical (OOP) traditional healer		$0·00 $15·76 $290·68	$0·00 $15·76 $290·68

(*continued on next page*)

Table 2 (*continued*)

Study ID, Rating, Specific mental health condition covered & study design	Countries, Study setting & Population	Cost duration/ Original Currency/ Price year	Description of cost incurred	Mean cost per case (PPP $Int 2022)	Monthly cost per case (PPP $Int 2022)
			Direct primary and secondary medical (OOP) medications	$44·45	$44·45
			Direct non-medical (travel) costs: outpatient service	$11·88	$11·88
			Direct non-medical (travel) costs: primary care	$26·23	$26·23
			Direct non-medical (travel) costs: traditional healer	$204·41	$204·41
			Indirect: Productivity losses by primary caregiver	$72·8 –$333·67	$72·8 –$333·67
Somaiya et al. (2014a), Somaiya et al. (2014b); 67 % Schizophrenia Prospective longitudinal observational study	India, Community, Hospital N=53; Male=27 (50·9 %); Mean age=30·4	12 months USD 2011	Direct secondary medical	$279.42	$23·29
			Indirect (productivity losses to individual and families and increased household expenditure)	$966.19	$80·52
Somaiya et al. (2014b); 67 % Bipolar disorder Prospective longitudinal observational study	India, Community, Hospital N=75; Male=52 (69·0 %); Mean age=34·3	12 months USD 2011	Direct secondary medical	$305·42	$25·45
			Indirect (productivity losses to individual and families and increased household expenditure)	$543·71	$45·31
Verma et al. (2021); 75 % Treatment-resistant schizophrenia Prospective longitudinal observational study	India, Community, Hospital N=52; Male=26 (50·0 %); Mean age=33·7	6 months INR NR	Direct secondary medical	$2019.18	$336·53
			Indirect (Productivity losses to individuals and carers)	$1806·90	$301·15

Key: Indian Rupees (INR), Pakistan Rupees (PKR), Sri Lankan Rupees (SLR), United States Dollar (USD), Not Reported (NR), Not Applicable (NA), Out-of-Pocket Payments (OOP)

productivity losses in their estimate of costs. Productivity losses made up 76 % and 61 %, respectively of total costs of men with harmful alcohol use in the control arm of a RCT in India over 3 (Nadkarni et al., 2017b) and 12 months (Nadkarni et al., 2017a). In another RCT for men with alcohol addiction in India 59·5 % of monthly costs were for productivity losses (Nadkarni et al., 2019). An economic modelling study for individuals admitted to hospital for alcohol use disorder in Sri Lanka (Ranaweera et al., 2018) reported that productivity losses due to absenteeism accounted for just 10 % of mean monthly costs of $1275. However the net present value of productivity losses due to premature mortality in hospital was separately estimated $194,014.

The remaining three studies were narrow in scope. One modelling study estimated the average cost of scaling up access to primary care for alcohol use disorder in India and Nepal at $0·49 and $0·25 respectively (Chisholm et al., 2016). Subsequently, using observational data, monthly programme costs, plus travel expenses and waiting-time costs were estimated as $1·46 and $2·34 respectively (Chisholm et al., 2020), with another observational study indicating that out-of-pocket costs for community health expenditure were higher in both countries (Lund et al., 2019).

3.5. Other conditions

Table 4 includes 13 studies with 22 cost estimates for other mental health conditions. Eight covered costs in India, with two each in Bangladesh and one in Sri Lanka. Five were modelling and eight observational studies. Five studies included productivity losses to individuals and/or their families.

The highest monthly costs in any study included in the review were for completed suicides in India. Drawing on national data on recorded suicides, these were estimated to be $16,633 (Poduri, 2016). This figure was net of cost savings to the health and education systems as a result of premature death. Overall, productivity losses accounted for 82 % of total costs, with remaining costs falling on sectors other than health. Other self-harm studies in Sri Lanka (Ahrensberg et al., 2019), Bangladesh (Verma et al., 2017) and India (Yadav et al., 2021) did not include productivity losses. The study in Bangladesh highlighted the high impact on families; 82 % of all medical and non-medical costs were out-of-pocket for intentional self-poisoning for 160 people admitted to a publicly funded hospital. The Indian study reported mean out-of-pocket costs for intentional self-harm hospitalisation were higher than for any other type of injury, with more than 60 % of service users and families incurring catastrophic health care costs (Yadav et al., 2021).

