

HPB Surgery

Original Research Article

Epidemiology of Depression in Low Income and Low Education Adolescents: a Systematic Review and Meta-Analysis

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ABSTRACT

Objective: The aim of this systematic review was to verify the epidemiology of depressive disorders among adolescents with low income and low schooling levels. **Method:** Studies were gathered by searching on the databases Cinahl, LILACS, Proquest, Psychinfo, PubMed, Scopus, and Web of Science, up to May 12, 2015 and updated on December 08, 2015, with no time or language restrictions. **Results:** The results from this meta-analysis revealed that the overall of depression symptoms among adolescents with low income and low schooling levels was 12.46 %. This review confirms a high prevalence of depression among adolescents with no differences regarding gender (50.7%) and more frequently among individuals with some family disruption. **Conclusion:** The prevalence of depression and depressive symptoms is high and frequently among individuals associated with some low income and low schooling levels in their family.

Keywords: Review; Prevalence; Adolescent; Depressive Disorder.

INTRODUCTION

Depression among adolescents has gained more scholarly attention as regards the discussion on mental health in this age group. At this stage of life, the first depressive episode may have longer average-lengths, higher recurrence rates, longer hospital stays and higher rates of comorbidities, including substance use (1).

The physiological and pathological mechanism of depression has not been fully elucidated.(2) Nevertheless, there is evidence of a strong association between depression and cardiovascular and metabolic problems,(2) stroke (3), and cardio-respiratory system diseases (4). Obesity has also been associated with depression. Frequent findings in the literature

have reported that depression affects more females than males (5-7).

In addition to organic mechanisms, it is also important to consider the socio-economic features influence on the development of depression. Among adolescents with low-income families, the prevalence of depression is higher (8) (9). Another factor that has an important influence on the development of depression in this age group is the parents's schooling level, that is, the more schooling years parents have, the smaller chances of depression among their children (8, 9).

Another important aspect in the genesis of depression among adolescents is social support and stability throughout life. Social support can be considered a multidimensional concept, as it encompasses the feeling that other people care about them, and the use of instruments for seeking advice and help from others, such as feedback and counseling (10).

Although some studies have already discussed the association between parents's schooling and income in the development of depression among adolescents, it is necessary to deepen the discussion on the relationship between social determinants and the disease process. In general, these factors have been analyzed as variables in many studies, but the discussion does not exhaust the possibilities of relationships with such phenomena. Up to now, there is no systematic review published in the literature on this topic. The objective of this systematic literature review is to investigate the epidemiology of depressive disorders among adolescents, answering this main question: "What is the prevalence and the epidemiological characteristics of depressive disorders among adolescents with low income and low schooling levels?"

METHODS

Protocol and registration

This systematic review was reported according to The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) Checklist (11). The systematic review protocol was registered at the International Prospective Register of Systematic Reviews (PROSPERO) under the number CRD42015027365.

Eligibility Criteria

Inclusion criteria

This review includes observational studies in which adolescents expressed depression symptoms or were diagnosed with depression. The PICOS (population, intervention, comparison, outcome, study design) format was adapted to define a clinical question with the following inclusion criteria (Box 1): Depression and depression symptoms were evaluated by: Center for Epidemiology Studies Depression Scale (CES-D), The Diagnostic Interview Schedule (DIS), Scale of Zung, Composite International Diagnostic Interview (CIDI), Symptom Check List (SCL25), Beck Depression Inventory, Structured Clinical Interview for DSM-IV Disorders (SCID).

Exclusion criteria

The following exclusion criteria were applied:

1- Non-observational studies; 2- Depression associated to other chronic diseases; 3- Studies to validate an instrument; 4- Without social determinant relationship; 5- Participants: children (0 to 12 years old), young adults (19 to 21 years old), adults (over 21 years old).

Information Sources

The search was performed with the following electronic bibliographic databases: Cinahl, LILACS, Proquest, Psychinfo, PubMed, Scopus, and Web of Science. A partial gray literature search was carried out with Google Scholar. The reference list of included articles was checked at the end of the searches. We conducted all searches across all databases from the earliest available date up to May 12, 2015, and updated on December 08, 2015.

Search

Appropriate truncation and word combinations were selected and adapted for each database search. All references were managed by appropriate reference manager software (EndNote® Web (Thomson Reuters, Philadelphia, PA) and duplicate hits were removed.

