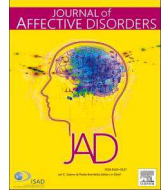


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Research paper

Association between comorbid anxiety and depression symptomatology, quality of life, social support and use of mental health services in youth from Bogota, Buenos Aires, and Lima

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ABSTRACT

Purpose: This study aimed to (1) examine the association between comorbid anxiety and depressive symptoms and quality of life (QoL) among adolescents and young adults and assess whether perceived social support modifies this relationship; and (2) explore the association between comorbid symptoms and use of mental health (MH) services, considering QoL as a potential effect modifier.

Methods: A cross-sectional study was conducted with 1816 adolescents and young adults aged 15–24 years from socioeconomically disadvantaged urban areas of Bogotá, Buenos Aires, and Lima. The analysis included descriptive statistics, bivariate tests, and multivariable generalised linear models to assess associations with QoL. Poisson regression models were used to examine the association with MH service use. Interaction terms were included to assess potential effect modification by social support and QoL, with all models adjusted for relevant sociodemographic and contextual confounders.

Results: Comorbidity of depressive and anxiety symptoms was associated with lower QoL scores ($\beta = -0.71$; $p < 0.001$). Higher perceived social support was positively associated with QoL and significantly moderated the comorbidity and QoL relationship ($p < 0.001$). Additionally, comorbidity was linked to increased use of MH services ($PR = 1.98$; $p < 0.001$). Each QoL additional point was associated with a reduction of 25 % in MH service use ($p < 0.001$); but QoL did not modify the association between comorbidity and service use, despite being close to significance ($p = 0.063$).

Discussion: Addressing both emotional symptoms and social factors is essential for improving youth well-being. Findings support strengthening social support networks and expanding access to services for vulnerable groups.

1. Introduction

The transition from adolescence to early adulthood is a critical period for the onset of mental health (MH) disorders, particularly anxiety and depression, which are among the most prevalent conditions in

this age group (World Health Organisation, 2024). Globally, it is estimated that approximately one in seven young people will experience these common MH disorders (World Health Organisation, 2018). In Latin America, nearly half of these MH conditions are related to anxiety and depression, highlighting the significant burden faced by young people in the region (Gordillo-Tobar et al., 2023).

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Abbreviations

CSRI	Client Service Receipt Inventory
GAD-7	General Anxiety Disorder-7
MANSA	Manchester Short Assessment of Quality of Life
MH	Mental Health
MSPSS	The Multidimensional Scale of Perceived Social Support
PHQ-8	Patient Health Questionnaire-8
QoL	Quality of Life
VEQ	Life Events Questionnaire

The comorbidity between anxiety and depression is particularly prevalent among young people, exacerbating their emotional experience (Chen, 2022). Research has shown that up to 45.7 % of individuals with a history of depression also experience anxiety disorders (Kessler et al., 2015). Furthermore, anxiety symptoms often precede depression, suggesting a developmental pattern in which anxiety may emerge first, potentially laying the groundwork for the subsequent onset of depression (McLaughlin and King, 2015). This comorbidity not only intensifies symptom severity but also complicates diagnosis and treatment, increasing vulnerability to long-term complications, both physically and emotionally (Garber and Weersing, 2010; Wu and Fang, 2014). Such difficulties are often compounded by the challenging circumstances many young people face, including poverty, insecurity, and limited access to MH services (Diez-Canseco et al., 2024).

MH problems significantly impact the quality of life (QoL) of young individuals, including in their social, academic, and professional functioning (Connell et al., 2012; Dey et al., 2012; Hertz-Palmor and Gothelf, 2022; Magiera and Pac, 2022; Morales-Ortiz et al., 2023; Sharpe et al., 2016; Weitkamp et al., 2013). The presence of both anxiety and depression further intensifies these challenges, as the two disorders often exacerbate one another's symptoms, making daily life more challenging to manage (Chen, 2022; Garber and Weersing, 2010; Johansson et al., 2013; Wu and Fang, 2014). This combination of emotional distress can hinder their ability to engage in positive social interactions and academic pursuits, ultimately leading to a lower overall QoL (Jenkins et al., 2021). Studies have explored factors that can reduce the negative impact of MH issues on QoL, with social support emerging as a key factor.