Very limited information on costs of dementia were identified. Mean costs in Pakistan for 34 people, including productivity losses, from private hospital inpatient admissions (over 5 days) and outpatient visits (over 29 days) were $2342·99 and $492·70 respectively (Malik and Khan, 2016). An Indian modelling study estimated productivity losses and residential care costs to be greater than health care cost for all mild, moderate and severe dementia scenarios (Rao and Bharath, 2013). Two Indian studies reported very limited information on out-of-pocket medication costs (Thakkar et al., 2014, Pati et al., 2020), while costs of investigations for possible dementia in ten people were reported in Pakistan (Faruqi et al., 2020).

Observational data at a private hospital in Pakistan and productivity losses for multiple conditions, including anxiety, obsessive compulsive disorder, learning disabilities, ADHD and psychosexual dysfunction, were used to estimated health care and productivity losses (Malik and Khan, 2016). Sample sizes were very small, other than for generalised anxiety disorder with 286 individuals. In this case, productivity losses accounted for 58·5 % and 80·8 % of all costs for inpatients and outpatients respectively. Mean direct and indirect annual costs of learning disabilities for schoolchildren were estimated in two Indian studies (Karande et al., 2019a, Karande et al., 2019b). They highlighted the high contribution of education-related costs, with parental willingness to pay for their children not to have a learning disability to be up to 7·8 times mean annual costs. Other studies examined monthly out-of-pocket costs for people with psychoactive substance use disorders or neurotic/somatoform disorders ($20·65) in India (Pati et al., 2020) and for unspecified mental disorders from a survey of 1600 households in Bangladesh (Rahman et al., 2020). An Indian study also examined drug utilisation/costs for multiple mental health conditions at a hospital

Table 3
Cost of alcohol use disorders (AUD) in South Asian Countries.

Study ID, Rating, Specific mental health condition covered & study design	Countries, Study setting & Population	Cost duration/ Original Currency/ Price year	Description of cost incurred		Mean cost per case (PPP $Int 2022)	Monthly cost per case (PPP $Int 2022)
Chisholm et al. (2016); 67 % AUD Modelling study	India and Nepal, Community People with depression, estimate: Sehore, India=7525; Chitwan, Nepal=3006	12 months USD 2008	Direct primary medical	India Nepal	$5·95 $3·08	$0·49 $0·25
Chisholm et al. (2020); 75 % AUD Prospective longitudinal observational study	India and Nepal, Community, Hospital India: N=205; Male=204 (99·5 %); Ages 16–25=24 (11·7 %), 26–35=60 (29·3 %), 36–50=82 (40·0 %), 51+=39 (19·0 %) Nepal: N=170; Male=144 (84·7 %); Ages 16–25=4 (2·4 %), 26–35=46 (27·1 %), 36–50=77 (45·3 %), 51+=43 (25·3 %)	3 months USD 2015	Direct secondary medical and non-medical (travel costs/waiting time)	India Nepal	$4·39 $7·03	$1·46 $2·34
Lund et al. (2019); 83 % AUD Retrospective Cross-sectional observational study	India and Nepal, Community Households in Sehore, India having people with psychosis=253; Male=99·5 %; Mean age=41·2; Chitwan, Nepal=186; Male=84·9 %; Mean age=40·6	1 month USD 2015	Direct primary and secondary medical (OOP)	India Nepal	$3·74 $2·63	$3·74 $2·63
Nadkarni et al. (2017a); 100 % AUD (Harmful drinking) RCT	India, Community, Hospital N=189 men in enhanced usual care group; Mean age=41·7	3 months USD 2015	Direct primary and secondary Indirect (productivity losses for individuals and families)		$44·46 $137·98	$14·82 $45·99
Nadkarni et al. (2017b); 100 % AUD (Harmful drinking) RCT	India, Community, Hospital N=189 men in enhanced usual care group; Mean age=41·7	12 months USD 2015	Direct primary and secondary Indirect (productivity losses for individuals and families)		$312·19 $494·48	$26·01 $41·21
Nadkarni et al. (2019); 100 % AUD (Alcohol dependence) RCT	India, Community, Hospital N=66 men in enhanced usual care group; Mean age=39·7	12 months USD 2015	Direct primary and secondary Indirect (productivity losses for individuals and families)		$364·48 $535·96	$30·37 $44·66
Ranaweera et al. (2018); 75 % AUD Modelling study	Sri Lanka, Community, Hospital Model assumes 7391 live hospital discharges per annum for AUD (7032 male and 359 female) and 256 deaths (248 male, 8 female)	12 months (for direct medical costs and absenteeism for 7391 individuals and carers and lifetime for premature mortality for 256 people SLR 2015	Direct secondary Indirect: Absenteeism Premature mortality		$13,792 $765·78 $194,013·98	$1149·36 $125·64 N/A