Study selection

The articles were selected in two phases. In phase one, two authors (S.S.K, G.C.M.F) independently reviewed the titles and abstracts of all the references. The articles that appeared to meet the inclusion criteria based on their abstracts were selected and collected. In phase two, three authors (S.S.K, G.C.M.F, E.R) read all the full-text articles and excluded those which were not in agreement with the inclusion criteria. The same three authors independently reviewed all full-text articles. Any disagreement between the authors in the first and second phases was resolved by means of discussion and mutual agreement. The final selection was entirely based the full-text version of the publication.

Data collection process and data items

One author (S.S.K) collected the required information from the selected articles such as characteristics of the study (author, year, location, and objective), population characteristics (total number, gender, age), characteristics of inequalities (income, low schooling level, statistical analysis) and outcome characteristics (main results, main conclusion).

Risk of bias in individual studies

The authors methodically appraised all of the selected studies according to the Meta Analysis of Statistics Assessment and Review Instrument Descriptive/case-series method to judge the quality of evidence (MAStARI) (12). Two authors (S.S.K. and E.R.) categorized the included articles as "Yes", "No", "Unclear" or "Not applicable" according to their analysis of each study. When they did not reach a consensus regarding quality, a third author (G.C.M.F.) intervened to make a final decision.

Summary measures

The prevalence of depression among adolescents has independent risk factors such as receiving insufficient support at school, being female, being regarded as low acculturated, and having low social support.

Synthesis of results

A meta-analysis was planned within the studies presenting enough data. The prevalence of depression among adolescents with low income and low schooling levels was analyzed by two types of meta-analysis, for fixed and random effects following the appropriate Cochrane Guidelines(13).

Meta-analysis was performed with the aid of MedCalc Statistical Software version 14.8.1 (MedCalc Software, Ostend, Belgium). Heterogeneity was calculated by inconsistency indexes (I²), and a value greater than 50% was considered an indicator of substantial heterogeneity between studies (14). The significance level was set at 5%.

Risk of bias across studies

Only to be applied if meta-analysis was possible.

RESULTS

Study selection

In phase one, 1,389 articles were selected from eight electronic databases. After the duplicates were removed, 1,368 different citations remained. Subsequently, we conducted a comprehensive evaluation of the abstracts and excluded 1,320, resulting in 48 articles at the end of this phase. Additionally, a partial gray literature search on Google Scholar found 38 studies out of which 10 were selected from an updated search. We did not identify any additional study from the reference lists of these studies. Subsequently, we retrieved the 58 articles, and after a review of the texts, 47 more articles were discarded. Therefore, 11 articles were chosen for analysis with the aim of answering the review question. A flow chart detailing the process of identification, inclusion, and exclusion of studies is shown in Figure 1.

STUDY CHARACTERISTICS

The studies were published from 1982 to 2012, where ten of them were in English (8, 10, 15-21), and one in Spanish (22). They were conducted in eight different countries: Colombia(22), Canada(16, 17), Iran(18), China(23), Pakistan(20), Finland(10), USA(15, 19, 21), and Norway(8). A summary of the studies is presented in Table 1.

Risk of bias within studies

The qualitative assessment showed high quality of the studies. Nine domains were evaluated by three authors who achieved consensus on the analyzed questions. The assessment result showed that all the articles have low risk of bias, as displayed in Table 2.

Results of Individual Studies

In his study relating depressive disorder and attempted suicide, Alaimo(15) detected that adolescents living in families in which the family head was unemployed the probability to have dysthymia, depressive disorder and attempted suicide was about twice higher. The study developed by Campo-Arias(22) and Cheung(17) observed that the prevalence of depression and depression symptoms is higher among females than males.

Depression symptoms were associated with gender differences, although depression has more incidence in among females, a study developed by Derdikman-Eiron(8) showed a large difference in associated symptoms of anxiety and depression among males related with lower subjective well-being, self-esteem, higher academic problems and lower psychosocial functioning than among female adolescents. Besides the depressive symptoms perceived in males, other symptoms such as stress, self-efficacy, parents' job, and poor

school performance were significantly associated with adolescent depression. The results point out that it could be because of cultural effects, in a society where a man's success is important to assure safety to his family (18).

