

# Income inequality and mental illness-related morbidity and resilience: a systematic review and meta-analysis



Wagner Silva Ribeiro, Annette Bauer, Mário César Rezende Andrade, Marianna York-Smith, Pedro Mario Pan, Luca Pingani, Martin Knapp, Evandro Silva Freire Coutinho, Sara Evans-Lacko

## Summary

**Background** Studies of the association between income inequality and mental health have shown mixed results, probably due to methodological heterogeneity. By dealing with such heterogeneity through a systematic review and meta-analysis, we examine the association between income inequality, mental health problems, use of mental health services, and resilience (defined as the ability to cope with adversity).

**Methods** We searched the Global Health, PsychARTICLES, PsycINFO, Social Policy and Practice, Embase and MEDLINE databases up to July 6, 2016, for quantitative studies of the association of income inequality with prevalence or incidence of mental disorders or mental health problems, use of mental health services, and resilience. Eligible studies used standardised instruments at the individual level, and income inequality at the aggregated, contextual, and ecological level. We extracted study characteristics, sampling, exposure, outcomes, statistical modelling, and parameters from articles. Because several studies did not provide enough statistical information to be included in a meta-analysis, we did a narrative synthesis to summarise results with studies categorised as showing either a positive association, mixed results, or no association. The primary outcome in the random-effects meta-analysis was mental health-related morbidity, defined as the prevalence or incidence of any mental health problem. This study is registered with PROSPERO, number CRD42016036377.

**Findings** Our search identified 15 615 non-duplicate references, of which 113 were deemed potentially relevant and were assessed for eligibility, leading to the inclusion of 27 studies in the qualitative synthesis. Nine articles found a positive association between income inequality and the prevalence or incidence of mental health problems; ten articles found mixed results, with positive association in some subgroups and non-significant or negative association in other subgroups; and eight articles found no association between income inequality and mental health problems. Of the nine articles included in our meta-analysis, one reported a positive association between income inequality and mental health problems, six reported mixed results, and two reported no association. Pooled Cohen's *d* effect sizes for the association between income inequality and any mental disorder or mental health problems were 0.06 (95% CI 0.01–0.11) for any mental disorder, and 0.12 (0.05–0.20) for depressive disorders. Our meta-regression analysis showed that none of the factors considered (sample size, contextual level at which income inequality was assessed, quality assessment, type of instruments, and individual income as control variable) explained heterogeneity between studies ( $I^2$  89.3%;  $p < 0.0001$ ). Only one study investigated the association between income inequality and resilience; it found greater income inequality was associated with higher prevalence of depression only among individuals with low income. The only study of the role of income inequality as a determinant of the use of mental health services reported no association.

**Interpretation** Income inequality negatively affects mental health but the effect sizes are small and there is marked heterogeneity among studies. If this association is causal and growing income inequality does lead to an increase in the prevalence of mental health problems, then its reduction could result in a significant improvement in population wellbeing.

**Funding** None.

## Introduction

Mental disorders are highly prevalent and are associated with a substantial proportion of the global burden of disease. Pooled 1-year prevalence of mental disorders is estimated to be 17.6% among adults<sup>1</sup> and 13.4% among children and adolescents.<sup>2</sup> It has been estimated that mental disorders account for 22.9% of all years lived with disability (YLD) worldwide,<sup>3</sup> and for 32.4% of YLD when mental health problems that are not clinically diagnosable<sup>4</sup> are considered. Studies have established that, along with genetic and biological factors, social

determinants affect individual and population mental health,<sup>5–7</sup> and that contextual factors, such as deprivation, poverty, and violence negatively affect mental health. Analysing data from a study of twins, Caspi and colleagues<sup>8</sup> concluded that 20% of variance in children's behaviour problems were attributed to contextual factors, and that neighbourhood deprivation accounted for 5% of the contextual effect.

It has been proposed that income inequality affects health through a material pathway and a psychosocial pathway. In the material pathway, income inequality

*Lancet Psychiatry* 2017

Published Online

May 25, 2017

[http://dx.doi.org/10.1016/S2215-0366\(17\)30206-7](http://dx.doi.org/10.1016/S2215-0366(17)30206-7)

S2215-0366(17)30159-1

See Online/Comment

[http://dx.doi.org/10.1016/S2215-0366\(17\)30206-7](http://dx.doi.org/10.1016/S2215-0366(17)30206-7)

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Personal Social Service

Research Unity, London School

of Economics and Political

Science, London, UK

(W Silva Ribeiro PhD,

A Bauer MSc, Prof M Knapp PhD,

S Evans-Lacko PhD);