Key: Alcohol Use Disorder (AUD), Indian Rupees (INR), Sri Lankan Rupees, (SLR), United States Dollar (USD), Not Applicable (NA), Out-of-Pocket Payments (OOP)

outpatient department but no breakdown of costs by condition was reported (Thakkar et al., 2013).

4. Discussion

This is the first systematic review to focus on the costs of all mental disorders, as well as intentional self-harm in South Asia, identifying 72 studies. Global reviews on this topic have previously found very few studies from this region (Christensen et al., 2020). A strength is our very comprehensive search strategy covering ten databases, including those focused on global health and the South Asia region. Moreover, there were no language restrictions in our review. We went beyond cost of illness and resource use studies to include costs for control populations of economic evaluations receiving no active intervention.

While our review covers papers until 2021; a rapid analysis of papers published subsequently in PubMed/Medline to the end of 2023 reveals few additional studies. They include an updated analysis of a study included in our review (Malik and Khan, 2016), that extrapolates hospital-only and productivity costs from a single private hospital in Pakistan to estimate costs at national level (Alvi et al., 2023). There are further estimates of out-of-pocket expenditure for unspecified mental health conditions in India (Ambade et al., 2022), the costs of intentional self-harm in the control arm of a trial in Pakistan (Alvi et al., 2022), and the costs of mental health problems for school-aged children in India (Malik et al., 2021). The existing evidence is concentrated in India and Pakistan. We only identified one costing study from Bhutan, while we found no studies in two South Asian countries, the Maldives and also in Afghanistan, despite the particularly grave challenges to mental health faced in that country. The studies we identified were mainly focused on the short-term impacts for depressive and psychotic disorders, with very few studies available on neurotic, stress-related or somatoform disorders (ICD10 F40–48), as well on behavioural and emotional disorders that typically have their onset in childhood or adolescence (ICD10 F90–98).

One key issue therefore is to strengthen, as well as raise awareness and provide incentives to undertake economic analysis in a South Asian context. It will also be important to further address the social stigma associated with mental disorders as this may also have limited demand for research. In doing this, the quality and breadth of economic evidence can be enhanced. Only thirty-eight (53 %) of 72 studies met two-thirds of transparent reporting criteria for costing. All journals should ensure papers adhere to reporting standards. Studies need to consistently provide a breakdown of resource use and unit costs, as well as total costs and distinguish between mental health-specific and other general health-related costs (Drummond et al., 2015).

Ideally it would be helpful to conduct a meta-analysis pooling cost estimates from across included studies. However, there is considerable heterogeneity in methods used to quantify resource and estimate costs in these studies; this is a common issue with many reviews of economic

Table 4
Cost of other mental disorders and intentional self-harm in South Asian Countries.

