



# A Literature Review on Poverty and Mental Health: Casual Relationship and Their Measurements

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## SUMMARY

*Background* Poverty is a major issue in public health. People, both adults and children, living in poverty are likely to experience physical as well as psychological health problems. Evidence has suggested that low income and deprivation of material necessities are strongly associated with poorer mental health. Moreover, interventional studies have also discovered long-term positive impact of cash transfer and antipoverty programs on mental health. Despite the growing body of literature that examined the associations between poverty and mental health, few studies reviewed the measurements of poverty and mental health outcomes in recent literature. This literature review therefore aims to bridge the research gap by examining the measurements of poverty and mental health outcomes used in recent literature, and the potential bidirectional relationship of poverty and mental health suggested by recent literature.

*Methods* Pubmed was used as the search engine. Original studies that were available in English, publicized within 5 years, and had full texts available were included. For selecting articles relevant for addressing the research aims, titles and abstracts were screened to select those looking at the associations or the causal relationship between poverty and mental health. Additionally, randomized controlled trials (RCTs) that specifically focused on the impact of anti-poverty interventions on mental health were also included.

*Results* Thirty-four studies were included in the final set of literature, among which 8 studies were RCTs on anti-poverty interventions, and the rest were observational studies on poverty and mental health outcomes. Income was the most frequently used measurement of poverty in observational studies (n=10). In addition, household incomes (n=8) was used more often than individual incomes (n=2). Deprivation (n=6) and food insecurity (n=4) were other frequent measurements of poverty. When it comes to the measurement of mental health outcomes, depressive symptoms measured by Center for Epidemiologic Studies Depression Scale (CES-D) was the most prevalent in all included studies (n=8). All recent observational studies indicated associations between poverty and poor mental health. Additionally, included RCTs on anti-poverty interventions like cash transfer programs or mentoring programs significantly improved mental health of the participants. Combinational anti-poverty interventions of cash transfer programs and mentoring programs were found to be even more effective than the cash transfer programs alone.

*Conclusions* Recent observational studies shown positive associations between poverty and poor mental health outcomes, mainly depression and poorer general mental well-being. Income and deprivation were closely interrelating measurements of poverty, and contributed both individually as well as collaboratively to the associations. RCTs suggested causal

relationships between poverty and mental health outcomes by demonstrating the improvement of mental health after anti-poverty interventions, especially for those combining mentoring with cash transfers.

## 1. BACKGROUND

Poverty is a major issue in public health. United Nation defines poverty as “a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information” and that poverty “depends not only on income but also on access to social services (1).” People living in poverty are likely to experience both physical and psychological health problems (2, 3). Long exposure to poverty is also negatively associated with the learning and academic performance in children (4). Likewise, mental health is a crucial problem. According to WHO, 970 million people worldwide suffered from mental disorders in 2019. Both anxiety and major depressive disorders especially experienced a sharp increase in their prevalence after the outbreak of the COVID-19 pandemic (5). Mental disorders are also causing a huge financial burden to the health care system due to the substantial medical costs they derived around the globe (6, 7).

In recent years, there is a growing body of literature that focuses on the associations and the potential causal relationship between poverty and mental health outcomes. Low income and deprivation of material necessities are strongly associated with poorer mental health (8-10). Studies that examined the associations between poverty and physical health also resulted in the same conclusion (10). Moreover, the associations between poverty and mental health were observed in children. Evidence showed that maternal economic status and deprivation of material necessities were associated with poorer mental health of children such as the development of depression (11, 12).

In spite of the abundance of literature establishing associations between poverty and mental health, one must be careful with assuming a direct causal relationship of one variable to the other. In the field of epidemiology, a factor is said to cause a given outcome when the factor increases the probability of the incidence of the outcome (13). A strong association can sometimes be confused as a causal relationship. However, other factors such as biases and confounding factors would have to be excluded before associations could be interpreted as causal. Conducting randomized controlled trials (RCTs), like in most cases to determine a new treatment’s efficacy, is one of the most effective way to demonstrate the underlying causal relationship between two variables (14). However, it is not always feasible or ethical to conduct such a trial. For instance, depriving subjects of all financial means to observe the development of depression in these subjects would be an unethical way to investigate the causal relationship of poverty to mental health. Well-established causal relationships are of high value in improving public health. They provide policy makers with insights on making future policy that could effectively tackle a given public health issue. Suppose poverty is discovered to result in the development of mental disorders, then governmental initiatives on providing subsidy to the poor can improve the public’s mental well-being.

Some studies looking at RCTs on antipoverty programs suggested causal evidence between poverty and mental health from a different perspective. Instead of examining the direct impact poverty has on the development of mental health, these RCTs were designed to see the effects of the interventions to improve mental health outcomes through reducing poverty. The impact cash transfer and antipoverty programs have on mental health was found to be positive and long-term (9). Some evidence suggested that cash transfer programs (CTPs) not only reduce suicide rates and symptoms of depression, but they also contribute to the mental wellbeing of the community as a whole by offering support to individuals (15). Unconditional cash transfer programs as well have strong mental health benefits for the poor (16). Furthermore, the role of specific economic interventions such as family assets, employment, and rental assistance in improving the mental health of the beneficiaries was also discovered (17, 18).