Research has consistently shown that strong support networks, such as family, friends, and close social connections, are associated with higher levels of well-being in young people (Connell et al., 2012; Damon et al., 2006; Magiera and Pac, 2022; Stea et al., 2024). Conversely, several studies have reported that lower levels of perceived or structural social support are strongly associated with an increased risk of depression, anxiety, and other mental health difficulties (Direess Alen et al., 2022; Moak and Agrawal, 2010; Odaci Comertoglu et al., 2024; Sareen et al., 2011; Seabrook et al., 2016; Stewart et al., 2022). Individuals who perceive limited support from their social environment may therefore be more vulnerable to developing emotional distress, whereas stronger social connections may contribute to better psychological outcomes.

Building on this evidence, some researchers have proposed that these networks can help buffer the adverse effects of MH struggles by offering emotional reassurance, reducing isolation, and facilitating access to vital resources, thereby promoting a better QoL despite the challenges posed by anxiety and depression (Defar et al., 2023; Gariépy et al., 2016; Magiera et al., 2017; Singstad et al., 2021). Moreover, evidence from different populations indicates that social support can influence QoL not only directly but also indirectly through its relationship with mental health. For example, studies have found that higher levels of social support are associated with lower depressive symptoms, which in turn predict better QoL (Kuang et al., 2022). Similarly, greater social support has been shown to attenuate the negative impact of depression on the

mental health component of QoL, although this buffering effect was not observed for physical health (Hoang et al., 2022). Taken together, these findings highlight the potential role of social support as a protective factor, mitigating the adverse consequences of anxiety and depression on young people's QoL.

Greater emotional maladjustment has been associated with a higher likelihood of seeking MH services (Essau and Gabbidon, 2013). However, despite this greater likelihood of seeking help, several barriers, such as social stigma, economic limitations, and geographic obstacles, continue to hinder access to MH services (Gulliver et al., 2010). These barriers often prevent young people from receiving the necessary care, exacerbating their emotional distress and further negatively impacting their QoL. Interestingly, studies have suggested that QoL may interact between comorbid anxiety and depression and the use of MH services. For example, a Canadian study found that lower severity of MH needs was more strongly associated with higher QoL, and that better QoL was linked to greater continuity of MH service use (Evans et al., 2007).

However, these types of studies in adolescents and young adults have mainly focused on European (Griffiths et al., 2017; Meade and Dowsell, 2015; Michel et al., 2009; Wunsch et al., 2021) and Asian (Leung and Fung, 2021) contexts, mostly on adolescents and young adults in academic settings, with a particular emphasis on university and school samples (Griffiths et al., 2017; Jenkins et al., 2021; Lima-Serrano et al., 2018; Sharpe et al., 2016), as well as in hospital settings encompassing various health care services (Erim et al., 2020; Hertz-Palmor and Gothelf, 2022; Peláez Mata et al., 2022). There is a significant lack of evidence regarding the assessment of our variables of interest in adolescents and young adults living in economically disadvantaged contexts, where they face housing insecurity, overcrowding, poor living conditions, and are affected by high levels of unemployment, pollution, traffic, crime, violence, high cost of living, limited access to social services, and competition for resources (Company-Córdoba et al., 2020).

Therefore, the main objectives of this study were:

1. To explore the relationship between the comorbidity of anxiety and depressive symptoms and QoL in adolescents and young adults from vulnerable urban areas of Bogotá, Buenos Aires, and Lima, and considering whether social support acts as a modifier of this relationship.
2. To investigate how the comorbidity of anxiety and depressive symptoms is associated with the use of MH services in adolescents and young adults from vulnerable urban areas of Bogotá, Buenos Aires, and Lima, and to evaluate whether QoL acts as an effect modifier in this relationship.

Based on previous literature, we hypothesised that the comorbidity of anxiety and depressive symptoms would be associated with lower QoL and a higher likelihood of using MH services. However, due to the scarce and inconsistent evidence on the moderating role of social support and QoL in adolescents and young adults, particularly within disadvantaged urban contexts, these analyses were approached in an exploratory manner.

