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Literacy and Mental Health Across the Globe: A Systematic Review

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Literacy and Mental Health Across the Globe: A Systematic Review

Purpose: Fourteen percent of the global population has little or no literacy. Literacy skills impact on daily functioning and have been shown to impact on social outcomes. Whilst there has been research examining the potential association between literacy and mental health outcomes in specific populations, there has been no systematic review of this literature to date.

Design/Methodology/Approach: A systematic review was carried out using Embase, PsycINFO and PubMed to identify relevant papers that measured both literacy and mental health. Data relating to the association between literacy and mental health were extracted. The papers included were assessed for quality using a bespoke quality rating tool. A narrative synthesis describes the findings.

Findings: Nineteen studies from across nine countries were included in the analysis. Seventeen studies showed a significant association between literacy and mental health, those with lower literacy had greater mental health difficulties. Some papers reported factors that interacted with this association, such as age, gender, poverty, and years of education.

Originality/Value: This is the first systematic review to look at the global picture of literacy and mental health. It suggests there is a relationship between literacy abilities and mental health outcomes, highlighting the importance of healthcare professionals and services including identification of literacy needs within routine mental health practice.

Key words: Literacy, Illiterate, education status, Mental Health, Mental illness, Prevalence

Paper type: Literature review

Introduction

Literacy is the ability to read and write to interact and communicate with the world around us (National Literacy Trust, NLT, https://literacytrust.org.uk/information/what-is-literacy). The basic reading skills required to become "literate" do not develop naturally; we learn to use our brain to recognise images in order to identify written letters and words (Wolf and Stoodley, 2008). Despite rising literacy rates over the past 50 years, there are still an estimated 773 million illiterate adults globally (UNESCO, 2021). Gilbert *et al.*, (2018) describe how lacking literacy skills holds a person back at all stages of life. Literacy is a human right that empowers and enables individuals to participate more fully in their own life and society (Murray, 2021). The '2030 Agenda for Sustainable Development' states the UN are committed to advancing literacy as part of their strategic goal of good health and wellbeing (Department of Economic and Social Affairs, 2016).

There is a known association between lower literacy and negative health outcomes (Berkman *et al.,*2004). Lower literacy is related to an increased risk of hospitalisation (Baker *et al.*, 2002), poorer global health status and some chronic diseases (DeWalt *et al.*, 2004), and shorter life expectancy (Gilbert *et al.*, 2018). Research also suggests an association between literacy difficulties and mental health. The existing literature largely focuses on reading difficulties in children, where associations have been documented with internalizing and externalizing difficulties (Arnold *et al.*, 2005; Snowling *et al.*, 2007). Morgan, Farkas, and Wu (2012) found poorer readers reported greater feelings of anger, sadness, loneliness, anxiety, distractibility, and being unpopular with their peers. They proposed that early reading failure results in negative effects on children's socioemotional adjustment. Boyes *et al.,* (2016) suggested the relationship between reading difficulties and mental health in children may be ameliorated or exacerbated by risk or resilience-promoting factors. One review of reading outcomes concluded that poorer readers were at moderately increased risk

for experiencing internalising problems, anxiety and depression, compared to typical readers across the lifespan (Francis *et al.*, 2019). Sentell and Shumway (2003) found that adults with a mental health problem had lower functional literacy levels, even after controlling for education level, demographic, and socioeconomic factors. In an older adult population, Zhang (2021) found low literacy increased anxiety and loneliness, and decreased happiness.

Beyond individuals, literacy has a broader socioeconomic and developmental context. Literacy rates are lower in developing countries (Roser and Ortiz-Ospina, 2016) and those with a history of conflict (Zua, 2021). There is also a gender gap in literacy abilities; two thirds of the global illiterate population are female, speculatively linked to cultural narratives around female school access (UNESCO, 2019). This gender difference in literacy abilities appears static with little progress over time (UNESCO, 2017). Cree, Kay, and Steward (2012) identifies lack of literacy as one of the most overlooked socio-economic issues globally, with the most marginalised and poorer populations being impacted most by lack of literacy skills (UNICEF, 2015). They recognised that without literacy skills, individuals risk becoming trapped in poverty due to limited opportunities for employment or income generation. Morrisroe (2014) suggests those with poorer literacy have poorer social outcomes, including higher criminal offence rates and negative impacts on employment. It is estimated that the cost of illiteracy to the global economy is £800 billion, due to the burden on healthcare systems and welfare payments (World Literacy Foundation, 2018).

The literature suggests that there is a possible relationship between literacy and mental health outcomes, however to our knowledge, there has been no systematic review of the literature to assess this relationship between general mental health and overall literacy abilities in adult populations. A systematic review will develop the existing literature by providing a thorough summary of the available research. Understanding this relationship

better will help develop future research and ways of working to best support individuals with

literacy difficulties within mental health practices.

Methods

To explore the association between literacy and mental health a systematic review

was undertaken. The review protocol was listed on the international prospective register of

systematic reviews (PROSPERO) in May 2021.

Search strategy

A systematic review of the literature was completed using Embase, PsycINFO and

PubMed on the 28th of July 2022. Search terms were refined following scoping searches and

identification of relevant keywords. Three search strings were utilised 1) Literacy, 2) Mental

health outcomes, and 3) Study type.

Inclusion criteria:

• Full text available in English

• Study participants over 18 years of age

• Include any measure or assessment of general literacy ability *and include a standardised*

measure of any element of mental health

• Journal article in a peer reviewed journal

Exclusion criteria:

• Health conditions that directly impact on cognitive functioning, such as developmental

disorders and dementia

• Articles which focus on a specific type of literacy, such as 'health literacy' or 'financial

literacy'

• Articles where the population of interest is under 18

- Articles where the main focus of the paper is a health condition

Initial abstract review was used to assess if the returned searches contained papers looking at the specific relationship between mental health and literacy. There were two independent reviewers of abstracts and any disagreements around inclusion of a paper were resolved by a third-party reviewer. Each article excluded was coded with a reason for exclusion (see Figure I. for PRISMA diagram).

The initial search returned 2146 papers. After initial screening procedures), 361 papers had a full text review for eligibility. Following a review of the results, searches were further limited to papers published in the last 10 years (2011-2021) due to changes in access to information as a result of increased global availability of the internet and the effect this may have on results of the review. Nineteen studies met the final study criteria and were included in the analysis.