Study ID, Rating, Specific mental health condition covered & study design	Countries, Study setting & Population	Cost duration/ Original Currency/ Price year	Description of cost incurred	Mean cost per case (PPP $Int 2022)	Monthly cost per case (PPP $Int 2022)
Ahrensberg et al. (2019); 100 % Intentional self-poisoning Prospective observational and modelling study	Sri Lanka, Hospital N=67; Male 40 (60 %); Mean age = 36·2. Then extrapolated to all pesticide poisoning cases in 2015 in Anuradhapura District, North Central Province and National levels;	Hospital stays only; mean 27 hours. USD 2015	Direct medical and non-medical (travel fuel): Primary-level hospitals Direct medical and non-medical (travel fuel): Secondary-level hospitals Direct medical and non-medical (travel fuel): Tertiary-level hospitals: Direct medical and non-medical (travel fuel): All hospital levels:	$11·79 $63·31 $347·75 $103·66. Overall, 33 % of costs were OOP.	N/A N/A N/A N/A
Faraqui et al. (2020); 75 % Dementia Retrospective observational study	Pakistan, Hospital N=10; Gender/age breakdown not reported	Not specified but time for investigations only. PKR 2018	Direct secondary medical govt hospital: govt funded costs: $331·55); private hospitals, all OOP	Govt-funded: $331.55 OOP: $79·07 $1158·00	N/A N/A
Karande et al. (2019a); 83 % Dyslexia, Dysgraphia and Dyscalcula Retrospective observational study	India, Community, including educational needs services, hospital N=138; Male 91 (66 %); Mean age: 14·6	Average 12-month costs reported (from total cost data ranging from 1 to 9 years) INR 2015	Direct learning disability clinic costs Direct OOP primary and secondary medical and educational costs plus indirect productivity losses to parents/ guardians	$965·13 $4606·47	$80·43 $383·87
Karande et al. (2019b); 83 % Unspecific learning disability Retrospective observational study	India, Community, including educational needs services, hospital N=100; Male 73 (73 %); Mean age: 14·8.	Average 12-month costs reported (from total cost data ranging from 1 to 11 years) INR 2017	Direct learning disability clinic costs Direct OOP primary and secondary medical and educational costs plus indirect productivity losses to parents/ guardians	$1286·77 $2023·00	$107·23 $169·17
Malik and Khan (2016); 83 % Dementia Retrospective observational and modelling study	Pakistan, Hospital N=1882 (34 with Dementia); Male=1039 (55·2 %); Ages <10=53 (2·8 %), 10–20=234 (12·4 %), 20–30=499 (26·5 %), 30–40=431 (22·9 %), 40–50=334 (17·7 %), 50–60=156 (8·3 %), 60+=175 (9·3 %)	5 days (admission) 29 days (ambulatory) PKR 2006	Direct secondary admission Direct secondary ambulatory Indirect (productivity losses for individuals and informal carers): admissions Indirect (productivity losses for individuals and informal carers): ambulatory	$1491·31 $231·35 $850·98 $261·35	N/A $231·35 N/A $261·35
Malik and Khan (2016); 83 % General anxiety disorder Retrospective observational and modelling study	Pakistan, Hospital N=1882 (286 with General Anxiety Disorder); Male=1039 (55·2 %); Ages <10=53 (2·8 %), 10–20=234 (12·4 %), 20–30=499 (26·5 %), 30–40=431 (22·9 %), 40–50=334 (17·7 %), 50–60=156 (8·3 %), 60+=175 (9·3 %)	5 days (admission) 73 days (ambulatory) PKR 2006	Direct secondary admission Direct secondary ambulatory Indirect (productivity losses for individuals and informal carers): admissions Indirect (productivity losses for individuals and informal carers): ambulatory	$1354·12 $341·65 $1909·68 $1440·94	N/A $142·35 N/A $600·39
Malik and Khan (2016); 83 % Obsessive compulsive disorder (OCD) Retrospective observational and modelling study	Pakistan, Hospital N=1882 (20 with OCD); Male=1039 (55·2 %); Ages <10=53 (2·8 %), 10–20=234 (12·4 %), 20–30=499 (26·5 %), 30–40=431 (22·9 %), 40–50=334 (17·7 %), 50–60=156 (8·3 %), 60+=175 (9·3 %)	6 days (admission) 88 days (ambulatory) PKR 2006	Direct secondary admission Direct secondary ambulatory Indirect (productivity losses for individuals and informal carers): admissions Indirect (productivity losses for individuals and informal carers): ambulatory	$1623·13 $505·92 $1264·84 $1057·92	N/A $174·87 N/A $365·66
Malik and Khan (2016); 83 % Learning disabilities Retrospective observational and modelling study	Pakistan, Hospital N=1882 (42 with Learning Disabilities); Male=1039 (55·2 %); Ages <10=53 (2·8 %), 10–20=234 (12·4 %), 20–30=499 (26·5 %), 30–40=431 (22·9 %), 40–50=334 (17·7 %), 50–60=156 (8·3 %), 60+=175 (9·3 %)	3 days (admission) 23 days (ambulatory) PKR 2006	Direct secondary admission Direct secondary ambulatory Indirect (productivity losses for individuals and informal carers): admissions Indirect (productivity losses for individuals and informal carers): ambulatory	$731·27 $254·84 $96·99 $83·51	N/A N/A N/A N/A
Malik and Khan (2016); 83 % ADHD Retrospective observational and modelling study	Pakistan, Hospital N=1882 (36 with ADHD); Male=1039 (55·2 %); Ages <10=53 (2·8 %), 10–20=234 (12·4 %), 20–30=499 (26·5 %), 30–40=431 (22·9 %), 40–50=334 (17·7 %), 50–60=156 (8·3 %), 60+=175 (9·3 %)	9 days (admission) 72 days (ambulatory) PKR 2006	Direct secondary admission Direct secondary ambulatory Indirect (productivity losses for individuals and informal carers): admissions Indirect (productivity losses for individuals and informal carers): ambulatory	$3144·66 $815·02 $205·57 $145·16	N/A $344·31 N/A $61·32