Kaltiala-Heino's (10) study associated depression with sociodemographic determinants as moving, parental unemployment, parental education and family structure, and detected differences in males and females' suffering. In both males and females, disruption in the life course enhance depression risk in adolescents. In the same way, the study by Huang-Chi(23) associated adolescent depression with high levels of family conflict and impaired family functioning accompanied by parents' marital discordance influence in depression.

Social determinants were widely cited in studies as an important influence on adolescent depression. Huang-Chi's (23) study showed that low family income, family conflict and impaired family functioning increase depression. The study by Mikolajczyk (19) points out that predictors of depressive symptoms were low school support, low acculturation, and coming from a one-parent family.

Vulnerabilities in the adolescents' course of life were probably associated with depression and depression symptoms. Rahman (20) states that there are interactions between childhood adversity, life difficulties, genetic propensity, and high levels of family problems. According to Schoenbach(21), besides these social vulnerabilities, parental education is significantly associated with depression. Adolescents with college-educated parents have a lower prevalence of depression.

Chaiton(16) brings out the association of depressive symptoms and smoking among adolescents, considering age, school performance, gender, family income, and showed that there is an important influence of environmental and contextual variables on higher depression scores among female smokers.

SYNTHESIS OF RESULTS

Research studies have shown that depression and depressive symptoms are more common among young females, and are associated with some low social support or peer relationship (15, 22). They also include variables such as subjective well-being, self-esteem, academic problems, frequency of meeting friends and the feeling of not having enough friends. The prevalence of anxiety and depression symptoms was strongly dependent on gender (8).

These studies found depression rates of 11.2% among girls and 5.9% among boys, moderate depression rates of 9.0% among girls and 4.7% among boys, and severe depression rates of 2.1% and 1.5%, respectively(15). Another research showed high depression rates of 66,9% among women and 49,2% among men(22). The prevalence of such symptoms was strongly dependent on gender: 14.7% of the girls reported symptoms of anxiety and depression vs. 5.8% of the boys (8). Although many studies showed high prevalence among females, Ghofranipour's(18) study identified prevalence of depressive symptoms in 402 male adolescents where 38,1% of them presented depressive symptoms and depression. Cheung(17), in a study with adolescents, indicated a prevalent rate of 7,6% for major depression between ages 15-18. Among males, the rate was 4,3%, and among females it was 11,1%.

Ethnocultural groups represent social vulnerability, and the prevalence of depressive disorders in some ethno groups is significantly higher. The prevalence among black males was significantly higher than that in white males and not quite significantly higher compared to white females and black

females(21). A study developed with Latino and Non-Latino white adolescents suggest that the risk of depressive symptoms is higher among Latino than Non-Latino white adolescents (19).

For adolescents of both sexes, social support from parents, peers and teachers is important(10). Depression rates among adolescents that live with just one parent was high if compared with adolescents not living with both parents(10). A study developed with adolescents of both sexes showed that disruptions in their life course increase the risk of depression. The rate of those who reported no disruptions in their life course was 9.0%. The rate of those classified as depressed who had experienced one disruption was 12,3%, and of those who had two disruptions was 15,3%, and the rate of those with three or more disruptions was 18.2%. The same study detected sociodemographic correlates of depression such as moving, parental unemployment, parental education and family structure(10). Rahman's (20) study with young woman in rural Pakistan found that the high level of psychological distress was associated with early adversity or poverty or psysical abuse, family stress, and adverse recent life events included educational problems and marriage plans.

A proportion meta-analysis was conducted. To easily interpret the results, the studies were clustered into overall prevalence of depression symptoms among adolescents with low income and low schooling levels over nine selected studies (8, 10, 15, 17, 18, 20-23). In addition, a female gender prevalence of depression symptoms was performed over 10 studies. The heterogeneity between the studies found in the meta-analysis was high, ranging from 99,31% to 99,47%, therefore a random model was choosen. All the information about the meta-analysis of individual studies was described in Figure 2 and Appendix 4. The results from this meta-analysis revealed that the overall of depression symptoms among adolescents with low income and low schooling levels was 12.46% (total sample=40394; Confidence Interval: 8,44 to 17,13) and no gender differences with a female prevalence of 50.70% (total sample=43826; Confidence Interval: 43.68 to 57.71).