INSERT FIGURE I: PRISMA diagram

Data extraction

A data extraction tool was developed by the authors which detailed the study characteristics, including demographic information, measure of literacy, mental health measure, and main outcomes.

Quality assessment

A bespoke quality assessment tool (See supplementary documentation), influenced by existing tools such as AXIS (Downes *et al.*, 2016), Critical Appraisal Skills Programme (CASP, 2018) cohort study checklist and The Newcastle-Ottawa Scale (Wells *et al.*, 2000), was developed by the authors to reflect the relevant factors when considering risk of bias and quality. This tool rated 5 areas: study question and design, sample, recruitment, validity of measures, and analysis. There were Ten questions in total, all with a dichotomous answer

choice of 'yes' or 'no'. A response of 'yes' scored 1 point, giving an overall quality score

rating between 0 and 10. Higher scores represent higher quality papers. The first author

independently rated each paper with the second author (BT) evaluating a third of the papers

to substantiate the quality ratings. A Kappa score of 0.89 was calculated indicating 'Almost

perfect agreement'. Papers scoring 9-10 were considered good quality, those scoring 7-8 were

considered fair quality, those scoring 5-6 were considered low quality. Any papers scoring 4

and below were considered very poor and unacceptable for inclusion. All papers scored

above the minimum quality rating. Overall scores awarded for quality can be found in Table

I.

Results

Study characteristics

Table I provides an overview of the characteristics of the 19 studies included in the

final review. Across the studies a total of 1,950,088 participants were included (range 154 -

1,909,205) from across nine countries (USA, China, Nepal, Thailand, Iran, India, Ghana,

Pakistan, and Brazil). Overall, there was a similar number of male and female participants,

974483 males and 975604 females (50%). The literacy prevalence rates reported varied

between 6% to 86% of participants reporting no literacy (mean rate of 33%).

INSERT TABLE I: STUDY CHARACTERISTICS

Table II provides details of mental health outcomes included in the papers and how

they were measured. There was no standardised approach to measuring literacy in the studies,

details of literacy measurement/assessment can also be found in Table II.

INSERT TABLE II: STUDY OUTCOMES

Association between literacy and Mental health

Seventeen of the papers (Basnet *et al*., 2018; Baral and Bhagawati, 2019; Charoensakulchai *et al*., 2019; Farooq *et al*., 2019; Firdaus, 2017; Fortes *et al.,*2011; Gupta *et al*., 2020; Hassandzadeh *et al.,*2018; Kohli *et al*., 2013; Liu *et al*., 2013; Manandhar *et al*., 2019; Mathias *et al*., 2015; Mubeen *et al.,*2012; Nguyen *et al.,*2017; Rong *et al*., 2019; Safi and Tariq, 2013; Simkhada *et al*., 2018) (90%) found a statistically significant association between poorer literacy and poorer mental health outcomes. One paper found no significant association (Lincoln *et al.,*2021). One paper reported that higher literacy was significantly associated with poorer mental health outcomes (Boakye-Yiadom *et al.,* 2015). However, when undertaking post-hoc calculations using the available raw data presented in the publication, the authors of this systematic review failed to replicate this finding.

Four papers explored mediating factors in the association between literacy and mental health. Liu *et al. (*2012) reported that age mediated the relationship between literacy and schizophrenia, with the strongest association amongst those under 40 years old and the greatest prevalence in the 18–19-year-old cohort (OR=1.64 % , 95 % CI: 1.35, 1.93). Firdaus *et al.* (2017) reported that amongst an immigrant population from rural India settled in Delhi, the year of immigration and poor housing conditions combined with low levels of education (used as a proxy for literacy) were associated with poorer mental health outcomes. Fortes *et al.* (2011) reported that low literacy in females in all but those who were extremely poor, presented an increase of 8.5% in comment mental disorders. Nguyen *et al.* (2017) found that literacy itself was an independent variable of the relationship between years of education and depressive symptoms. Specifically, literacy mediated the relationship between education and depressive symptoms, predominantly among those with lower levels of education. Literacy was found to be a statistically significant mediator of the relationship between education and depressive symptoms, accounting for 28% of the effect.

Discussion

This review identified 19 studies that looked at the relationship between mental health outcomes and literacy. The majority of papers (90%) indicated a significant association between literacy abilities and mental health outcomes, with poorer literacy abilities associated with poorer mental health outcomes. Whilst causality cannot be established as most studies were cross-sectional, the results suggest there is an association between literacy and mental health outcomes across multiple countries.

Several papers examined related variables that might interact with the relationship between literacy and mental health. Age, gender, years of schooling, and poverty level were all found to have interaction effects with the relationship between literacy and mental health. It is difficult to summarise generalisable conclusions about these interactions, as the review is limited by what the papers included in their analyses. Not all papers looked at interactions between variables, thus there is limited information on these more complex associations and further research is needed to understand these relationships. However, given these factors all represent social inequalities, the findings contribute to our understanding of the social determinants of mental health. Allen *et al.,*(2014) conclude that mental health is shaped by the social, economic, and physical environments in which we live, and they recognise that social inequalities act as risk factors for mental health, with poorer people disproportionately impacted.

There are several ways in which literacy and mental health may impact on each other. From a socio-economic perspective, poor literacy skills may limit opportunities for engaging with society (Cree, Kay, and Steward 2012) as well as limiting access to well paid jobs (Dugdale and Clark, 2008) and thus socio-economic status and financial security. Literacy skills have been found to impact on an individual's psychological empowerment, feelings of self-esteem and- self-confidence (Stromquist, 2009). Research also suggests that literacy impacts on help seeking and health care utilisation (Baker *et al.*, 1996). Further to this, the

intersectionality of literacy and mental health difficulties (Lincoln *et al.*, 2017) may also be a contributing factor to this relationship. Easton *et al.* (2013) identify that the stigma associated with poor literacy may contribute to poorer mental health. The current review supports the notion of poor literacy being a social inequality which contributes to poorer outcomes for individuals, including poorer mental health. However, it is essential for future research to explore the relationship between literacy and mental health further, as well as the mechanisms behind this relationship

Within the included papers, educational status was often used as a proxy measure for literacy abilities. Using educational attainment, or years of schooling, as a measurement of literacy assumes those who attend school gain literacy skills, and those that don't access formal education do not have literacy skills. However, research has shown that literacy and education are related but separate constructs (UNICEF, 2015), thus educational attainment alone is unlikely to be a true reflection of a person's literacy abilities. Research also shows that education itself has a positive impact on both health (Cutler and Lleras-Muney, 2006) and mental health (Chevalier and Feinstein, 2006) outcomes. Whilst literacy and education are related, the research available suggests that using educational attainment as a measure of literacy may present a misleading picture. For a true examination of the relationship between literacy and mental health, a standardised literacy measure should be developed and utilised with those across the spectrum of literacy abilities and educational background.