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Table 4 (*continued*)

Study ID, Rating, Specific mental health condition covered & study design	Countries, Study setting & Population	Cost duration/ Original Currency/ Price year	Description of cost incurred		Mean cost per case (PPP $Int 2022)	Monthly cost per case (PPP $Int 2022)
Malik and Khan (2016); 83 % Psychosexual dysfunction Retrospective observational and modelling study	Pakistan, Hospital N=1882 (25 with Psychosexual dysfunction); Male=1039 (55·2 %); Ages <10=53 (2·8 %), 10–20=234 (12·4 %), 20–30=499 (26·5 %), 30–40=431 (22·9 %), 40–50=334 (17·7 %), 50–60=156 (8·3 %), 60+=175 (9·3 %)	8 days (admission) 51 days (ambulatory) PKR 2006	Direct secondary admission Direct secondary ambulatory Indirect (productivity losses for individuals and informal carers): admissions Indirect (productivity losses for individuals and informal carers): ambulatory		$2237·91 $379·22 $4248·91 $530·73	N/A $226·17 N/A $316·53
Pati et al. (2020); 67 % Neurotic, stress-related and somatoform disorders Retrospective cross-sectional observational study	India, Hospital N=500 adults (99 with neurotic, stress-related, and somatoform disorders); Male=261 (52·0 %); Mean age=39·8, including 254 with mood disorder	12 months INR NR	Direct primary and secondary medical: (OOP) medicines Direct primary and secondary medical: diagnostics Direct primary and secondary medical: (travel)		$62·35 $139·17 $46·19	$5·20 $11·60 $3·85
Pati et al. (2020); 67 % All organic mental disorders Retrospective cross-sectional observational study	India, Hospital N=500 adults (25 with organic mental disorders); Male=261 (52·0 %); Mean age=39·8.	12 months INR NR	Direct primary and secondary medical: (OOP) medicines Direct primary and secondary medical: diagnostics Direct primary and secondary medical: (travel)		$65·22 $182·18 $53·68	$5·44 $15·18 $4·47
Pati et al. (2020); 67 % Mental and behavioural disorders due to psychoactive substances Retrospective cross-sectional observational study	India, Hospital N=500 adults (40 with mental and behavioural disorders due to psychoactive substances); Male=261 (52·0 %); Mean age=39·8.	12 months INR NR	Direct primary and secondary medical: (OOP) medicines Direct primary and secondary medical: diagnostics Direct primary and secondary medical: (travel)		$ 58·40 $160·73 $84·78	$4·87 $13·39 $7·06
Poduri (2016); 75 % Suicide Retrospective cross-sectional observational and modelling study	India, Community, Hospital N=131,666 recorded suicides; Male 89,139 (68 %). Mean age not reported.	12 months INR NR	Net direct primary and secondary medical Net direct non-medical, including education and living expenses averted Indirect (productivity loss) Total net costs per completed suicide		-$2264·31 $5244·61 $13,652.66 $16,632·96	-$188·69 $437·05 $1137·72 $1386·08
Rahman et al. (2020); 83 % Unspecified mental health conditions Retrospective cross-sectional observational study	Bangladesh, Community, Hospital N=7202 individuals in 1593 households; Male = 3590 (49·9 %); Mean age not reported	1 month BDT 2011	Direct primary and secondary OOP medical unadjusted Direct primary and secondary OOP medical adjusted		$130·76 $165·25	$130·76 $165·25
Rao and Bharath (2013); 67 % Mild dementia Modelling study	India, Community, Hospital Hypothetical cases of mild dementia in urban and rural areas	12 months INR NR	Direct medical Direct Day/ Residential Care Direct non-medical Indirect (productivity losses and informal care)	Urban Rural Urban Rural Urban Rural Urban Rural	$538·42 $379·49 $622·75 $38·92 $240·02 $120·01 $1556·88 $778·44	$44·87 $31·62 $51·90 $3·24 $20·00 $10·00 $129·74 $ 64·87
Rao and Bharath (2013); 67 % Moderate dementia Modelling study	India, Community, Hospital Hypothetical cases of moderate dementia in urban and rural areas	12 months INR NR	Direct medical Direct Day/ Residential Care Direct non-medical Indirect (productivity losses and informal care)	Urban Rural Urban Rural Urban Rural Urban Rural	$1602·29 $1378·49 $3035·93 $467·07 $513·77 $237·62 $2724·55 $1362·27	$227·05 $ 114·87 $252·99 $38·92 $ 133·52 $19·80 $42·81 $113·52
Rao and Bharath (2013); 67 % Severe dementia Modelling study	India, Community, Hospital Hypothetical cases of severe dementia in urban and rural areas	12 months INR NR	Direct medical Direct Day/ Residential Care Direct non-medical Indirect (productivity losses and informal care)	Urban Rural Urban Rural Urban Rural Urban Rural	$739·52 $445·98 $6811·37 $1264·97 $1689·87 $626·00 $3892·21 $1946·11	$61·63 $37·17 $567·61 $105·41 $140·83 $52·17 $324·35 $162·18
Thakkar et al. (2013); 75 % Schizophrenia, BPD, depression, anxiety disorders, childhood behavioural disorders, dementia, substance abuse disorders,	India, Hospital N=600 prescriptions (unclear of number of individuals). Prescriptions for males 288 (48·2 %). Mean age: 33·9.	Per prescription only INR NR	Direct cost per prescription to hospital (all diagnoses - 90 % psychotropics)		$7.53	N/A