Risk of bias across studies

The main concern about the studies included was sample representativeness. We could not find homogeneity in question 3 (Were confounding factors identified and strategies to deal with them stated?), question 4 (Were outcomes assessed using objective criteria) and question 8 (Were the outcomes measured in a reliable way) for cross-sectional studies.

DISCUSSION

This systematic review investigated the available evidence about depression symptoms among adolescents with low income and low schooling levels, and the meta-analysis results revealed a high prevalence of about 12.5%, with no differences regarding gender (50.7% females). Different researchers around the world have studied the prevalence of depression among adolescents (8, 10, 15-22). The outcomes that evidence prevalence rates was shown in a study by Campo-Arias(22) which describes gender differences among depression symptoms. Another study brought similar outcomes showing that prevalence of depression was high in Taiwanese adolescents, representing 12,3% in a population of 9.586 adolescents in Southern Taiwan(23). Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low

self-worth, disturbed sleep or appetite, and poor concentration(24).

Mental health disorders and depression affects 400 million people in the world. This is contributor to years lived with disability globally. Because of low levels of investment and effective treatment coverage, mental disorders also have serious economic consequences. Depression had costs of at least US\$ 800 billion in 2010, and it is expected to more than double by 2030(24, 25).

The gender differences in depressive symptoms studied in Canada, Colombia, China, Pakistan, Finland, Norway and United States showed that depression rates were higher in adolescent females (8, 10, 15, 17-22). There are indications in some studies developed with male and female adolescents that certain risk factors are more frequently related to females than males as regards depression symptoms (17, 20, 26). Vulnerability correlated with girls in adolescence was intensified by stressors such as differential socialization in this life period, specially in spheres such as parents relationship, sex role, behavior problems, school achievement, self-image, puberty challenges, changing body (27).

A Pakistan (20) study showed that 4.4% of females had depressive disorder. This score was associated with childhood experience of poverty, parents' education, stressful life events, disturbed family relationships and mother's depression. These social determinants can influence subjective well-being, self-esteem and psychosocial functioning in adolescents with symptoms of anxiety and depression, as found in a study (8) with a sample of 8,704 adolescents where 10.2% of them presented symptoms of anxiety or depression, out of which 14.7% were females and 5.8% males.

Although gender differences were found in the vast majority of studies included in this systematic review, our meta-analysis did not demonstrate significant differences. The social determinants can also influence the outcomes of studies about depression and depressive symptoms. Determinants of mental health and mental disorders include not only individual attributes such as the ability to manage one's thoughts, emotions, behaviors and interactions with others, but also social, cultural, economic, political and environmental factors such as national policies, social protection, living standards, working conditions, and community social supports. Exposure to adversity at a young age is an established preventable risk factor for mental disorders(25). We found in this review a high influence of social determinants in depressive disorder. Some risk factors identified were identified such as female gender, young, disruptions in life course, low schooling levels, low income, family problems, peer relationship, school conflicts (10, 17, 18, 20, 21, 23).

Two studies about adolescents that investigate socioeconomic differences in adult depression found evidences that low level of social support had a greater impact on depression among socioeconomic status subjects (7, 28). Some social inequalities and determinants can influence in depressive symptoms, for instance, among female adolescents, living in urban areas, with low self-esteem, high family conflict levels, poor family functioning, lower rank and decreased satisfaction in a peer group, less connectedness to school, poor academic performance, parental marriage disruption, and low family income were more likely to have depression (8, 10, 15, 18, 20, 23). Depressive disorder was significantly associated with experience of poverty or a financially disadvantaged situation (17, 19, 20).

In another context of life, Gofranipour's(18) study showed depression demographical and psychological determinants among 402 Iranian male adolescents. Depressive symptoms

were associated with low levels of self-efficacy and high levels of perceived stress and some demographic variables of father's jobs and academic situation. In the Iranian society, the father's job is one of the main components that decrease anxiety in terms of economic issues, because the financial situation in a family can provide security and optimism among the members. The Iranian social context and cultural aspects would be considered determinants associated with male adolescent depression.