2. Materials and methods

2.1. Design and setting

A cross-sectional secondary study was conducted as part of the OLA Research Programme between April 2021 and November 2022 in three Latin American capital cities: Bogotá (Colombia), Buenos Aires (Argentina), and Lima (Peru). These cities are major urban centres in South America, each with diverse socio-economic conditions and significant regional influence. The main aim of the programme was to identify which resources help adolescents and young adults residing in disadvantaged urban areas to prevent and recover from depression and/or anxiety (Pribe et al., 2021).

The main OLA study used a case-control design to examine a wide range of risk and protective factors, including sociodemographic characteristics, stressful life events, substance use, social capital, and participation in sports, arts, and social media activities, in a large sample of adolescents and young adults (Gómez-Restrepo et al., 2025). Unlike the main OLA study, the present analysis adopts a cross-sectional approach to address more specific questions related to QoL, comorbid anxiety and depressive symptoms, perceived social support, and the use of mental health services.

2.2. Participants

The study included adolescents and young adults residing in disadvantaged neighbourhoods in Bogotá, Buenos Aires, and Lima. To be included in the study, participants were required to fulfil the following criteria: they had to reside in a neighbourhood within the lowest 50 % according to the Human Development Index (HDI) (Nations, 2008) in Bogotá and Lima and the Unsatisfied Basic Needs Index (NBI) (Santos, 2014) in Buenos Aires. Additionally, participants were required to be between 15 and 16 years of age for the adolescent group and between 20 and 24 years for the young adult group. For adolescents, the assent and consent of a parent or guardian were required; for young adults, informed consent was necessary (Gómez-Restrepo et al., 2025).

Individuals with a diagnosed severe mental disorder (e.g., psychosis, bipolar disorder, or schizophrenia), a diagnosed learning disability, inability to read or write, or lack of capacity to provide informed consent (in the case of young adults) or assent (in the case of adolescents) were excluded from participation (Gómez-Restrepo et al., 2025).

Additionally, given the study's aim to explore the association of comorbid anxiety and depression symptoms with the variables of interest, participants presenting only one of these symptoms (either anxiety or depression) were excluded.

2.3. Procedures

The study employed a non-probabilistic sampling approach, recruiting through educational institutions, community settings, and social media. Moreover, non-governmental organisations and government-run initiatives in the fields of education and employment played a pivotal role in establishing contact with prospective participants. Considering the limitations imposed by the pandemic, the recruitment strategies employed varied according to the specific circumstances and available options in each city (Gómez-Restrepo et al., 2025).

The inclusion and exclusion criteria were consistently checked during the selection process to ensure that all participants met the eligibility criteria for inclusion in the study (Gómez-Restrepo et al., 2025). A research team conducted the screening, recruitment, and data collection processes for each country. Before the study began, the researchers who administered the questionnaires underwent training in data collection procedures and completed courses on good clinical practice and research ethics (Gómez-Restrepo et al., 2025).

The recruitment of participants was conducted between April 2021 and November 2022. In accordance with the regulations set forth by the respective governments in response to the global pandemic, recruitment was conducted using in-person and virtual modalities. A screening process identified and invited participants who satisfied the inclusion criteria. Once informed consent and/or assent had been obtained, participants were invited to complete a questionnaire online or on paper (Gómez-Restrepo et al., 2025). Completing the questionnaire typically required between 30 and 60 min.

All assessments were conducted under the supervision of trained research assistants, either in person or via secure Zoom sessions. Questionnaires were completed individually or in small groups, depending on participants' circumstances. The presence of research assistants allowed participants to receive clarifications when needed and ensured

adherence to study procedures. Assistants were also trained to identify and appropriately manage potential situations of emotional distress, following ethical protocols. This supervision also helped ensure that questionnaires were completed by participants themselves.

Finally, the online questionnaires were completed on the REDCap platform (Kragelund et al., 2018), and a trained research assistant manually entered the responses into REDCap for paper questionnaires.