Departamento de Psiquiatria,

Universidade Federal de

São Paulo, São Paulo, Brazil

(M César Rezende Andrade PhD,

P Mario Pan MSc); University of

East London, London, UK

(M York-Smith MSc); Università

degli studi di Modena e Reggio

Emilia, Italy (L Pingani PhD);

and Escola Nacional de Saúde

Pública, Fundação Oswaldo

Cruz, Rio de Janeiro, Brazil

(Prof E Silva Freire Coutinho PhD)

Correspondence to:

Dr Wagner Silva Ribeiro, Personal

Social Service Research Unity,

London School of Economics and

Political Science,

WC2A 2AE London, UK

[w.silva-ribeiro@lse.ac.uk](mailto:w.silva-ribeiro@lse.ac.uk)

**Research in context****Evidence before this study**

A recent meta-analysis has shown that income inequality increases the odds ratio for poor health and the relative risk of mortality. However, empirical studies of the association between income inequality and mental health problems have shown mixed results, with some studies finding that greater income inequality is associated with higher prevalence of mental health problems, whereas other studies have reported no association. Methodological heterogeneity between studies might be responsible for such mixed results. We identified research by searching six electronic databases for studies investigating the association between income inequality and mental health problems.

**Added value of this study**

Our meta-analysis found that income inequality is associated with mental health problems and with depressive disorder, albeit the overall effect sizes were small (0.06 and 0.12, respectively).

**Implication of all the available evidence**

Reducing income inequality could improve population mental health and wellbeing, which supports its inclusion in the public health agenda.

affects health outcomes through poverty and deprivation, which are related to increased stress<sup>9</sup> and reduced access to health care,<sup>10</sup> and are prevalent in highly unequal societies.<sup>11</sup> The psychosocial pathway relies on status competition and insecurity,<sup>12</sup> leading to social problems,<sup>13</sup> such as lack of social cohesion and violence, low levels of trust, and weaker community life.<sup>12</sup> Evidence shows that these psychosocial factors can affect health through physiological effects of chronic stress and through their effects on health-related behaviours and individuals' self-esteem.<sup>14</sup> Those, in turn, cause psychosocial stress<sup>5,6</sup> and increase the risk of developing mental health problems at an individual level.<sup>15-19</sup>

Understanding the association between income inequality and mental health could have major public health implications if the association is shown to be causal. For example, in a recent meta-analysis,<sup>11</sup> investigators estimated that for every 0.05 unit increase in the Gini coefficient of income inequality, the odds ratios for poor health and overall relative risk of mortality increased 4% and 8%, respectively. If income inequality has a similar effect on mental health, then a reduction in inequality could lead to improved population wellbeing.

So far, empirical studies of the association between income inequality and mental health problems have shown mixed results. Pickett and Wilkinson<sup>12</sup> reported a strong correlation ( $r=0.73$ ) in high-income countries. In the USA, the result was replicated in women and children, but not in men.<sup>12</sup> Other findings have shown that income inequality is negatively correlated with mental health in the USA at state level, but not at more proximal levels, such as community, or in other countries.<sup>20</sup> Such mixed results might be attributed to methodological heterogeneity between studies, such as study design, methods used to assess mental health problems, or contextual levels at which income inequality was measured. Therefore, it is important to address these results in a systematic review and meta-analysis, which can deal with heterogeneity between

studies and results through statistical methods and sensitivity analysis.

We aimed to investigate the association between income inequality and mental health-related morbidity, defined as the prevalence or incidence of any mental health problem. Specifically, we wanted to assess the association between income inequality and prevalence and incidence of mental disorders. Social capital and social cohesion, which are affected by income inequality, are thought to facilitate access to health care<sup>21</sup> and to increase resilience, defined as the ability to cope with adversity.<sup>22</sup> Therefore, we also investigated the association between income inequality and the use of mental health services and resilience. We hypothesised that the prevalence and incidence of mental disorders would be higher, and that resilience and use of mental health services would be lower, in people living in regions with greater income inequality.

**Methods****Search strategy and selection criteria**

This systematic review followed the Centre for Review and Dissemination's guidance for reviews in health care. The protocol is available online. We searched six electronic databases (Global Health, PsychARTICLES, PsycINFO, Social Policy and Practice, Embase, and MEDLINE) with no initial time or language restriction for articles published up to July 6, 2016. The following subject heading and keywords were used: (income inequality-related terms) AND (mental health-related terms OR resilience; the full search term list is available in appendix p 1). Studies not identified through the search were sought by consulting experts, and by checking reference lists of included articles and relevant review articles.

We included quantitative studies of the association of income inequality with prevalence or incidence of mental disorders or mental health problems, resilience, and use of mental health services. Inclusion criteria were: assessment of mental health problems at the individual

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