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Table 4 (*continued*)

Study ID, Rating, Specific mental health condition covered & study design	Countries, Study setting & Population	Cost duration/ Original Currency/ Price year	Description of cost incurred		Mean cost per case (PPP $Int 2022)	Monthly cost per case (PPP $Int 2022)
personality disorders Retrospective cross-sectional observational study			Direct OOP costs per prescription (all diagnoses - 90 % psychotropics)		$4.02	N/A
Thakkar et al. (2014); 67 % Dementia Retrospective cross-sectional observational study	India, Hospital N=100 prescriptions (unclear of number of individuals). Prescriptions for males 84(84 %). Mean age: 64·04.	Per prescription only INR NR	Direct cost per prescription to hospital (all diagnoses - 53 % cognition enhancers)		$17·27	N/A
			Direct OOP costs per prescription (all diagnoses - 53 % cognition enhancers)		$23·35	N/A
Verma et al. (2017); 67 % Intentional self-poisoning Prospective longitudinal observational study	Bangladesh, Hospital N=160. Male = 76 (47·5 %); Median age = 22.	Hospital stay only (Median 3 days) USD 2016	Median direct secondary health care costs		$247·95	N/A
			Median direct-non health care (transport, service charge, food) costs		$222·38	N/A
Yadav et al. (2021); 75 % Intentional self-harm Retrospective observational and modelling study	India, Hospital 113,823 households with 555,114 people in the National Sample Survey. No gender/age breakdown.	12 months INR 2017	Direct OOP secondary health and direct non-health (travel)	Male Female Both	$1688·26 $2643·64 $1860·10	$140·49 ($220·30) ($155·01)

Key: Bangladesh Taka (BDT), Indian Rupees (INR), Pakistan Rupees (PKR), United States Dollar (USD), Not Reported (NR), Not Applicable (NA), Out-of-Pocket Payments (OOP)

studies, with meta-analysis not being feasible or robust because of these challenges (Shields and Elvidge, 2020). Notwithstanding the challenges and caution that must be exercised in comparing estimates of costs in our review, Fig. 2 shows the mean monthly cost for all studies which included specific estimates of both direct and indirect costs. In total there are 33 different cost estimates, with some studies looking at costs