2.4. Variables and instruments

2.4.1. Comorbidity of anxiety and depression symptoms

This was constructed based on the Patient Health Questionnaire-8 (PHQ-8) and Generalised Anxiety Disorder-7 (GAD-7) questionnaires, with cut-off points set at PHQ-8 > 9 points and GAD-7 > 9 points, as recommended in screening evaluations (Villarreal-Zegarra et al., 2023; Kroenke et al., 2009).

The PHQ-8 is a measure of depressive symptoms, including a lack of interest or pleasure in activities, changes in appetite, difficulty sleeping, fatigue, feelings of worthlessness, and thoughts of self-harm. The scale comprises eight items, each rated on a scale of 0 to 3, where 0 indicates the absence of the symptom, and 3 reflects its occurrence almost every day in the last 15 days (Kroenke et al., 2009). The Spanish version of the PHQ-8 has been demonstrated to possess satisfactory psychometric properties, including validity, reliability, and good sensitivity and specificity (Huarcaya-Victoria et al., 2020).

The GAD-7 assesses the severity and frequency of anxiety symptoms, including, but not limited to, nervousness, excessive worry, difficulty relaxing, and irritability. The questionnaire comprises seven items, each scored on a scale of 0 to 3, where 0 indicates the absence of the symptom and three indicates its occurrence almost daily in the last 15 days (Spitzer et al., 2006). The Spanish version of the GAD-7 has previously demonstrated satisfactory validity and reliability (Byrd-Bredbenner et al., 2021).

Both instruments exhibited optimal fit indices for a unidimensional model in the study population, with evidence of invariance concerning gender, age group, educational level, and country (Vilela-Estrada et al., 2025). Furthermore, both questionnaires demonstrated adequate internal consistency, with omega (ω) and alpha (α) coefficients above 0.8 (Vilela-Estrada et al., 2025).

The participants were classified according to the presence of comorbid symptoms, as determined by questionnaire assessment. The resulting two categories were as follows: I) Without symptoms: participants who did not reach the cut-off point in either questionnaire (PHQ-8 $\leq$ 9 and GAD-7 $\leq$ 9) and II) Symptom comorbidity: participants who exceeded the cut-off point in both questionnaires (PHQ-8 > 9 and GAD-7 > 9).

2.4.2. Quality of life

QoL was assessed using the Manchester Short Assessment of Quality of Life (MANSA) (Priebe et al., 1999). In the study, we used the dimension of satisfaction with various life domains. It consists of 12 items that explore: occupational status, financial circumstances, social connections, sexual activity, recreational pursuits, housing conditions, personal security, familial relationships, and physical and mental well-being. Participants were invited to rate their satisfaction with each life satisfaction with each dimension on a scale ranging from 1 (indicating a lack of satisfaction) to 7 (indicating complete satisfaction).

The MANSA has demonstrated satisfactory psychometric properties in its Spanish version, exhibiting acceptable validity and internal consistency ($\alpha > 0.74$) in patients with MH disorders (Petkari and Priebe, 2023; Priebe et al., 1999). In our sample, MANSA exhibited optimal fit indices of internal structure and adequate internal consistency ($\alpha = 0.862$). This study was analysed using the mean of the 12 satisfaction items to reflect subjective QoL, with higher scores indicating a better QoL.

2.4.3. Perceived social support

The Multidimensional Scale of Perceived Social Support (MSPSS) was used to assess perceived social support. This self-report instrument consists of 12 items designed to evaluate support from three primary sources: family, friends, and other significant individuals. Each subscale includes four items, with responses rated on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). The MSPSS has demonstrated adequate psychometric properties for measuring perceived social support in Argentina, Colombia, and Peru (Almonacid et al., 2023; Matrángolo et al., 2022; Trejos-Herrera et al., 2018). The total score was calculated by averaging the 12 items. Based on the total score, participants were categorised into three levels of perceived social support: low (1–2.9), moderate (3–5), and high (5.1–7) (Zimet et al., 1988). This variable was treated as a categorical polytomous variable, with participants classified according to their overall perception of social support; this categorisation has been frequently adopted in studies using the MSPSS and was used here to enhance interpretability and comparability (Haddad et al., 2024; Miller-Matero et al., 2025; Samson, 2020; Tan-tirattanakulchai and Hounnaklang, 2022).