It is important to consider contextual and structural factors within the countries included in this review. Given that education was often used as a proxy for literacy, the variety of access to and standard of education across the countries should be considered. Mean years of schooling for the countries included in the review ranged from 5 to 13 years (Baumann, 2021). Whilst this shows variety in amount of education access, education in different countries may also vary based on sex, health, cultural identity, and poverty. The

availability and structure of mental health services across the different countries should also

be considered, as the majority of included papers originated from low- and middle- income

countries. Despite mental health being the leading cause of disability worldwide (Mensah and

Collins, 2015), there is a significant mental health treatment gap, particularly in low and

middle income countries, where 75% of people who need mental health services lack access

to appropriate care and support (Kohn *et al.*, 2004).

Implications

Whilst this systematic review cannot ascertain direction of the relationship between

literacy abilities and mental health outcomes, it does suggest an association between the two.

If we were to hypothesise that poorer literacy leads to poorer mental health outcomes, a focus

on promoting literacy from an early age, and across the lifespan, has the potential to have a

positive impact on life-long mental health outcomes. Future research could look to explore

the direction of this relationship using a literacy intervention and measuring the impact on

mental health outcomes. Irrespective of the direction of the relationship between literacy and

mental health, it also highlights the importance of healthcare professionals being able to

identify and support people with literacy difficulties within mental health practice settings.

Limitations

This systematic review aimed to give a global picture of the association between

literacy and mental health. However, the studies included in this review only covered nine

countries, many of which were low- and middle-income countries, therefore, it cannot be

considered truly representative of the global picture. This reflects the lack of good quality

research assessing the relationship between literacy and mental health on a more universal

level internationally. Whilst it does give an insight into the picture across multiple countries,

it would be useful to research the association across a wider range of countries. Consideration

should also be given to the cross-cultural differences in the perceptions, experience, and

reporting of mental health difficulties within the different countries included in this review.

For example, whilst all the measures of mental health in this review were validated, they

were frequently constructed with a westernised understanding and conceptualisation of

mental health, which may not be reported consistently in global populations due to different

social constructs of mental health (Jacobs *et al.,* 2015).

Due to the range of methods used to assess literacy abilities and mental health

outcomes a meta-analysis was not able to be completed with the included studies, so the data

were unable to be combined for statistical analysis. Furthermore, it is recognised that many of

the included studies use years of education as a proxy measure for literacy abilities and thus

may not most accurately capture true literacy abilities.

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Figure I: PRISMA diagram

Identification

Electronic Database searches: EMBASE, PscyhINFO, PubMed.
Initial search (n=2146)

Further search criteria applied using NOT Boolean operator
(n=686)

Records after duplicates removed
(n= 528)

Screening

Records screened by title
(n=528)

Excluded (n= 167)

Titles which indicate main population group is child or adolescent (n=84)

Titles which indicate main focus of paper is a health condition (n=83)

Eligibility

Full text articles assed for eligibility
(n= 361)

Full text articles excluded (n=342)

- Full text not available (n=14)
- Not in English (n=2)
- Not a published journal article (n=60)
- Included participants under 18 (n=27)
- Main focus not mental health conditions/symptoms (n=91)
- Caregiver focus (n=3)
- Literacy not measured (n=12)
- Specific literacy rather than general literacy (n=23)
- Didn't measure association between literacy and Mental health (n=13)
- Substance abuse (n=18)
- Physical health (n=18)
- Testing a tool(s)/protocol (n=11)
- Included cognitive impairment or older adult population and doesn't explicitly state about cognitive impairment as exclusion (n=10)
- Not community dwelling (n=11)
- Articles over 10 years old removed (n=18)
- Mental health condition an exclusion criterion (n=6)
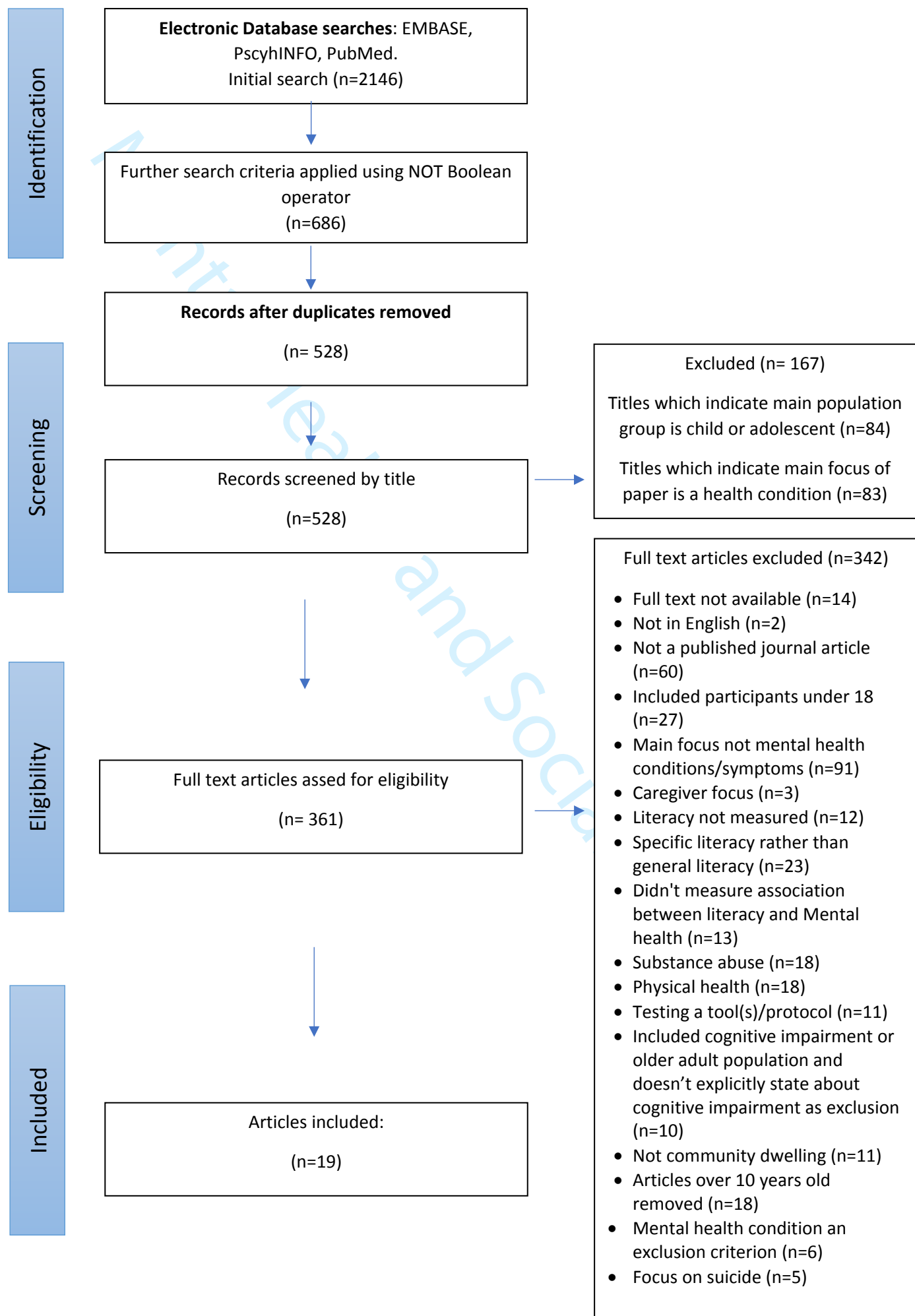- Focus on suicide (n=5)