Both directions of the potential causal relationship between poverty and mental health have been investigated: the pathway from poverty to mental illness and vice versa. Some studies found that long-term postpartum depression could lead to detrimental effects on children's psychological well-being (19). On the other hand, the development of mental illness such as depression or anxiety might result in a decrease in employment rate, an indication of poverty, according to other studies that targeted the adult population (9). Several proposed mechanisms of mental illness leading to poverty include decreased cognitive function, lowered productivity due to fatigue, and discrimination involving social stigma. Since cognitive function could be impaired by mental illness, the decreased cognitive function reduces the working ability of those suffering from these illnesses. Moreover, people who are depressed are also more prone to fatigue (20), and experience difficulties to focus for a long period of time (21). This negatively affects their productivity at work (22). The affected individuals might therefore be only able to work for reduced hours than that of mentally healthy individuals. Additionally, social stigma towards people with mental illness might cause discrimination of this population in the job market, leading to lower salaries or hiring rates (23).

According to a perspective published in 2022, some studies have suggested an aggregated impact of different scopes of poverty on mental health (24). The scopes of poverty ranged from absolute poverty on a personal level to poverty inequality on a national level, all of which respectively contributed to a person's mental health. Family poverty and neighbourhood poverty was found to have negative impact on the mental health of children and the youth (25). Some studies have suggested that decreased income and unemployment, two of the drivers of individual poverty, resulted in the development of mental illness such as depression or mortality through drug overdoses (9). Underlying mechanisms might consist of the uncertainties and challenging living conditions linked to poverty. Constant concerns over financial situation to sustain one's living could place those with unstable income under

substantial stress (26). This population is also more likely to live in challenging ecological environments where natural disasters or pollutions pose a threat to the mental health of the residents (27, 28).

The diverse aspects of poverty were embodied in the various measurements of poverty in the literature. Common measurements of poverty used in studies include the amount of income received per unit or the employment status of an individual (8, 9). Depending on the study design, income could come in different subtypes like household income or individual income. For mental health outcomes, various scales for the evaluation of mental disorders performed by health care professionals and subjective self-assessed mental health questionnaires are reported to measure mental health outcomes in a recent meta-analysis (8). However, income alone does not cover every aspect of poverty and might only be applicable for adults who are legal to and have the capability to work. Limiting the inclusion of studies to those that looked at income as the measurement of poverty could potentially leave out population like children and the elderly who have already retired. Furthermore, while true that income and employment implicate large degree of poverty, they do not capture every dimension of living in poverty. Therefore, the studies that look at the two factors could not identify other contributors that might also play a role in affecting mental health of individuals.

It would be of value to inform policy makers on specific dimensions of the broader poverty that are associated with mental health, as well as the specific types of mental health issues that are commonly linked to poverty. However, few studies reviewed the measurements of poverty and mental health outcomes in recent literature. We are therefore interested in bridging the gap by conducting a literature review with the following research questions: What are the measurements of poverty in recent studies? What are the measurements of mental health in recent poverty studies? What do recent studies suggest regarding potential bidirectional causal relationship between poverty and mental health? The results of the literature review would provide more insight into the mechanisms between certain poverty aspects and mental health outcomes, allowing policy makers to implement efficient welfare policies in tackling public mental health.

## 2. METHODS

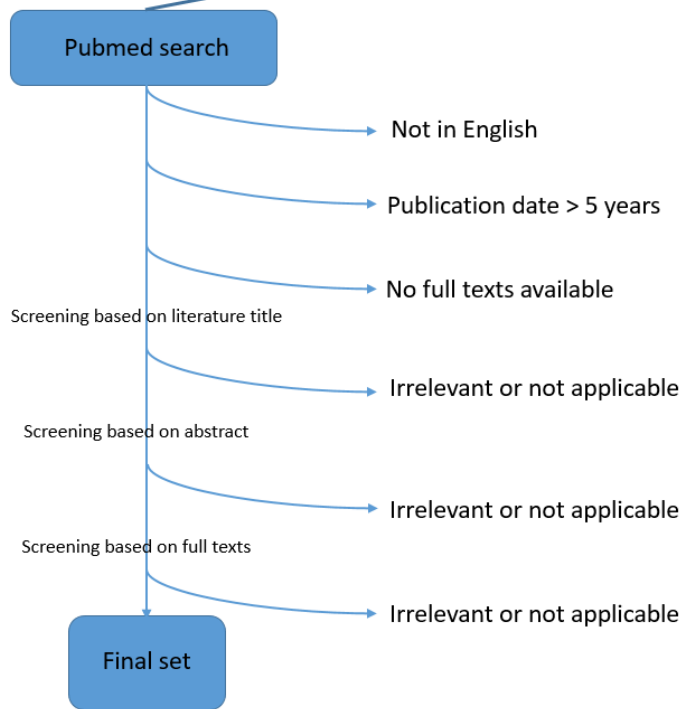
### *Search terms and inclusion criteria of the literature*

In this literature review, Pubmed was used as the search engine. Searching of the literature was performed on the 28<sup>th</sup> of September in 2022. The search strategy was based on the meta-analysis by Thomson and Igelström (2022) on the impact of change in income on mental health. The search terms poverty[MeSH Terms] and mental health[MeSH Terms] were identified and used in our search. The complete search term used in Pubmed was ((((((poverty[MeSH Terms]) AND (mental health[MeSH Terms])) NOT (review[Publication Type])) NOT (meta-analysis[Publication Type])) NOT (systematic review[Publication Type]) NOT (comment[Publication Type])). Filters of studies that were available in English, publicized within 5 years, and had full texts available were applied. For selecting articles relevant for answering the research questions, the following steps were taken: 1) screening of titles, 2) screening of abstracts, and 3) reading the full text (Figure 1). After screening the titles and the abstracts of the remaining studies at this step, studies irrelevant or whose publication type was non-applicable were further excluded. Studies that looked at the associations or the causal relationship between poverty and mental health were considered relevant and would be included. For studies with multiple hypotheses, they would be included if any of their research questions looked at the associations or the causal relationship between poverty and mental health. Furthermore, RCTs that specifically focused on the impact of anti-poverty interventions on mental health were also included. In that case, a given study would be considered irrelevant if poverty was not a variable or exposure of the study but rather a general description of the characteristic of all subjects. For example, studies that looked at mental health changes due to COVID-19 in low income countries would be excluded. When it comes to study types, only original research articles were included. Articles focusing on the inequality in mental health as study outcome was also excluded. Either poverty or mental health should be the observed outcome, while the other being the exposure. That is, mediation studies with poverty as mediator of a relationship between an exposure different from poverty and mental health would be excluded.