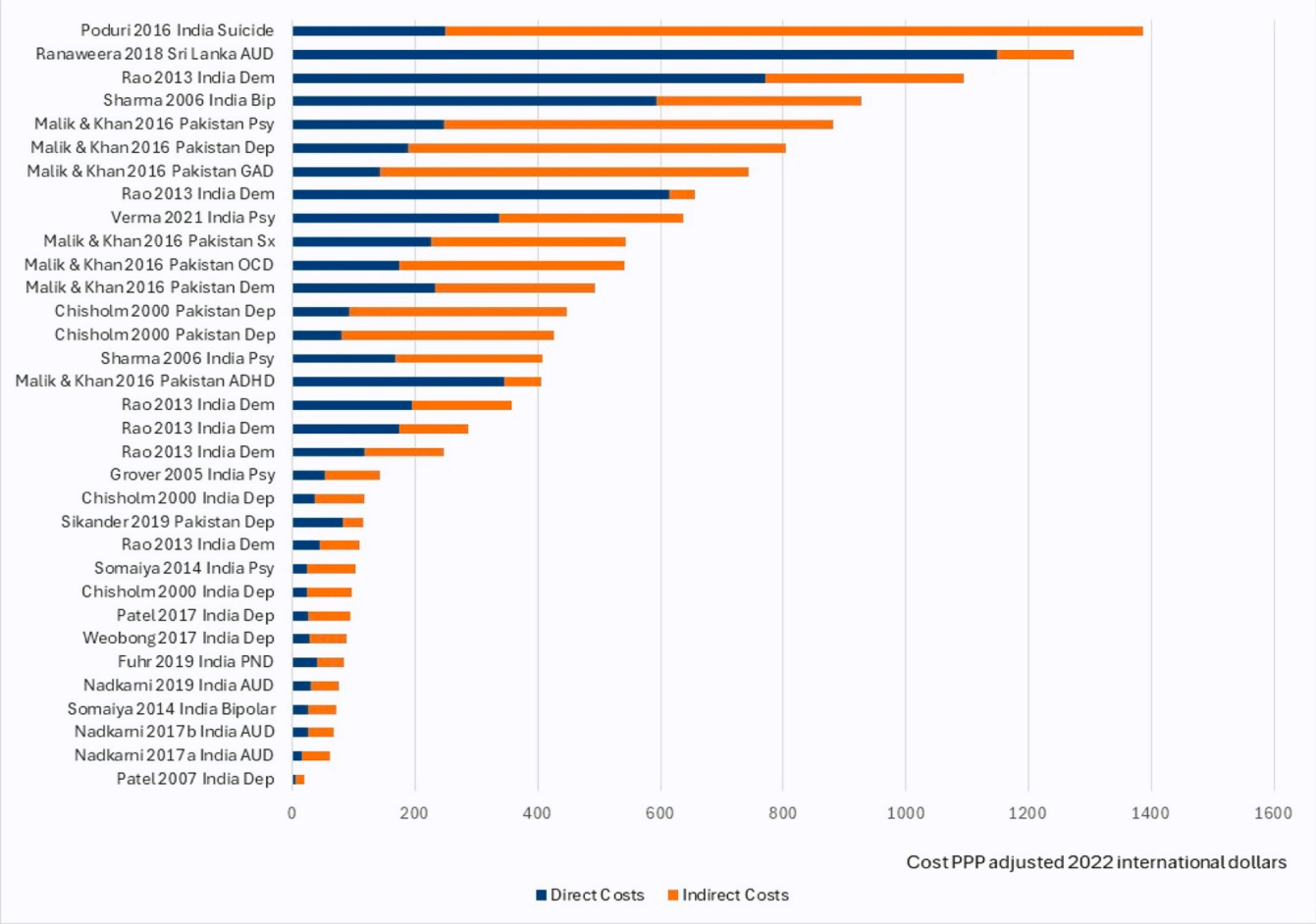

Fig. 2. Monthly economic costs of mental disorders (2022 PPP adjusted $Int). Key: Alcohol Use Disorder (AUD), Attention Deficit and Hyperactivity Disorder (ADHD), Obsessive Compulsive Disorder (OCD), Dementia (Dem), General Anxiety Disorder (GAD), Perinatal Depression (PND), Psychosis and related disorders (Psy), Psychosexual Dysfunction (Sx).

across multiple countries, conditions or settings. (See Appendix 12 for supplementary Table with data from Fig. 2).