Included

Articles included:
(n=19)

Table 1: Study characteristics

Author(s) and date	Country	Study Design	Study aims	Sample/population	Quality rating score
Lincoln *et al.* (2021)	USA	Cross-sectional mixed methods	Examines literacy among people seeking care in a state funded mental health clinic (Site 1) and a safety-net hospital clinic (Site 2).	• *n*= 228 • Adults aged 18 and over • Attendees of two urban, public outpatient mental health clinics	7
Nguyen *et al.* (2017)	USA	Longitudinal survey data analysis	Assess the hypothesis that literacy may be a mediator of the effect of education on depressive symptoms	• *n*=16718 • Adults aged 50 and over • Participants from the Health Retirement Study (HRS), a longitudinal study of U.S. adults aged 50 and over and their spouses.	9
Rong *et al.* (2019)	China	Cross sectional survey (face to face interviews)	Assess the status of depressive symptoms and quality of life (QoL) among rural elderly in central China (Anhui Province) and explore correlations and associated factors for depressive symptoms.	• *n*= 3349 • Adults aged 60 and over • Community dwelling in Anhui Province, China	8
Liu *et al.* (2013)	China	Cross sectional survey data and follow up face to face interviews	Examine the relationship between illiteracy and schizophrenia in Chinese sample	• *n*= 1909205 • Adults aged 18 and over • Data utilised from the 'Second China National Sample Survey on Disabilities (2006)'	9
Baral and Bhagawati (2019)	Nepal	Cross sectional survey (face to face interviews)	Investigate the prevalence of post-traumatic stress disorder and use of coping strategies among adult survivors of Nepalese 2015 earthquake.	• *n*= 291 • Adults aged 20 and over • Survivors of Nepal Earthquake 2015	7

Manandhar *et al.* (2019)	Nepal	Cross sectional survey (face to face interviews)	Estimate the prevalence and any associated factors of depression among the elderly in the Kavre district	• *n*= 439 • Adults aged 60 and over • Community dwelling based in Kavre district, Nepal	10
Simkhada *et al.* (2018)	Nepal	Cross sectional survey (face to face interviews)	Examine the prevalence of depressive symptoms and explore possible contributory risk factors in older adults living in Nepal.	• *n*= 300 • Adults aged 60 years and over • Community dwelling based in Kathmandu, Nepal	10
Basnet *et al.* (2018)	Nepal	Cross sectional survey (face to face interviews)	Explore depression and anxiety among war-widows from the Nepalese civil war	• *n*= 358 • Female survivors of conflict who were married women and whose husband was killed or made to disappear during the civil war period (1996–2006)	6
Charoensakulchai *et al.* (2019)	Thailand	Cross sectional survey (face to face interviews)	Evaluate the prevalence and associated factors for geriatric depression	• *n*=416 • Adults aged 60 and over • Community dwelling in Ban Nayao community	9
Hassanzadeh *et al.* (2018)	Iran	Cross sectional survey data analysis	Explore the association(s) between demographic factors, smoking status, social capital, and poor mental health status in a sample of Iranian men.	• *n*= 11064 • Adults aged 20 and over • Males based in Tiran, Iran	8
Gupta *et al.* (2020)	India	Cross sectional survey (face to face interviews)	Estimate the prevalence of depression and the various risk factors related to it among rural adult population.	• *n*=816 • Adults aged 18 and over • Rural population based in Jammu Northwest India	9
Firdaus (2017)	India	Cross sectional survey (face to face interviews)	Examine the relationship between specific components of social environment and psychological well-being of migrants in an urban centre.	• *n*= 1230 • Adults aged 18 and over • Migrant workers based in Delhi, India	8

Mathias *et al.* (2015)	India	Cross sectional survey (face to face interviews)	Describe depression prevalence, healthcare seeking and associations with socioeconomic determinants in a district in North India.	• *n*=960 • Adults aged 18 and over • Community dwelling in Dehradum district, India	9
Kohli *et al.* (2013)	India	Cross sectional survey (face to face interviews)	Describe the prevalence of unrecognised depression among outpatient attendees of a rural hospital in Delhi, India and its sociodemographic correlates.	• *n*=395 • Adults aged 18 and over • Attendees of outpatient department, Rural Delhi, India	9
Boakye-Yiadom *et al.*, (2015)	Ghana	Cross sectional survey (face to face interviews)	Assess the prevalence of stress and anxiety, as well as the association that exists between stress/anxiety and sociodemographic characteristics, among pregnant women in Ghana.	• *n*= 154 • Adults aged 18 and over • Pregnant women visiting the Tamale West hospital for antenatal care	6
Farooq *et al.* (2019)	Pakistan	Cross sectional survey (face to face interviews)	Estimate the prevalence of anxiety and depressive symptoms and their association with multimorbidity and the demographic characteristics of adults aged 30 years and above in Karachi, Pakistan.	• *n=2867* • adults aged over 30 years • Community dwelling in in the Gulshan-e-Iqbal town of Karachi, Pakistan.	9
Safi and Tariq (2013)	Pakistan	Cross sectional survey (face to face interviews)	Assess the prevalence of, and to identify the non-hormonal risk factors associated with depression among pregnant women attending antenatal clinic in Peshawar Pakistan.	• *n*=300 • Adults aged 18 years and older • Pregnant women accessing prenatal care at Hayatabad Medical Complex, (HMC) hospital Peshawar, Pakistan	7
Mubeen *et al.* (2012)	Pakistan	Cross sectional survey (questionnaire)	Describe the prevalence of depression and to identify associated risk factors among community dwelling elderly in Karachi.	• *n*=284 • Adults aged 60 and over • Community dwelling based in Karachi, Pakistan	7