*Figure 1. Flow chart of the search and the extraction of literature.*



(((poverty[MeSH Terms]) AND (mental health[MeSH Terms])) NOT (review[Publication Type])) NOT (meta-analysis[Publication Type])) NOT (systematic review[Publication Type]) NOT (comment[Publication Type])

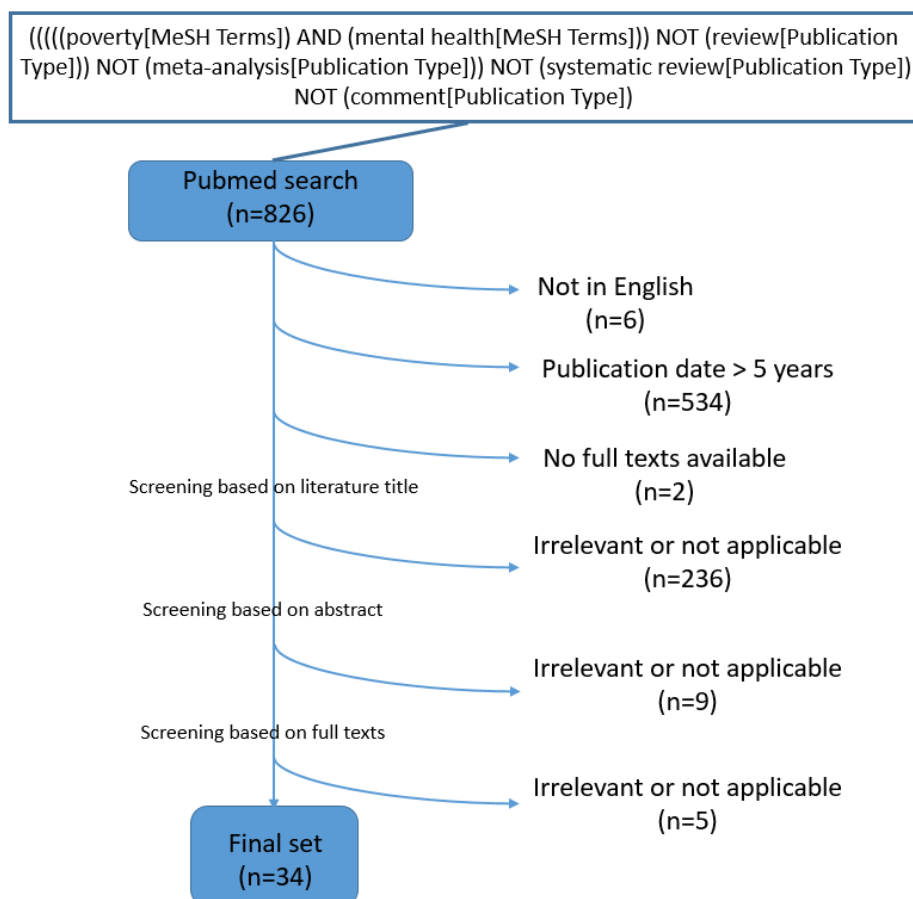


### 3. RESULTS

#### *Selection of the literature*

Figure 2 presents the results of the selection of literature. After applying the search terms, 826 results were yielded. After applying the filters of studies that were available in English, publicized within 5 years, and had full texts available, two hundred and eighty-four studies remained. Two hundred and fifty studies were then excluded after screening the title, the abstract, and the full texts. In the final set of literature, thirty-four studies were included. Among the total 34 studies that were included, eight of them were RCTs on anti-poverty interventions, and the rest were observational studies on poverty and mental health outcomes. To address the research questions, the abstracts of the studies on anti-poverty interventions and mental health were reviewed, while full texts of the research aims, methods, results, and the discussions of studies were reviewed for all the observational studies in the final set of literature.

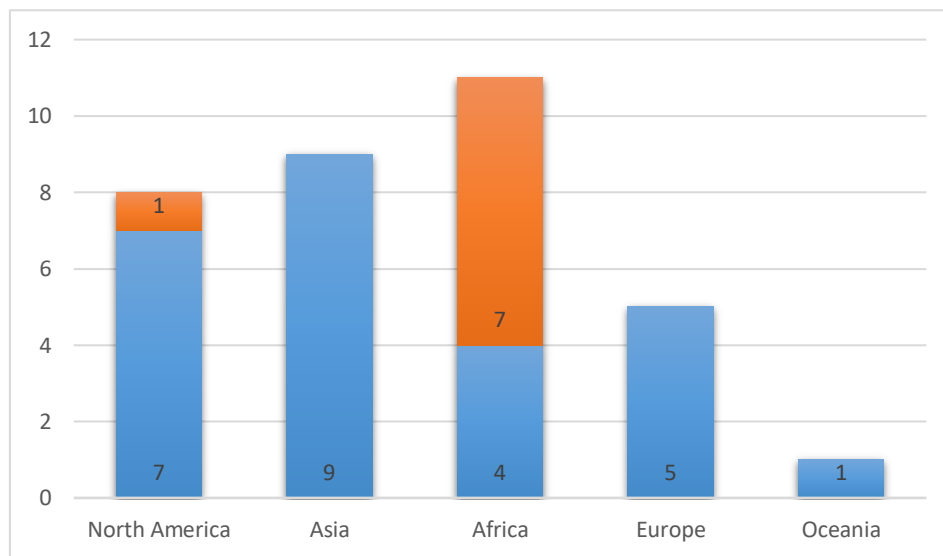
*Figure 2. The selection of literature.*