Similarly, other studies (15, 19, 21) expressed that ethnic groups were a cultural factor in the analysis of depression prevalence. Mikolajczyk's (19) study about correlates of depressive symptoms between Latino and Non-Latino white adolescents suggested that the risk of depressive symptoms was twice as high among Latinos compared to Non-Latino whites. Depressive symptoms were slightly higher in the low acculturation group than in the high acculturation group. Latino ethnicity brought out risk factors for depressive symptoms among the strata with higher income and more support at home and school. Non-Latino whites and Latinos had a similar risk of depressive symptoms. It is important to explain that adolescents with high acculturation levels were born in the USA and had bilingual communication. The low acculturation Latino groups were characterized by foreign adolescents using only the Spanish language. In the results of Alaimo's(15) study, depressive disorders were compared with Non-Hispanic white and black adolescents and the prevalence was represented among girls. Mexican-American adolescents reported significantly higher rates of suicide attempts and had the largest prevalence of depressive disorders. In this old American study, it was possible to realize that depression was related to distinct communities when considering the socio-cultural differences between groups. Roberts (29) in another study reported that Mexican adolescents had more depression than Anglo adolescents.

When analyzing Schoenbach's (21) study, we perceived that the prevalence of a depressive symptom in 384 young adolescents was 66% whites and 34% black adolescents, 69% of the black adolescents lived in households with only one natural parent. A study developed with Chinese American and Anglo American adolescents suggested a lower prevalence of depression in this population (29, 30). An study that analysing an ethnically a sample of African American, Hispanic and White adolescents and the access to treatment for depression and results are significant for ethnicity, with white students scoring higher than Hispanic and higher than Black students(31).

Disruption life events emerged in some studies and characterized factors that contribute to prevalence of depressive adolescents. Kaltiala-Heino's(10) study considered the role of discontinuities in life course and social support in adolescent depression. The study encompassed 16.464 adolescent participants, out of which 172 had at least mild depression. The prevalence was 11,2% among girls and 5,9% among boys. Moderate depression was 9,0% among girls and 4,7% among boys, and severe depression was 2,1% and 1,5%, respectively. Depression was more common among adolescents whose family had moved to their current living area, among those living apart from both parents and whose

parents had a low schooling level. In general, depression was more common among respondents with accumulated discontinuities in their life course. The author conceptualized that social support is interpersonal and expresses emotional concern, esteem and value, and believes that people build a social network(10). In this sense, it was affirmed that social support and depressive symptoms were correlated with parents, and school had positive effects in adolescent life. Parents and school officials need to model positive relationships and highlight the importance of good relationships with same aged peers in order to strengthen the role that social environment plays in buffering against depression during this important developmental stage(7). Additionally, adolescence means stress, changes in life, in body, social status and peer relationship. Depressive symptoms was growing in this population. Demographic variables considerably influence towards depression in adolescents. Father's and mother's jobs, school and social conditions are determinants to family success because they develop safety and optimism in their members (8, 10, 15, 17-19, 22).

LIMITATIONS

The main limitation of this study was the population of the studies selected by convenience sample. In this prevalence study, we found different depressive disorder contexts, which did not allow us to point out with absolute certainty the conditions of the adolescents with depression. The prevalence of depressive disorders among adolescents comprises their social, cultural, family structure and this review did not have variables to capture such determinants. We aimed know just three social determinants associated with adolescent depression: income, family and school, therefore we know that there are other important condition that influence depressive diseases.

CONCLUSION

The prevalence of depression among adolescents was high with an overall of 12.46%, with no differences regarding gender. There is influence of social determinants in this context. Depression is high among individuals connected with low family income, in ethnocultural disadvantage or under situations of family disruption associated with risk factors, marital disruption, family conflict and impaired family functioning.