| Fortes *et al.* (2011) | Brazil | Cross sectional survey (face to face interviews) | Detect if there was any group of patients within the Family Health Strategy at greater risk for common mental disorders and to recommend alternative interventions to aid those patients. | • *n*=714
• Adults aged 18 to 65
• Attendees of a family Health centre in Petropoplis, Brazil | 7 |

Table I provides an overview of the characteristics of the studies included in the final review

Table II: Study outcomes

Author(s) and date	Literacy measure (s)	Mental health measure(s) (mental health condition assessed)	Main results relating to literacy and mental health	Factors found to be partial mediators of relationship between literacy and mental health outcomes	Demonstrated a significant association between literacy and mental health
Lincoln *et al.* (2021)	Woodcock-Johnson III test of achievement (WJ) used to categorise literacy abilities	Diagnostic data (ICD-9 codes) from patients' medical records (depression, anxiety, PTSD, bipolar disorder, and schizophrenia-spectrum disorders)	Whilst some relationships between literacy and mental health diagnoses were found when models were adjusted to include neurocognitive and sociodemographic characteristics these associations were no longer significant		No
Nguyen *et al.* (2017)	Brief vocabulary test and years of schooling	Center for Epidemiologic Studies Depression, CES-D (Depression)	Descriptive statistics showed that people with the combination of poor literacy and lower education attainment had higher depression scores Literacy was found to be a statistically significant partial mediator of the relationship between education and depressive symptoms, accounting for 28% of the effect.	• Years of schooling	Yes
Rong *et al.* (2019)	Categorised by educational status, including illiterate	Geriatric Depression Scale, GDS 30 (Depression)	Illiteracy was a statistically significant associated factor for depressive symptoms among rural elderly persons OR 1.34 (1.125-1.595) p=0.001		Yes

Liu *et al.* (2013)	Chinese character recognition test, if reported no schooling interviewer would ask further questions	International Classification of Diseases, ICD-10, symptom checklist (Schizophrenia)	Illiteracy was significantly associated with schizophrenia Adjusted OR 2.08 (1.84-2.36) Young illiterates showed a high prevalence of schizophrenia PR 7.54 (6.20-9.18)	• Age	Yes
Baral and Bhagawati (2019)	Classified as literate or illiterate and educational status	PTSD symptom checklist, PCL-5. (Post-traumatic Stress disorder, PTSD)	Significantly more illiterates (25.5%) had PTSD compared to literates (13.9%) p<0.0001		Yes
Manandhar *et al* (2019)	Dichotomised educational status as illiterate or literate	Geriatric Depression Scale, GDS 15 (Depression)	Illiteracy was significantly associated with geriatric depression OR 3.1 (1.7–5.1) p<0.001 Adjusted OR 2.1 (1.1-4.0) p=0.037		Yes
Simkhada *et al.* (2018)	Classified as illiterate or literate (able to read and write)	Geriatric Depression Scale, GDS 15 (Depression)	Illiteracy was significantly associated with twice the likelihood of having depression Adjusted OR 2.01 (1.08–3.75)		Yes
Basnet *et al.* (2018)	Classified educational status as illiterate or literate	Beck's Depression Inventory-21, BDI-21 (Depression) Beck's Anxiety Inventory-21, BAI-21 (Anxiety)	Illiteracy was significantly associated with moderate anxiety and depression. Being literate significantly reduced the odds of moderate severity depression score, OR 0.49 (0.26–0.91)		Yes

			Being literate significantly reduced the odds of moderate severity anxiety score, OR 0.23 (0.12–0.43)		
Charoensakulchai *et al.* (2019)	Categorised as illiterate or at least primary education	Thai version of the Geriatric Depression Scale, TGDS (Depression)	Illiteracy was significantly associated with risk for depression Adjusted OR 2.86, (1.19–6.17) p= 0.04		Yes
Hassan zadeh *et al.* (2018)	Categorised by educational status, including illiterate category	General Health Questionnaire 28, GHQ-28 (Mental health status)	Illiteracy was directly associated with poor mental health status Adjusted OR 1.18 (1.09-1.29) p=0.04		Yes
Gupta *et al.* (2020)	Classified educational status as illiterate or literate	Patient Health Questionnaire, PHQ-9 and Beck's Depression Inventory, BDI-II (Depression)	Illiteracy was significantly associated with depression OR 3.8 (1.31-11.06) p<0.001		Yes
Firdaus (2017)	Unclear how obtained literacy status but Illiterate as a respondent characteristic	World Health Organization Well-Being Index, WHO5 (Mental wellbeing)	Illiteracy was significantly associated with poor mental well-being OR = 2.55 (1.91-2.43 p< 0.01)	• Year of immigration • Living condition	Yes
Mathias *et al.* (2015)	Categorised by educational status, unschooled classed as illiterate	Patient Health Questionnaire- 9, PHQ-9 (Depression)	Illiteracy (or being unschooled) was a significant risk factor for depression. People who had not completed primary schooling had almost four times greater risk of depression after controlling for other variables Adjusted OR 3.7 (1.2-12.0)		Yes