### Characteristics of the literature

Characteristics of the selected 26 observational studies and the 8 RCTs are listed respectively in table 1 and table 2. Figure 3 shows the continents where the studies were performed. The majority of the studies were performed in Africa (n=11). Most observational studies were performed in Asia (n=9). North America, or the United States of America (USA) in this case, accounts for 7 observational studies, and Europe accounts for 5. Four observational studies were performed in Africa, and only one study was performed in Oceania in Australia. However, most RCTs on anti-poverty interventions were performed in Africa (n=7), with only one performed in North America.

Figure 3. Frequency of the continent where the studies were performed.



Blue: observational studies. Orange: RCTs.

Table 1. Characteristics of the literature on observational studies.

Title	First author	Year	Journal	Study subjects	Country/ Region	Poverty	Mental Health
Mechanisms connecting objective and subjective poverty to mental health	Chang, Q	2020	Social science & Medicine	1605 household heads	Hong Kong	Income Self-assumption	Chinese Health Questionnaire
Housing affordability effects on physical and mental health: household survey in a population with the world's greatest housing affordability stress	Chung, R. Y.	2020	Journal of Epidemiology and Community Health	1978 adults	Hong Kong	Income	MCS in SF-12v2
Triple jeopardy: the joint impact of racial segregation and neighborhood poverty on the mental health of black Americans	Do, D. P.	2019	Social psychiatry and psychiatric epidemiology	16,000 blacks and 56,000 whites over 25 years old	USA	Neighborhood poverty*	K6
Does social capital interact with economic hardships in influencing older adults' health? A study from China	Gu, L.	2021	International journal for equity in health	1712 urban and 1823 rural adults between 65-95 years old	China	Income	CES-D
Effects of multidimensional child poverty on children's mental health in Mainland China	Li, C.	2020	Journal of Health Psychology	1314 fourth to ninth graders	China	Deprivation	CDI, SASC, CSES, GSES

Multidimensional energy poverty and mental health: micro-level evidence from Ghana	Lin, B.	2020	International Journal of Environmental Research and Public Health	household heads	Ghana	Deprivation	K-10
Maternal depression and economic well-being: A quasi-experimental approach	McGovern, M. E.	2022	Social science & Medicine	2691 mothers	USA	Income Deprivation	CIDI-SF
Study of the differential consequences of neglect and poverty on adaptive and maladaptive behavior in children	Herruzo, C.	2020	International Journal of Environmental Research and Public Health	157 children between 3 and 12 years	Andalusia, Spain	Children from marginalized slum areas	BASC
The double burden of poverty and marital loss on the mental health of older Australian women; a longitudinal regression analysis using 17 annual waves of the HILDA cohort	Ervin, J. L.	2021	Social Psychiatry and Psychiatric Epidemiology	5055 adults over 65 years old	Australia	Income	MHI
The impact of household energy poverty on the mental health of parents of young children	Mohan, G.	2022	Journal of Public Health	Families of 8568 children of 9-year-old	Ireland	Deprivation	CES-D

Associations between food insecurity and the severity of psychological distress among African-Americans	Allen, N. L.	2018	Ethnicity and Health	4003 Black/African American adults	California	Food insecurity	K6
Socioeconomic and lifestyle factors associated with mental health problems among Mongolian elementary school children	Aoki, A.	2022	Social Psychiatry and Psychiatric Epidemiology	1694 4th year public elementary school students	Ulaanbaatar (Mongolia)	Income	SDQ
Period poverty and mental health implications among college-aged women in the USA	Cardoso, L. F.	2021	BMC Womens Health	471 college attending women	USA	Deprivation	PHQ
Deprivation is associated with worse physical and mental health beyond income poverty: a population-based household survey among Chinese adults	Chung, R. Y.	2018	Qual Life Res	2282 household respondents	Hong Kong	Income	MCS in SF-12v2
The association between neighbourhood-level deprivation and depression: evidence from the south african national income dynamics study	Dowdall, N.	2017	BMC Psychiatry	11955 adults	South Africa	Neighborhood poverty**	CES-D

Mental health problems and socioeconomic disadvantage: a controlled household study in rural Ethiopia	Hailemichael, Y.	2019	International journal for equity in health	835 households	Ethiopia	Socioeconomic status	WHODAS-II
Maternal Economic Well-Being and Mental Health among Young Adult Children: Race/Ethnicity	Lee, J.	2021	International Journal of Environmental Research and Public Health	4224 children and young adults	USA	Income	CES-D
Food insecurity, mental distress, and suicidal ideation in rural Africa: Evidence from Nigeria, Uganda and Ghana	Sweetland, A. C.	2019	International journal of social psychiatry	1142 rural village residents	Nigeria, Uganda, and Ghana	N/A	K6, PRIME-MD
Economic growth and mental health in 21st century China	Wang, Q.	2019	Social Science & Medicine	17705 adults over 45 years old	China	Income	CES-D
Food insecurity and maternal mental health among african american single mothers living with HIV/AIDS in the alabama black belt	Zekeri, A. A.	2019	Journal of Health Care for the Poor and Underserved	190 African American mothers	Black belt, USA	Food insecurity	CES-D