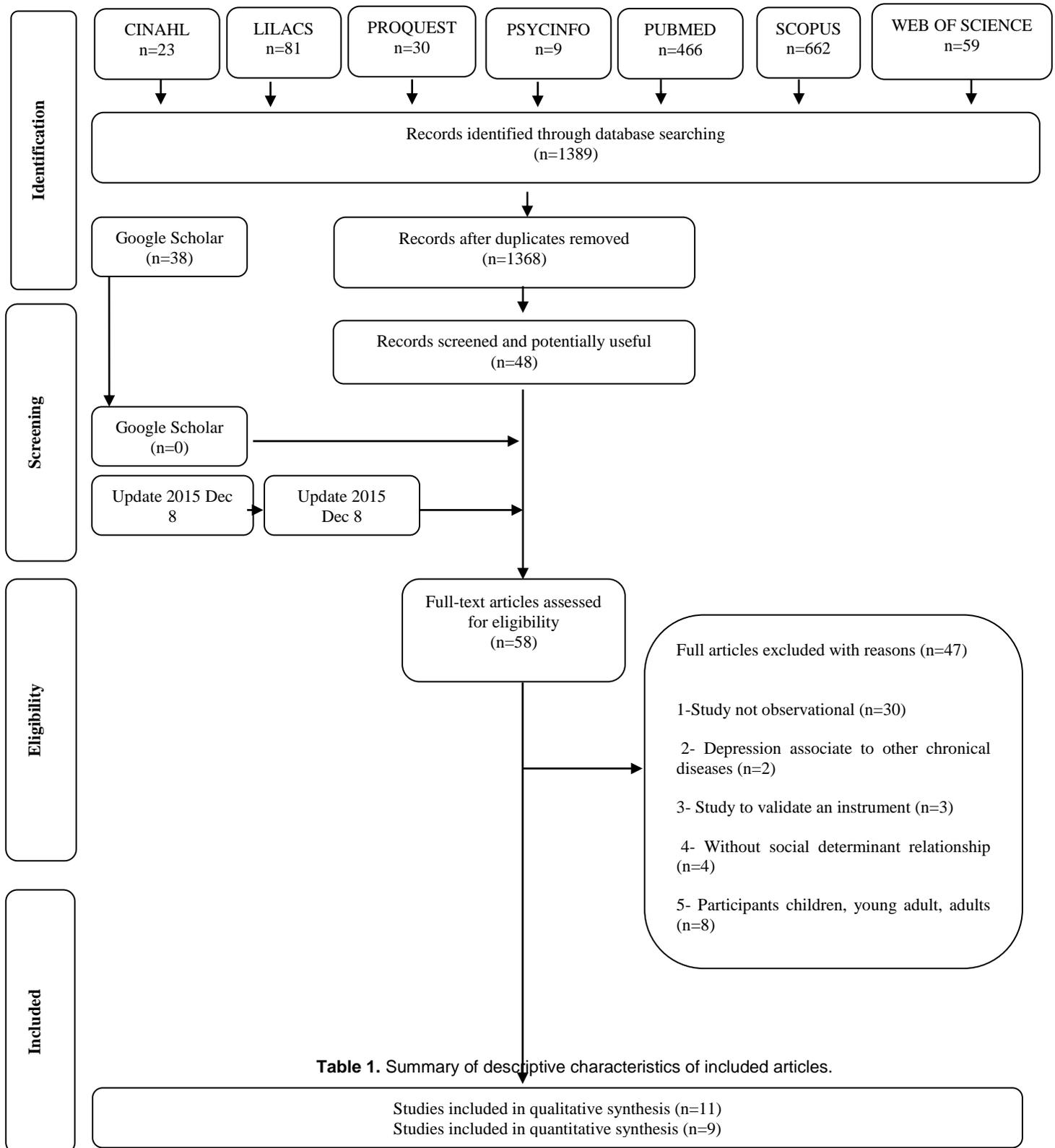
HUMAN PARTICIPANT PROTECTION

Institutional review board approval was not needed as our research did not involve human participant interactions or identifiable private information.

DECLARATION OF INTEREST:

The authors declare that there are no conflicts of interest.

Figure 1. Flow Diagram of Literature Search and Selection Criteria¹



¹ Adapted from PRISMA.