2.4.4. Use of MH services

The utilisation of specialised MH services was evaluated using two questions derived from an adapted version of the Client Service Receipt Inventory (CSRI) (Beecham and Knapp, 1992). The questions were: “Have you had any remote/virtual or in-person appointments with a psychiatrist in the last three months?” and “Have you had a remote/virtual or in-person appointment with a psychologist/psychotherapist in the last three months?”, and responses were dichotomised as ‘yes’ or ‘no’.

2.4.5. Confounding variables

We selected the following confounding variables based on an epidemiological approach for both symptom comorbidity, QoL and use of MH services: city of residence (Bogotá, Buenos Aires, Lima), gender (male, female, others), age group (adolescent, young adult), main occupation (work, study, housewife, no occupation), the highest level of education attained by participants (no formal education, primary, secondary, higher education), the highest level of education of parents (no formal education, primary, secondary, higher education), poverty rate of participants' districts of residence, based on NBI (Nations, 2008) and HDI (Santos, 2014) (lowest 25 % or 50 % in terms of human development and socioeconomic conditions), and number of stressful life events in the past year (0–2 or 3 or more), based on the Life Events Questionnaire (VEQ) (Heubeck and O'Sullivan, 1998).

2.5. Data analysis

As this research is a cross-sectional study based on data from the OLA Project, statistical power calculations were conducted for each objective. For the first objective, the power calculation was based on the findings of a previous study in the Swedish general population, which reported a mean QoL score of 0.51 for individuals with comorbidity, compared to 0.71 for those without symptoms (Johansson et al., 2013). The power calculation considered the comparison of means between two independent groups, and the statistical power of our sample was at least 99 %.

For the second objective, the power calculation was based on a larger Finnish study, which reported that 29 % of individuals without comorbidity used MH services, compared to 58 % of those with comorbidity (Hämäläinen et al., 2008). A power calculation comparing two proportions using our sample size yielded an estimated statistical power of at least 99 %.

Given the high statistical power estimated for both research objectives, data analysis was undertaken based on the adequacy of the sample size to detect the expected associations. First, any observations containing missing values for all variables of interest were excluded. Then,

absolute and relative frequencies of categorical variables were obtained, along with the mean and standard deviation of QoL.

For the first objective, bivariate analyses were employed to examine the relationship between QoL and the variables under investigation. The Student's *t*-test was employed to compare independent dichotomous categorical variables, and the one-way ANOVA or Kruskal–Wallis test was used for polytomous categorical variables, depending on the homoscedasticity of the variables. In addition, both unadjusted and adjusted generalised linear models (GLMs) with a Gaussian family and identity link function were fitted to assess the association between comorbid symptoms and QoL. Robust standard errors were used in both models to improve the accuracy of the estimates. The adjusted model was controlled for potential confounders using an epidemiological approach, with robust variance estimation. Multicollinearity was assessed using the Variance Inflation Factor (VIF); and values <5 were considered acceptable.

To assess potential effect modification by perceived social support, an interaction term between comorbidity and social support was included in the adjusted model. The significance of the interaction was tested using the Wald test for composite linear hypotheses via the *testparm* command in STATA. Predictive margins were computed to visualise how social support modified the relationship between comorbidity and QoL.

For the second objective, which examined the use of MH services, bivariate associations were assessed using the chi-squared test for categorical variables, and Student's *t*-test for continuous variable (QoL), as appropriate. The suitability of the Poisson model was first assessed by comparing the mean and variance of the outcome, conducting a chi-square goodness-of-fit test ($p > 0.05$), and examining the deviance statistic. A negative binomial model was estimated to further assess potential overdispersion, as the dispersion parameter (alpha) was not significantly different from zero ($p = 1.000$), equidispersion was assumed, and Poisson regression was deemed appropriate. Subsequently, both unadjusted and adjusted Poisson regression models were fitted to estimate the association between comorbid anxiety and depressive symptoms and the use of MH services. The adjusted model controlled for potential confounders using an epidemiological approach. Multicollinearity was assessed using the VIF, and values <5 were considered acceptable. Robust standard errors were used to improve the accuracy of the estimates.