Trajectory of Food Insecurity and Its Association with Longitudinal Mental Health and Sleep Outcomes in Adolescents from Economically Disadvantaged Families	Lee, T. H.	2021	Nutrients	1921 teenagers between 12-18 years old	Taiwan	Food insecurity	BSRS
How Working Conditions, Socioeconomic Insecurity, and Behavior-Related Factors Mediate the Association Between Working Poverty and Health in Germany	Pförtner, T. K.	2022	International journal of public health	11500 employees between 17-67 years old	Germany	Income	MCS in SF-12v2
Socioeconomic status, stressful life situations and mental health problems in children and adolescents: Results of the German BELLA cohort-study	Reiss, F.	2019	PLoS One	2111 participants between 7-17 years old	Germany	Income	SDQ
Household food insecurity and mental health among teenage girls living in Urban Slums in Varanasi, India: a cross-sectional study	Rani, D.	2018	International Journal of Environmental Research and Public Health	418 teenage girls between 13-19 years old	Varanasi, India	Food insecurity	MHI



Health inequalities between employed and unemployed in northern Sweden: a decomposition analysis of social determinants for mental health	Brydsten, A.	2018	International journal for equity in health	2371 adults between 16-64 years old	Sweden	Employment	GHQ
Associations between mental health and job loss among middle- and low-income veterans and civilians during the COVID-19 pandemic: An exploratory study	Umucu, E.	2022	Stress Health	6607 adults over 22 years old	USA	Employment***	PHQ, PCL-5, short-form UCLA Loneliness Scale

CES-D: Center for Epidemiologic Studies Depression Scale. MCS: Mental Component Summary. SF-12v2: 12-item Short-Form Health Survey version 2. K6: Kessler 6 scale. K-10: Kessler 10 scale. CDI: Children's depression Inventory. SASC: Social Anxiety Scale for Children. CSES: Rosenberg's Children's Self-Esteem Scale. GSES: General Self-Efficacy Scale. CIDI-SF: Composite International Diagnostic Interview Short Form. BASC: Behavior Assessment System for Children. MHI: Mental Health Inventory. SDQ: Strengths and Difficulties Questionnaire. PHQ: Patient Health Questionnaire. WHODAS-II: WHO Disability Assessment Schedule. PRIME-MD: Primary Care Evaluation of Mental Disorders. BSRS: Brief Symptom Rating Scale. GHQ: General health questionnaire. PCL-5: PTSD Checklist for DSM-5.

\*proportion of residents below the federal poverty level

\*\* measured by residents' income and material, employment, education, and living environment index

\*\*\* Job loss in the past month

Table 2. Characteristics of the literature on RCTs.

Title	First author	Year	Journal	Study subjects	Country/ Region	Anti-poverty interventions	Mental Health
Government of Malawi's unconditional cash transfer improves youth mental health	Angeles, G	2019	Social science & medicine	2099 adolescents	Malawi	National Unconditional cash transfer program	CES-D
The Impact of a Family-Based Economic Intervention on the Mental Health of HIV-Infected Adolescents in Uganda: Results From <i>Suubi + Adherence</i>	Cavazos-Rehg, P.	2021	The Journal of adolescent health	702 HIV adolescents	Uganda	<i>Suubi + Adherence</i>	BHS, CDI, TSCS
Evaluating potential mediators for the impact of a family-based economic intervention ( <i>Suubi+Adherence</i> ) on the mental health of adolescents living with HIV in Uganda	Cavazos-Rehg, P.	2021	Social science & medicine	702 HIV adolescents	Uganda	<i>Suubi + Adherence</i>	BHS, CDI, TSCS
Impact of cash incentives for low-income individuals to seek a primary care visit on mental health	Bradley, C. J.	2020	Social science & medicine	981 subjects	Virginia, USA	Cash incentive to see a primary care provider	PROMIS

outcomes: Evidence from a randomized controlled trial							
Mechanisms and perceived mental health changes after a livelihood intervention for HIV-positive Kenyans: Longitudinal, qualitative findings	Hatcher, A. M.s	2020	Transcultural psychiatry	31 farmers with HIV	Kenya	Shamba Maisha intervention	Qualitative interviews
Improving mental health among ultra-poor children: Two-year outcomes of a cluster-randomized trial in Burkina Faso	Ismayilova, L.	2018	Social science & medicine	360 adolescents (10-15 years)	Burkina Faso	TU, TU+	CES-DC, RSES, CRIES
The worse the better? Quantile treatment effects of a conditional cash transfer programme on mental health	Ohrnberger, J.	2020	Health Policy Plan	790 HIV adults	Malawi	Malawi incentive program	MCS in SF-12
Cost-Effectiveness of a Savings-Led Economic Empowerment Intervention for AIDS-Affected Adolescents in Uganda: Implications for Scale-up in Low-Resource Communities	Ssewamala, F. M.	2018	The Journal of adolescent health	1383 adolescents	Uganda	Bridges, Bridges+	CDI, BHS, interviews

BHS: Beck Hopelessness Scale. TSCS: Tennessee Self Concept Scale. PROMIS: Patient-Reported Outcomes Measurement Information System. CES-DC: Center for Epidemiologic Studies Depression Scale for Children. RSES: Rosenberg Self-Esteem Scale. CRIES: Children's Revised Impact of Events Scale.