While Fig. 2 illustrates the variability in results across conditions and countries, making comparison challenging, some patterns that can observed. First, that in just eight of these 33 estimates did direct costs outweigh indirect costs. The estimate of costs of suicide in India, at $1387 per month was the highest of all studies, with indirect costs accounting for 82 % of all costs (Poduri, 2016). In respect of depression, in only one study, looking at the costs of perinatal depression in Pakistan did indirect costs account for a minority of costs (28 %) (Sikander et al., 2019). Similarly, in only one study of the costs of psychosis and related disorders were indirect costs a minority, at 47 % of total costs for individuals with treatment resistant schizophrenia in India (Verma et al., 2021) In this case medical care costs may be expected to be higher.

Fig. 2 also indicates that the highest estimates of cost for both depression and psychosis were from Pakistan, although it should be stressed that these estimates are from one specific private hospital setting, and costs are likely to differ in public hospital settings in Pakistan (Malik and Khan, 2016). Another observation related to that analysis in Pakistan, where a common approach was used to estimate costs, was the very similar levels of monthly cost for individuals being treated for psychosis and for depression, $880.77 and $805.17 respectively. Future studies, using comparable methodology across mental disorders are needed to explore these differences in cost further. A final observation from Fig. 2 is what it does not show, and that is the lack of studies outside of India and Pakistan, with one exception from Sri Lanka, that have looked at both the direct and indirect costs of mental disorders.

The high contribution in most studies of indirect costs, mainly due to exclusion from employment and other productive activities, also highlights the risk of families incurring catastrophic costs. These costs are only the tip of the iceberg. Only one study in our review looked at costs beyond one year. However, poor mental health can have very long-lasting impacts affecting employment and social functioning over decades, as well as having intergenerational effects (Goodman et al., 2011). Poor mental health can also have a substantial adverse impact on human capital acquisition, reducing lifetime opportunities (McDaid et al., 2020, Hoffmann et al., 2021).

Human capital, vital to continuing economic development in South Asia, would be strengthened through earlier intervention to protect mental health. Arguments for this investment will be strengthened further if longer-term adverse impacts on productivity and the wider economy of not taking action are considered. One way of doing this is would be to conduct more economic modelling studies that estimate the potential long-term economic impacts of mental health conditions (McDaid, 2014).

Our review also indicates a need for well-designed studies on the economic impact of the broad range of mental health conditions. Beyond depressive and psychotic disorders, knowledge of economic impacts of many highly prevalent conditions such as anxiety disorders and dementia, as well as conditions associated with high levels of disability burden, notably eating disorders, appear very limited in South Asia. A lack of information on these issues again means that the true potential of investing in effective actions for better mental health may not be understood.

Another critical issue that multiple papers did address is the level of out-of-pocket expenditure associated with poor mental health. While publicly funded health service coverage is increasing, such as through the Indian Ayushman Bharat Yojana health insurance scheme for some inpatient care costs for low-income people (National Health Authority, 2019), it would be helpful to distinguish consistently between public-purse costs and family costs when reporting results. This could help clarify risk of incurring catastrophic health care costs associated with mental health problems. The cost impact of changing the way people access services, such as through digital/telephone services, can also be explored.

4.1. Implications

There is existing and consistent evidence on the profound and potentially avoidable costs of mental health conditions that can inform policy and practice in South Asia. These estimates are probably conservative; data on longer term impacts, as well as for many more conditions including anxiety, eating disorders and dementia are needed. It is also important to assess costs for more countries, including Afghanistan where no studies were found.

Despite limitations in the evidence, this review highlights some profound impacts within and beyond health care systems associated with poor mental health. This information can be used to help inform policy and practice; it can also be combined with updated estimates of the prevalence and incidence of mental health conditions in South Asia (Vidyasagaran et al., 2023), as well as other data on the enduring impacts of poor mental health, to model potential long term benefits to society if some of these issues could be avoided through prevention, earlier intervention, and better management.

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Ethical statement

Ethical approval was not required for this study. This article does not contain any studies with human participants or animals performed by any of the authors.

CRediT authorship contribution statement

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Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ajp.2024.104239.

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