	Study outcomes				
Kohli *et al.* (2013)	Categorised by educational status, including illiterate category	Primary Care Evaluation of Mental Disorders, PRIME MD Patient Health Questionnaire-9, PHQ-9 (Depression)	Education status (illiteracy) was significantly associated with presence of depression ($\chi 2$= 14.3, df=6 and p=0.026) When only looking at those that had no previous diagnosis, literacy was associated with less odds of having depression OR=0.54, (0.328-0.911) p=0.02		Yes
Boakye - Yiado m *et al.,* (2015)	Categorised by educational status, including illiterate category	Kessler Psychological Distress Scale, K10 (Stress) State Trait Anxiety Inventory STAI (Anxiety)	There was no statistically significant association between illiteracy and stress. However, a higher proportion of people who had attained tertiary educational status had anxiety disorders (p=0.0421)		Negative impact of literacy
Farooq *et al.* (2019)	Categorised by educational status	Aga Khan University Anxiety Depression Scale, AKUADS (Depression, Anxiety)	Illiteracy (defined as no formal education vs higher education) was a significant factor associated with anxiety and depression symptoms Adjusted OR 1.51 (1.09 to 2.07)		Yes
Safi and Tariq (2013)	Categorised by educational status, uneducated= illiteracy	Centre for Epidemiologic Studies Depression Scale, CES-D (Depression)	Statistically more women who were uneducated/illiterate (90%) had depression compared to those who were educated (81%) p value = 0.00		Yes
Mubee n *et al. (*2012)	Categorised by educational status, including illiterate category	Geriatric Depression Scale, GDS 15 (Depression)	Illiterates had significantly higher levels of depression (P<0.001)		Yes

Fortes *et al.* (2011)	Categorised by educational status, including illiterate category	General Health Questionnaire, GHQ-12 (Common mental disorders, CMD)	No statistically significant association between illiteracy and common mental disorders. Adjusted PR 1.06 (0.84-1.40) However, illiterate patients who were not extremely poor presented an increase of 8.5% in CMD compared to illiterates who were extremely poor. Crude PR 1.38 (1.07-1.78) P=0.042	• Gender • Monthly income	No overall effect but effect when looking at poverty level as mediator

Table II provides details of the measures and outcomes recorded in the reviewed articles.

Systematic review quality assessment tool (Hunn et al., 2022)
Quality rating tool, influenced by existing tools such as AXIS, Critical Appraisal Skills Programme (CASP) cohort study checklist and The Newcastle-Ottawa (NOS).

		Yes	No
Study question and design	1. Did the study address a clearly focused issue?		
	2. Was an appropriate method used to answer the question?		
Sample	3. Was the study population and setting clearly specified and defined?		
	4. Were inclusion and exclusion criteria stated?		
Recruitment	5. Was the study population recruited in an acceptable way?		
	6. Was a sample size justification, power description, or variance and effect estimates provided?		
Validity of measures	7. Was mental health measured in a standard, reliable, or appropriate way for all participants?		
Analysis	8. Was the statistical analysis adequately described and appropriate?		
	9. Were confounding factors controlled within the analysis?		
	10. Was there an assessment of statistical significance?		
9-10 good quality, 7-8 were fair quality, 5-6 low quality, 4 and below considered as very poor/unacceptable.			

Critical Appraisal Skills Programme (2018). CASP Cohort Study Checklist. [online] Available at: https://casp-uk.net/wp-content/uploads/2018/01/CASP-Cohort-Study-Checklist_2018.pdf

Downes, M.J., Brennan, M.L., Williams, H.C. and Dean, R.S. (2016). "Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS)." *BMJ open,* Vol. 6 No.12

Wells, G. A., Shea, B., O'Connell, D., Peterson, J., Welch, V., Losos, M., & Tugwell, P. (2000). The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses

Literacy and mental health

Literacy and Mental Health Across the Globe: A Systematic Review

Purpose: Fourteen percent~~14%~~ of the global population has little or no literacy. Literacy skills impact on daily functioning and have been shown to impact on social outcomes. Whilst there has been research examining the potential association between literacy and mental health outcomes in specific populations, there has been no systematic review of this literature to date.

Design/Methodology/Approach: A systematic review was carried out using Embase, PsycINFO and PubMed to identify relevant papers that measured both literacy and mental health. Data relating to the association between literacy and mental health were extracted. The papers included were assessed for quality using a bespoke quality rating tool. A narrative synthesis describes the findings.

Findings: Nineteen studies from across nine countries were included in the analysis. Seventeen studies showed a significant association between literacy and mental health, those with lower literacy had greater mental health difficulties. Some papers reported factors that interacted with this association, such as age, gender, poverty, and years of education.

Originality/Value: This is the first systematic review to look at the global picture of literacy and mental health. It suggests there is a relationship between literacy abilities and mental health outcomes, highlighting the importance of healthcare professionals and services including identification of literacy needs within routine mental health practice.

Key words: Literacy, Illiterate, education status, Mental Health, Mental illness, Prevalence

Paper type: Literature review

Introduction

Literacy is the ability to read and write to interact and communicate with the world around us (National Literacy Trust, NLT, https://literacytrust.org.uk/information/what-is-literacy). The basic reading skills required to become "literate" do not develop naturally; we learn to use our brain to recognise images in order to identify written letters and words (Wolf and Stoodley, 2008). Despite rising literacy rates over the past 50 years, there are still an estimated 773 million illiterate adults globally (UNESCO, 2021). Gilbert *et al.*, (2018) describe how lacking literacy skills holds a person back at all stages of life. Literacy is a human right that empowers and enables individuals to participate more fully in their own life and society (Murray, 2021). The '2030 Agenda for Sustainable Development' states the UN are committed to advancing literacy as part of their strategic goal of good health and wellbeing (Department of Economic and Social Affairs, 2016).

There is a known association between lower literacy and negative health outcomes (Berkman *et al.,*2004). Lower literacy is related to an increased risk of hospitalisation (Baker *et al.*, 2002), poorer global health status and some chronic diseases (DeWalt *et al.*, 2004), and shorter life expectancy (Gilbert *et al.*, 2018). Research also suggests an association between literacy difficulties and mental health. The existing literature largely focuses on reading difficulties in children, where associations have been documented with internalizing and externalizing difficulties (Arnold *et al.*, 2005; Snowling *et al.*, 2007). Morgan, Farkas, and Wu (2012) found poorer readers reported greater feelings of anger, sadness, loneliness, anxiety, distractibility, and being unpopular with their peers. They proposed that early reading failure results in negative effects on children's socioemotional adjustment. Boyes *et al.,* (2016) suggested the relationship between reading difficulties and mental health in children may be ameliorated or exacerbated by risk or resilience-promoting factors. One review of reading outcomes concluded that poorer readers were at moderately increased risk

for experiencing internalising problems, anxiety and depression, compared to typical readers across the lifespan (Francis *et al.*, 2019). Sentell and Shumway (2003) found that adults with a mental health problem had lower functional literacy levels, even after controlling for education level, demographic, and socioeconomic factors. In an older adult population, Zhang (2021) found low literacy increased anxiety and loneliness, and decreased happiness.