Author, Year, Country	Sample (n)	Age (range years)	Setting	Assessment	Results
Alaimo, 2002, United States	754	15-16	Adolescents that participate of the Third National Health and Nutrition Examination Survey	The Diagnostic Interview Schedule (DIS)	Trends in the prevalence of depressive disorders and suicidal symptoms varied by family income; the only significant difference was that low income adolescents were less likely to report suicide ideation than high income adolescents.
Campo-Arias, 2006, Colombia	633	10-19	Students of public school	Scale of Zung	The prevalence of the depression was 58,0%. The depression is significantly high in females 66,9%, then in males 49,2%. The statistic difference was significantly 1,36, IC95%: 1,19-1,56.
Chaiton, 2007, Canada	3382	Under 18 years old and 18 year old	Students in Grades 7-12 in public school	Center for Epidemiology Studies Depression Scale (CES-D)	The prevalence of smoking in a school appears to interact with the relationship between smoking and depression. This study found that the prevalence of smoking at a school moderated the influence of smoking on students' depression symptoms. Students who reported current smoking had a higher depressive symptom score than nonsmokers only if they attended a school with a lower prevalence of smoking.
Cheung, 2006, Canada	2866	15-18	Adolescents in households	Composite International Diagnostic Interview (CIDI)	Overall, females were shown to have higher rates of depression and suicidality compared to males. Results suggest that financially disadvantaged youth are particularly at risk for suicidality.
Derdikman-Eiron, 2011, Norway	8704	13-19	Adolescents in junior high schools and seniors high schools	Symptom Check List (SCL25)	Overall, 10.2% of the participants presented symptoms of anxiety and depression. The prevalence of these symptoms was strongly dependent on gender: 14.7% of the girls reported symptoms of anxiety and depression vs. 5.8% of the boys, $p < 0.001$.
Ghofranipour, 2013, Iran	402	The mean age of the adolescents was 15.44	Students in school and depression among male adolescents.	Center for Epidemiology Studies Depression Scale (CES-D)	Stress, self-efficacy, father's job, and past semester grade point average were associated significantly with depression among the adolescents. High levels of depression were associated with low level of self-efficacy and high level of perceived stress; also some demographic variables such as fathers' job and academic situation can be related to depression among male adolescents.
Huang-Chi, 2008, Taiwan	9586	Not refer year old	Taiwanese adolescent in schools	Center for Epidemiological Studies Depression Scale (MC-CES-D)	Adolescents who were female, were older, lived in urban areas, had lower self-esteem on the C-RSES, perceived higher family conflict, poor family function on the C-APGAR and lower rank within and decreased satisfaction with status in their peer group, who had less connectedness to school, had poor academic performance, and whose parental marriage was disruptive and family income low (NT\$30 000) were more likely to have depression.

Kaltiala-Heino, 2001, Finland	16464	14-16	Middle adolescent population in schools, (49.9% females/ 50.1% males)	Beck Depression Inventory	Prevalence of mild depression was 11.2% among girls and 5.9% among boys, of moderate depression 9.0% among girls and 4.7% among boys, and of severe depression 2.1% and 1.5%, respectively. Depression was more common among respondents whose parents had a lower education. In both girls and boys, moderate to severe depressive sion was more common among those with accumulated discontinuities in their life course.
Mikolajczyk, 2007, United States	3196	12-17	Latino and Non-Latino White adolescents residing in California	Center for Epidemiology Studies Depression Scale (CES-D)	Crude analyses suggested that the risk of depressive symptoms was twice as high among Latinos as compared to Non-Latino. Other risk factors included female gender, low household income, one Parent household, and low support at home and at school.
Rahman, 2009, Pakistan	321	16-18	Unmarried women in Pakistan	Structured Clinical Interview for DSM-IV Disorders (SCID)	Major depressive disorder, diagnosed using the SCID, was found in 14 out of the 321 (4.4%) young women. Univariate analysis shows that depressive disorder was significantly associated with experience of childhood poverty, 4 or more recent life events and a high score on index of family relations and maternal depression.
Schoenbach, 1982, United States	384	Not refer year old	Junior high school students	Center for Epidemiology Studies Depression Scale (CES-D)	The findings of a greater prevalence of a depressive "syndrome" among blacks and among low income families are consistent with studies of self-reported.

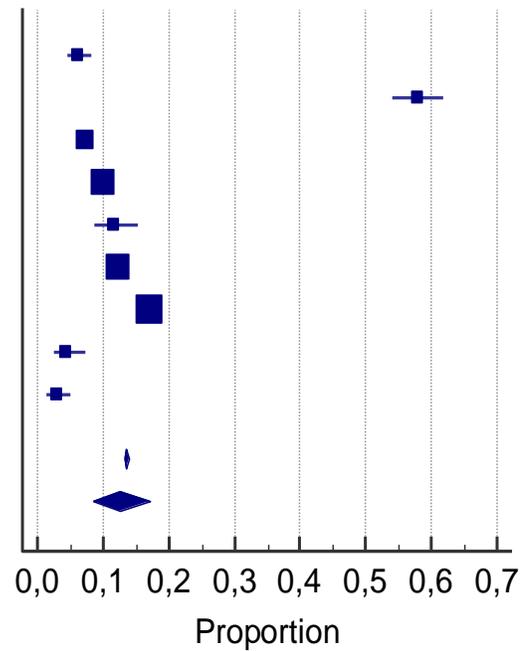
Table 2. Risk of bias summarized assessment.