### *Measurements of poverty in recent observational studies*

Generally speaking, the concept of poverty expands across various dimensions even only on an individual or a household level. Poverty is often measured objectively from material perspectives, such as income or deprivation of basic materials and needs to sustain one's life (10-12, 29-46). The frequency of the measurements of poverty is illustrated in figure 4. Among the measurements of poverty that were used in the selected observational studies, income was the most frequently used measurement (n=10), whose data was usually extracted from national surveys or database (10, 12, 29-31, 33, 34, 40, 42, 45, 47). Measurements of income could be further categorized into household incomes and individual incomes. In studies that gave details on the construction of household incomes, both private income and payments from the government were included in the household income (29, 34). In a study that looked at housing affordability, the monthly household incomes were first subtracted with monthly mortgage repayments or rents before grouping the subjects (30). It is rather less common to assign a certain numerical threshold to categorize subjects into groups of different levels of poverty. Relative poverty, on the other hand, was more often used. Dividing participants into groups based on quartiles of household incomes or setting median monthly household income as the poverty line were common approaches (10, 29, 31, 34, 45). For example, low household income in a study was defined by the population in the lowest quartile of household income (31). Similarly, other studies that also used income as the measurement of poverty assigned subjects whose household income was below median to the poverty group (29, 34). For studies performed in the USA, federal poverty limit was often used as a reference for defining poverty groups (12, 33, 36, 47). Individual incomes were also the measurement of poverty in some studies (12, 31). However, they were less frequently used compared to household incomes.

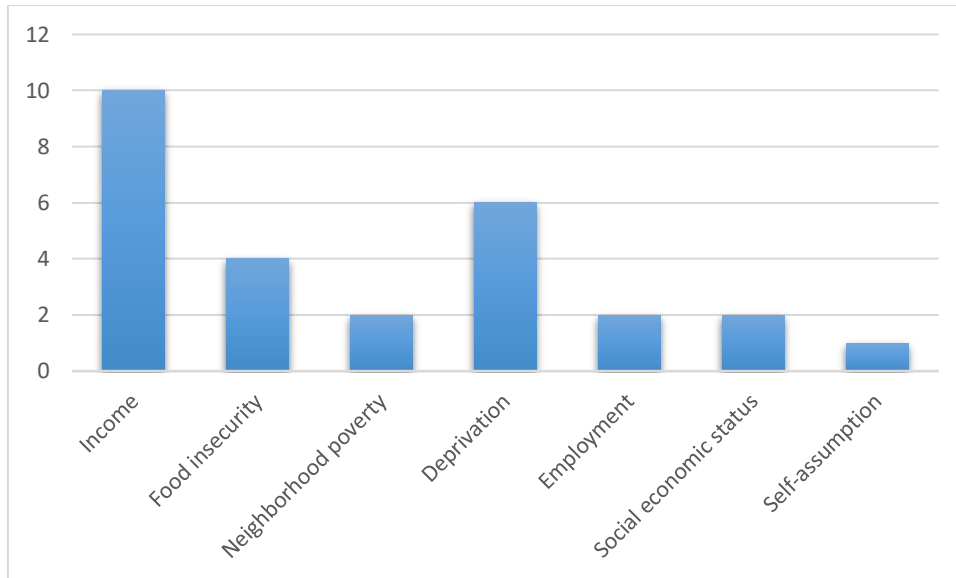
The second-to-most frequently used measurement of poverty in recent observational studies was deprivation (n=6) (10, 11, 32, 33, 35, 39). Studies that measured deprivation often made use of surveys to collect the data. In most cases, respondents of these surveys were asked whether they struggled to afford certain service or products over a past period of time or the frequency they experienced these struggles (11, 33, 35, 39). Questions commonly asked in these surveys were Some studies looked at multiple dimensions of deprivation, while others focused on the deprivation of a specific category. For instance, a study that examined the impact multidimensional deprivation has on children included a total of seven dimensions of deprivation. Looking at the individual impact of food, drinking water, hygienic facilities, health care, education, housing, and information, it is suggested that food deprivation, healthcare deprivation, educational deprivation, and information deprivation specifically contributed to poor mental health in children (32). Energy poverty, measured by the deprivation of heating in the household in a study, was an example of studies that focused on a specific dimension of

deprivation (35). Similarly, period poverty was focused in a different study. Deprivation of menstrual products was the specific deprivation dimension used to measure poverty of individuals in this case (39).

Food insecurity is another way used in the included studies to measure and classify poverty level. Modules and food insecurity scales were common measuring tools to collect data for this type of study design (36, 41, 43, 46). Measuring food insecurity on an individual level was more frequently used than measuring that of a household. Varieties in study designs of this type were observed (36, 41). A study conducted in California also took into account of hunger, and separated the participants with food insecurity into those experiencing hunger and those without, in order to identify the role that hunger plays in determining the severity of psychological distress regarding food insecurity (36). Rather than investigating only the food insecurity status of subjects at the time when the measuring took place, a study included an additional group of subjects whose food insecurity level declined from highly insecure to low insecure as well throughout the study period (41).

Other measurements to classify the poverty level of study participants were also used (33, 37, 38, 44, 47-50). To identify individuals who are likely to live in poverty or to measure poverty on a societal level, neighbourhood poverty was used (47-49). Poor neighbourhoods were defined with the use of national's data or index, which gave information on the social-economic performance of a given geographical area. The proportion of population living below federal poverty level in a neighbourhood, for instance, indicated poor neighbourhoods in a study (47). A disadvantageous social-economic area could also be identified by looking at multiple factors (48, 49). A South African study identified neighbourhood poverty as the neighbourhoods whose residents had low income and suffered from deprivation of multiple domains, such as material, employment, education, and living environment (48). Additionally, the employment and the social-economic status were also used as poverty measurements in recent literature (33, 38, 44, 50). Studies that used social-economic status as measurements often had their own contributing criteria (40, 44). However, income was a common criterion that were shared in different studies. In a study where social-economic status was the measurement of poverty, a composite index of household income, parental education, and parental unemployment contributed to determining the social-economic status of an individual (44). The other study used equalized household income, consumption, and asset-based wealth to define household social-economic status (40). Furthermore, subjective poverty was used in one study as the measurement of poverty (29). In this study, participants were asked if they considered themselves living in poverty according to their living environment.