Beyond individuals, literacy has a broader socioeconomic and developmental context. Literacy rates are lower in developing countries (Roser and Ortiz-Ospina, 2016) and those with a history of conflict (Zua, 2021). There is also a gender gap in literacy abilities; two thirds of the global illiterate population are female, speculatively linked to cultural narratives around female school access (UNESCO, 2019). This gender difference in literacy abilities appears static with little progress over time (UNESCO, 2017). Cree, Kay, and Steward (2012) identifies lack of literacy as one of the most overlooked socio-economic issues globally, with the most marginalised and poorer populations being impacted most by lack of literacy skills (UNICEF, 2015). They recognised that without literacy skills, individuals risk becoming trapped in poverty due to limited opportunities for employment or income generation. Morrisroe (2014) suggests those with poorer literacy have poorer social outcomes, including higher criminal offence rates and negative impacts on employment. It is estimated that the cost of illiteracy to the global economy is £800 billion, due to the burden on healthcare systems and welfare payments (World Literacy Foundation, 2018).

The literature suggests that there is a possible relationship between literacy and mental health outcomes, however to our knowledge, there has been no systematic review of the literature to assess this relationship between general mental health and overall literacy abilities in adult populations. A systematic review will develop the existing literature by providing a thorough summary of the available research. Understanding this relationship

better will help develop future research and ways of working to best support individuals with literacy difficulties within mental health practices.

Methods

To explore the association between literacy and mental health a systematic review was undertaken. The review protocol was listed on the international prospective register of systematic reviews (PROSPERO) in May 2021.

Search strategy

A systematic review of the literature was completed using Embase, PsycINFO and PubMed on the 28th of July 2022. Search terms were refined following scoping searches and identification of relevant keywords. Three search strings were utilised 1) Literacy, 2) Mental health outcomes, and 3) Study type. Full search terms can be found in Appendix B.

Inclusion criteria:

- Full text available in English

- Study participants over 18 years of age

- Include any measure or assessment of general literacy ability *and include a standardised measure of any element of* mental health

- Journal article in a peer reviewed journal

Exclusion criteria:

- Health conditions that directly impact on cognitive functioning, such as developmental disorders and dementia

- Articles which focus on a specific type of literacy, such as 'health literacy' or 'financial literacy'

- Articles where the population of interest is under 18

- Articles where the main focus of the paper is a health condition

Initial abstract review was used to assess if the returned searches contained papers looking at the specific relationship between mental health and literacy. There were two independent reviewers of abstracts and any disagreements around inclusion of a paper were resolved by a third-party reviewer. Each article excluded was coded with a reason for exclusion (see Figure I. for PRISMA diagram)n.

The initial search returned 2146 papers. After initial screening procedures (see Figure I. for PRISMA diagram), 361 papers had a full text review for eligibility. Following a review of the results, searches were further limited to papers published in the last 10 years (2011-2021) due to changes in access to information as a result of increased global availability of the internet and the effect this may have on results of the review. Nineteen studies met the final study criteria and were included in the analysis.

INSERT FIGURE I: PRISMA diagram

Data extraction

A data extraction tool was developed by the authors which detailed the study characteristics, including demographic information, measure of literacy, mental health measure, and main outcomes.

Quality assessment

A bespoke quality assessment tool (See extended data supplementary documentationAppendix C), influenced by existing tools such as AXIS (Downes *et al*., 2016), Critical Appraisal Skills Programme (CASP, 2018) cohort study checklist and The Newcastle-Ottawa Scale (Wells *et al*., 2000), was developed by the authors to reflect the relevant factors when considering risk of bias and quality. This tool rated 5 areas on a scale of

1-10: study question and design, sample, recruitment, validity of measures, and analysis. There were Ten questions in total, all with a dichotomous answer choice of 'yes' or 'no'. A response of 'yes' scored 1 point, giving an overall quality score rating between 0 and 10. Higher scores represent higher quality papers. The first author independently rated each paper with the second author (BT) evaluating a third of the papers to substantiate the quality ratings. A Kappa score of 0.89 was calculated indicating 'Almost perfect agreement'. Papers scoring 9-10 were considered good quality, those scoring 7-8 were considered fair quality, those scoring 5-6 were considered low quality. Any papers scoring 4 and below were considered very poor and unacceptable for inclusion. All papers scored above the minimum quality rating. Overall scores awarded for quality can be found in Table I.

Results

Study characteristics

Table I provides an overview of the characteristics of the 19 studies included in the final review. Across the studies a total of 1,950,088 participants were included (range 154 - 1,909,205) from across nine countries (USA, China, Nepal, Thailand, Iran, India, Ghana, Pakistan, and Brazil). Overall, there was a similar number of male and female participants, 974483 males and 975604 females (50%). The literacy prevalence rates reported varied between 6% to 86% of participants reporting no literacy (mean rate of 33%).

INSERT TABLE I: STUDY CHARACTERISTICS

Table II provides details of mental health outcomes included in the papers and how they were measured. There was no standardised approach to measuring literacy in the studies, details of literacy measurement/assessment can also be found in Table II.

INSERT TABLE II: STUDY OUTCOMES

Association between literacy and Mental health

Seventeen of the papers (Basnet *et al*., 2018; Baral and Bhagawati, 2019; Charoensakulchai *et al*., 2019; Farooq *et al*., 2019; Firdaus, 2017; Fortes *et al*.,2011; Gupta *et al*., 2020; Hassandzadeh *et al*.,2018; Kohli *et al*., 2013; Liu *et al*., 2013; Manandhar *et al*., 2019; Mathias *et al*., 2015; Mubeen *et al*.,2012; Nguyen *et al*.,2017; Rong *et al*., 2019; Safi and Tariq, 2013; Simkhada *et al*., 2018) (90%) found a statistically significant association between poorer literacy and poorer mental health outcomes. One paper found no significant association (Lincoln *et al*.,2021). One paper reported that higher literacy was significantly associated with poorer mental health outcomes (Boakye-Yiadom *et al.,* 2015). However, when undertaking post-hoc calculations using the available raw data presented in the publication, the authors of this systematic review failed to replicate this finding.