Author, Year	Risk of Bias
Campo-Arias et al (22), 2006	low
Chaiton et al (16), 2007	low
Kaltiala-Heino et al (10), 2001	low
Cheung et al (17), 2006	low
Mikolajczyk et al (19), 2007	low
Derdikman-Eiron et al (8), 2011	low
Schoenbach et al (21), 1982	low
Alaimo et al (15), 2002	low
Rahman et al (20), 2009	low
Huan-Chi et al (23), 2008	low
Ghofranipour et al (18), 2013	low

Figure 2. Forest plot for depression symptoms associated to adolescents with low income and low education. Sample = 40394.

Results from 2 types of meta-analysis: fixed and random effects.

Study	Sample size	Proportion (%)	95% CI
Alaimo, 2002	754	6,233	4,616 to 8,203
Campo-Arias, 2006	633	57,978	54,024 to 61,857
Cheung, 2006	2866	7,292	6,367 to 8,306
Deridkman-Eiron, 2011	8984	10,051	9,437 to 10,692
Ghofranipour, 2013	402	11,692	8,718 to 15,243
Huang-Chi, 2008	9586	12,299	11,648 to 12,973
Kaltiala-Heino, 2001	16464	17,201	16,627 to 17,786
Rahman, 2009	321	4,361	2,405 to 7,209
Schoenbach, 1982	384	2,865	1,438 to 5,068
Total (fixed effects)	40394	13,462	13,131 to 13,799
Total (random effects)	40394	12,461	8,443 to 17,132



Test for heterogeneity

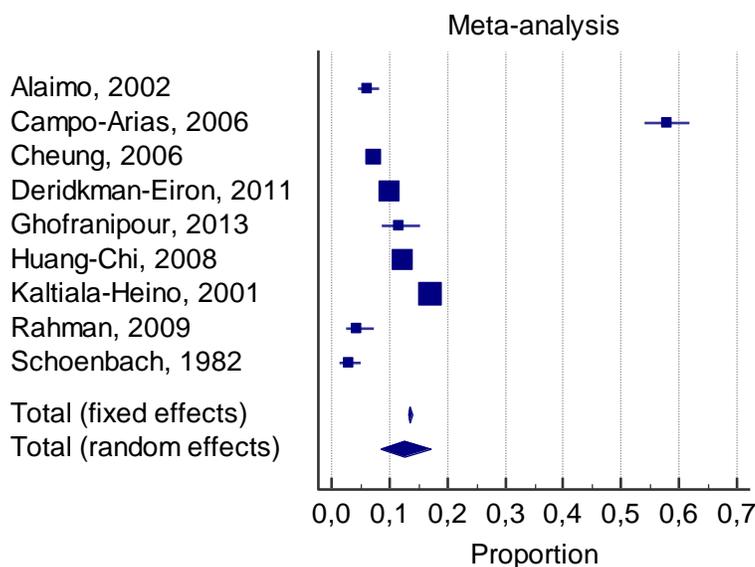
Q	1160,6487
DF	8
Significance level	P < 0,0001
I ² (inconsistency)	99,31%
95% CI for I ²	99,14 to 99,45

Appendix 4. Complete analysis and data from Proportion Meta-Analysis for prevalence of Depression in Low Income and Low Educations Adolescents.

Variable for studies	Author__Year		
Variable for total number of cases	Total_Sample Total Sample		
Variable for number of positive cases	Depression_Symptoms Depression Symptoms		
Study	Sample size	Proportion (%)	95% CI
Alaimo, 2002	754	6,233	4,616 to 8,203
Campo-Arias, 2006	633	57,978	54,024 to 61,857
Cheung, 2006	2866	7,292	6,367 to 8,306
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Total (random effects)	40394	12,461	8,443 to 17,132

Test for heterogeneity

Q	1160,6487
DF	8
Significance level	P < 0,0001
I ² (inconsistency)	99,31%
95% CI for I ²	99,14 to 99,45



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