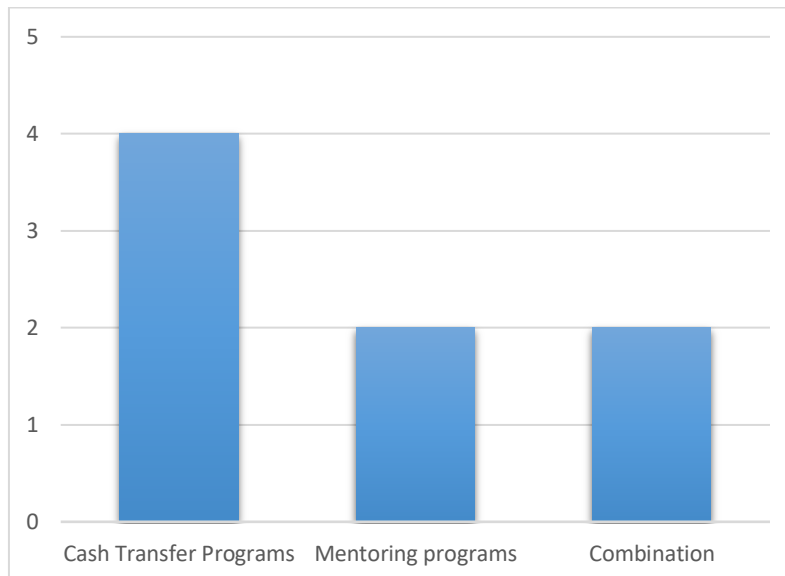
Figure 4. Frequency of poverty measurements in observational studies.



#### Types of anti-poverty interventions in recent RCTs

Anti-poverty interventions that were observed in the selected RCT studies could be roughly classified into cash transfer programs (n=4), finance-related mentoring programs (n=2), and the combination of both (n=2) (Figure 5). Finance-related mentoring programs come in various forms such as financial workshops, trainings on financial management, trainings on income-generating activities (51-53).

Figure 5. Frequency of types of anti-poverty interventions.



#### Measurements of mental health in recent studies

The questionnaires used to measure mental health and their measuring outcomes are listed in table 3. Center for Epidemiologic Studies Depression Scale (CES-D), which evaluates the

status of depression, was used the most among all 34 selected studies (n=8) (12, 31, 35, 45, 46, 48). CES-D also serves as a reliable predictor for the risk of mortality in older people (31). Kessler scales, the 6 (K6) or the 10 (K10), were the second-to-most frequently used measurement of mental health (n=4), focusing on the evaluation of psychological distress (11, 36, 47, 54). The mental component summary (MCS) in a 12-item Short-Form Health Survey version 2 (SF-12v2) was another frequently used measurement of mental health (n=3) (10, 30, 42). This scale evaluates the general psychological distress and well-being of the individual. Depression in children were often measured by Children’s Depression Inventory (CDI), as observed in 3 of the included studies (17, 32, 55). Mental Health Inventory (MHI), Beck Hopelessness Scale (BHS), and Patient Health Questionnaire (PHQ) were all observed twice in the included studies. They respectively assessed general mental issues including anxiety, depression, and behavioural control (34, 43), hopelessness (17, 55), and anxiety and depression (39, 50). Other measurements of mental health were observed only once in this review (29, 33, 37, 38, 41, 44, 49). Among these measurements, depression and anxiety accounted for the outcomes which were most frequently examined (32, 33). For instance, Social Anxiety Scale for Children (SASC) and Composite International Diagnostic Interview Short Form (CIDI-SF) were used to measure these outcomes. For children, behaviour assessments and difficulties were common measurements of mental health as well (37, 44, 49). Teachers or parents of a given child were often the respondents of the questionnaires used in these assessments. While negative mental health outcomes were used in most studies, a study focusing on children also measured positive mental health outcomes in children, specifically self-esteem and self-efficacy (32).

*Table 3. Questionnaires used as measurements of mental health in all studies*

Name of the questionnaire	Number of times used in the studies	Measuring outcome(s)
Center for Epidemiologic Studies Depression Scale (CES-D)	n=8 (19%)	Depression
6-item (K6) and 10-item (K10) Kessler scales	n=4 (9.5%)	Psychological distress
Mental component summary (MCS) in 12-item Short-Form Health Survey version 2 (SF-12v2)	n=3 (7.1%)	Psychological distress Well-being
Children’s Depression Inventory (CDI)	n=3 (7.1%)	Depression in children
Mental Health Inventory (MHI)	n=2 (4.8%)	General mental issues: anxiety, depression, behavioural control



Beck Hopelessness Scale (BHS)	n=2 (4.8%)	Hopelessness
Patient Health Questionnaire (PHQ)	n=2 (4.8%)	Anxiety Depression
Other	n=18 (42.9%)	

#### *ASSOCIATIONS BETWEEN POVERTY AND MENTAL HEALTH*

All of the observational studies included in this literature review indicated positive associations between poverty and poor mental health (10-12, 29-38, 40-50, 54). Not only the individual poverty aspects like low income, deprivation of either multiple dimensions or specific categories, food insecurity, non-employment, low social-economic status, neighbourhood poverty, and self-assumed poverty were linked to poor mental health, but composite index of poverty that took different aspects into account were associated as well. Moreover, some observational studies found gender differences in the associations (34, 35). Within-person deterioration in mental health after a transition into relative poverty was observed in older Australian women but not men (34). While household energy poverty appeared to affect the mental health of the parents, a stronger association was seen in mothers than fathers (35). It is in addition note-worthy that income poverty and deprivation are often interrelated but have independent detrimental effects on mental health of its own (10, 29). In a study that used both income and deprivation as interrelated but distinct measurements of poverty, low income and being deprived of non-monetary resources both contributed independently to the worsen of mental health (10). Furthermore, parental education was found to be an associated social-economic factor in the mental health of children beyond income (37, 44). Associations between low maternal education and both internalising and externalising problems in children were discovered (37). In a study where parental education was one of the indicators of social-economic status, the risk of developing mental health issues was lower in children whose parents were higher-educated than those whose parents were lower-educated (44). The association was also significant in the event of stressful life situation, according to the same study.