Four papers explored mediating factors in the association between literacy and mental health. Liu *et al. (*2012) reported that age mediated the relationship between literacy and schizophrenia, with the strongest association amongst those under 40 years old and the greatest prevalence in the 18–19-year-old cohort (OR=1.64 % , 95 % CI: 1.35, 1.93). Firdaus *et al.* (2017) reported that amongst an immigrant population from rural India settled in Delhi, the year of immigration and poor housing conditions combined with low levels of education (used as a proxy for literacy) were associated with poorer mental health outcomes. Fortes *et al.* (2011) reported that low literacy in females in all but those who were extremely poor, presented an increase of 8.5% in comment mental disorders. Nguyen *et al.* (2017) found that literacy itself was an independent variable of the relationship between years of education and depressive symptoms. Specifically, literacy mediated the relationship between education and depressive symptoms, predominantly among those with lower levels of education. Literacy was found to be a statistically significant mediator of the relationship between education and depressive symptoms, accounting for 28% of the effect.

Discussion

This review identified 19 studies that looked at the relationship between mental health outcomes and literacy. The majority of papers (90%) indicated a significant association between literacy abilities and mental health outcomes, with poorer literacy abilities associated with poorer mental health outcomes. Whilst causality cannot be established as most studies were cross-sectional, the results suggest there is an association between literacy and mental health outcomes across multiple countries.

Several papers examined related variables that might interact with the relationship between literacy and mental health. Age, gender, years of schooling, and poverty level were all found to have interaction effects with the relationship between literacy and mental health. It is difficult to summarise generalisable conclusions about these interactions, as the review is limited by what the papers included in their analyses. Not all papers looked at interactions between variables, thus there is limited information on these more complex associations and further research is needed to understand these relationships. However, given these factors all represent social inequalities, the findings contribute to our understanding of the social determinants of mental health. Allen *et al.,*(2014) conclude that mental health is shaped by the social, economic, and physical environments in which we live, and they recognise that social inequalities act as risk factors for mental health, with poorer people disproportionately impacted.

There are several ways in which literacy and mental health may impact on each other. From a socio-economic perspective, poor literacy skills may limit opportunities for engaging with society (Cree, Kay, and Steward 2012) as well as limiting access to well paid jobs (Dugdale and Clark, 2008) and thus socio-economic status and financial security. Literacy skills have been found to impact on an individual's psychological empowerment, feelings of

self-esteem and- self-confidence (Stromquist, 2009). Research also suggests that literacy

impacts on help seeking and health care utilisation (Baker *et al.*, 1996). Further to this, the

intersectionality of literacy and mental health difficulties (Lincoln *et al.*, 2017) may also be a

contributing factor to this relationship. Easton *et al.* (2013) identify that the stigma associated

with poor literacy may contribute to poorer mental health. The current review supports the

notion of poor literacy being a social inequality which contributes to poorer outcomes for

individuals, including poorer mental health. However, it is essential for future research to

explore the relationship between literacy and mental health further, as well as the

mechanisms behind this relationship

Within the included papers, educational status was often used as a proxy measure for

literacy abilities. Using educational attainment, or years of schooling, as a measurement of

literacy assumes those who attend school gain literacy skills, and those that don't access

formal education do not have literacy skills. However, research has shown that literacy and

education are related but separate constructs (UNICEF, 2015), thus educational attainment

alone is unlikely to be a true reflection of a person's literacy abilities. Research also shows

that education itself has a positive impact on both health (Cutler and Lleras-Muney's, 2006)

and mental health (Chevalier and Feinstein, 2006) outcomes. Whilst literacy and education

are related, the research available suggests that using educational attainment as a measure of

literacy may present a misleading picture. For a true examination of the relationship between

literacy and mental health, a standardised literacy measure should be developed and utilised

with those across the spectrum of literacy abilities and educational background.

It is important to consider contextual and structural factors within the countries

included in this review. Given that education was often used as a proxy for literacy, the

variety of access to and standard of education across the countries should be considered.

Mean years of schooling for the countries included in the review ranged from 5 to 13 years

(Baumann, 2021). Whilst this shows variety in amount of education access, education in different countries may also vary based on sex, health, cultural identity, and poverty. The availability and structure of mental health services across the different countries should also be considered, as the majority of included papers originated from low- and middle- income countries. Despite mental health being the leading cause of disability worldwide (Mensah and Collins, 2015), there is a significant mental health treatment gap, particularly in low and middle income countries, where 75% of people who need mental health services lack access to appropriate care and support (Kohn *et al.*, 2004).

Implications

Whilst this systematic review cannot ascertain direction of the relationship between literacy abilities and mental health outcomes, it does suggest an association between the two. If we were to hypothesise that poorer literacy leads to poorer mental health outcomes, a focus on promoting literacy from an early age, and across the lifespan, has the potential to have a positive impact on life-long mental health outcomes. Future research could look to explore the direction of this relationship using a literacy intervention and measuring the impact on mental health outcomes. Irrespective of the direction of the relationship between literacy and mental health, it also highlights the importance of healthcare professionals being able to identify and support people with literacy difficulties within mental health practice settings.

Limitations

This systematic review aimed to give a global picture of the association between literacy and mental health. However, the studies included in this review only covered nine countries, many of which were low- and middle-income countries, therefore, it cannot be considered truly representative of the global picture. This reflects the lack of good quality research assessing the relationship between literacy and mental health on a more universal

level internationally. Whilst it does give an insight into the picture across multiple countries, it would be useful to research the association across a wider range of countries. Consideration should also be given to the cross-cultural differences in the perceptions, experience, and reporting of mental health difficulties within the different countries included in this review. For example, whilst all the measures of mental health in this review were validated, they were frequently constructed with a westernised understanding and conceptualisation of mental health, which may not be reported consistently in global populations due to different social constructs of mental health (Jacobs *et al.,* 2015).

Due to the range of methods used to assess literacy abilities and mental health outcomes a meta-analysis was not able to be completed with the included studies, so the data were unable to be combined for statistical analysis. Furthermore, it is recognised that many of the included studies use years of education as a proxy measure for literacy abilities and thus may not most accurately capture true literacy abilities.

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