#### *CAUSAL RELATIONSHIP BETWEEN POVERTY AND MENTAL HEALTH*

In the studies included in this literature review, RCTs performed to investigate the impact anti-poverty interventions have on improving mental health provides the strongest evidence in suggesting the causal relationship between poverty and mental health (17, 51-53, 55-58). Most RCTs suggested that financial incentives like cash transfer programs alone significantly improves mental health outcomes in poverty population (56-58). This effect was in particular more significant for subjects with worse mental health at baseline (57, 58). Furthermore,

evidence also suggested that mentoring or coaching programs improve mental health outcomes in subjects who live in poverty (17, 51, 52). Family-based interventions on training in financial management and activities to generate income were successful in improving the mental health of HIV adolescents living in poverty (17, 51). Similarly, trainings on financial management and sustainable farming practices in food insecure farmers helped reduce stress, anxiety, and depressive symptoms, as well as improve mood and hopefulness for the future (52). Interventions with a combination of financial incentives and mentoring programs appeared to be more effective than giving financial incentives alone in improving mental health in poverty (53, 55). A greater reduction in depressive symptoms was observed in subjects who received additional family coaching on top of the financial incentives compared to those receiving only financial incentives in a study (53). Notably, larger financial incentives might not produce a greater improvement in mental health. A study that involved child saving accounts and provided two different saving rates (1:1 and 1:2) showed reductions in depression and hopelessness for the children receiving the incentives. However, no significant difference in the reduction was found between the group with the higher and the lower saving rates (55).

## 4. DISCUSSIONS

This literature review investigates the studies that looked at the relationship between poverty and mental health within the past 5 years. Studies from various countries and sample sizes were reviewed. All included observational studies suggested positive associations between poverty and mental health, which is in line with the results from previous literature (8-12). Though direct causal relationship of poverty to mental health could not be derived from the included observational studies, it was indicated by the RCT studies on anti-poverty interventions in this review. All of the RCT studies showed improvement of mental health in the participants of anti-poverty interventions, especially in those who had worse mental health at baseline. Additionally, combinational anti-poverty interventions of financial incentives and financial mentoring programs are more effective in improving mental health of the participants than providing financial incentives alone. It would therefore be a rational approach for policy makers to supplement cash transfer programs with trainings on financial management or income-generating activities when implementing future anti-poverty policies to tackle mental health issues in this population. Notably, most mental health outcomes were measured by depression and general mental well-being. It is therefore hard to draw associations or causalities between poverty and other mental disorders such as schizophrenia or Attention-deficit/hyperactivity disorder (ADHD) with the literature selected in this review.

To measure poverty, using income seems to be less biased and efficient. Since money and all kinds of monetary medians are means to exchange products in nowadays society, the ability to purchase and exchange, which is strongly linked to one's income, appears to be a fair measurement of poverty. Furthermore, the amount of income of an individual is usually recorded in the national database systematically, it allows faster and easier collection of data as opposed to performing surveys. On the other hand, deprivation and subjective poverty contains certain degree of bias. Nevertheless, low income and being deprived of non-monetary resources are often inter-related and contribute both collectively and independently to poor mental health outcomes. To prevent relying too heavily on a particular dimension and to grasp the holistic nature of poverty, it seems reasonable to incorporate multiple measurements of poverty in one study to investigate the relationship between the broader economic hardships and mental health outcomes (10, 12, 29, 33).

### *LIMITATIONS*

Like all studies, several limitations apply to this review. To begin with, only the literature published within the past 5 years was reviewed. Therefore, studies with significant findings but were published more than 5 years ago were left out. In addition, the measurements of mental health outcomes were mainly on depression and general mental well-being. Few

observations were made for the associations between poverty and other types of mental disorders. Lastly, there lacked an equal distribution among the countries where studies were conducted. Especially for RCTs, African countries accounted for the most in the set of selected literature. Findings derived from these studies might not be applicable for every part of the world. However, the potential limitations do not outweigh the added insight to this field of research by this review.

#### *FUTURE RESEARCH*

Given the consistent positive associations between poverty and mental health as suggested by recent literature, it would be valuable to further investigate the direct causality of poverty to mental health outcomes. For example, Mendelian randomization could be applied in future studies to investigate the causality. Involving genetic variations, confounding factors that are usually hard to control could be largely bypassed. Moreover, looking into the causal relationships between poverty and different types of mental disorders would be beneficial in elucidating specific aspects of mental health that play a role.

#### *CONCLUSION*

Recent observational studies shown positive associations between poverty and poor mental health outcomes, mainly depression and poorer general mental well-being. Income and deprivation were closely interrelating measurements of poverty, and contributed both individually as well as collaboratively to the associations. RCTs suggested causal relationships between poverty and mental health outcomes by demonstrating the improvement of mental health after anti-poverty interventions, especially for those combining mentoring with cash transfers.

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