Finally, to examine potential effect modification by QoL, an interaction effect between comorbidity and QoL was included in the adjusted model. The significance of the interaction was tested using the Wald test via the *test* command in STATA, and interaction effects were further explored through post-estimation analyses.

All analyses were conducted at a 95 % confidence level, with statistical significance set at $p < 0.05$. Data were analysed using STATA version 18.0 (StataCorp, College Station, TX, USA).

2.6. Ethics considerations

The study protocol and instruments were approved by the Institutional Review Boards (IRBs) of Universidad de Buenos Aires in Argentina (approved on October 2nd, 2020), Pontificia Universidad Javeriana in Colombia (ref. FM-CIE-1138-20), Universidad Peruana Cayetano Heredia in Peru (ref. Constancia 581-33-20), and Queen Mary University of London in the UK (ref. QMERC2020/02).

All young adult participants provided informed consent. For adolescents, consent was obtained from their parents or legal guardians, and assent was obtained from the adolescents themselves. Consent and assent could be provided in person, digitally via REDCap, as a photo of the signed document, or verbally during a phone call or virtual meeting, with the conversation audio recorded.

Participants with severe scores on the PHQ-8 or GAD-7 (PHQ-8 ≥ 20 , GAD-7 ≥ 15) were given information about free or low-cost MH services.

3. Results

3.1. Participants characterisation

We received 2405 questionnaire responses from a pool of 6176 potentially eligible individuals. Two participants withdrew from the study, and one completed the questionnaires twice. After excluding these cases, data from 2402 participants were retained. Additionally, 163 participants were excluded due to missing data on key variables.

To focus specifically on individuals presenting comorbid symptoms of anxiety and depression, as well as those without significant symptoms of either condition, we excluded participants who reported symptoms of only depression ($n = 314$) or only anxiety ($n = 109$), defined as scores below 10 on the PHQ-8 and GAD-7, respectively. The final analytic sample comprised 1816 participants, as shown in Fig. 1.

The mean QoL score in the sample was 4.64 (SD = 1.11) and 14.8 % of participants reported using MH services. 50.22 % of the sample presented with comorbid symptoms of anxiety and depression. Table 1 summarises the characteristics of the study sample. Differences in QoL and MH service use across subgroups with varying characteristics are presented in the supplementary material (see Supplementary Tables 1 and 2, respectively).

3.2. Association between the comorbidity of anxiety-depression symptoms, perceived social support and QoL scores

Comorbidity of anxiety and depression symptoms was significantly

associated with QoL in both unadjusted and adjusted models (Table 2). In the adjusted model, participants with comorbid symptoms reported significantly lower QoL scores compared to those without comorbidity ($\beta = -0.71$; 95 % CI: $-0.81, -0.62$; $p < 0.001$).

Additionally, higher levels of perceived social support were associated with better QoL. Participants with moderate and high levels of support tended to report progressively higher QoL scores compared to those with low support (Table 2). Moreover, the interaction analysis assessed whether perceived social support levels modified the relationship between the comorbidity of anxiety and depression symptoms and QoL, yielding $\chi^2(5) = 690.90$ and $p < 0.001$. This suggests that the association between these variables varies according to levels of perceived social support.

The model's predicted probabilities, shown in Table 3, indicate that QoL is consistently higher among individuals without comorbid anxiety and depression symptoms compared to those with comorbidity, across all levels of perceived social support. Furthermore, greater perceived social support is associated with improved QoL in both groups. Nevertheless, even at the highest levels social support, participants with comorbid symptoms continue to report lower QoL than those without symptoms.

Association between the comorbidity of anxiety-depression symptoms, QoL scores and use of MH services.

The comorbidity of anxiety and depression symptoms was significantly associated with increased use of MH services in both unadjusted and adjusted models (Table 4). In the adjusted model, participants with comorbid symptoms exhibited almost twice the prevalence of MH

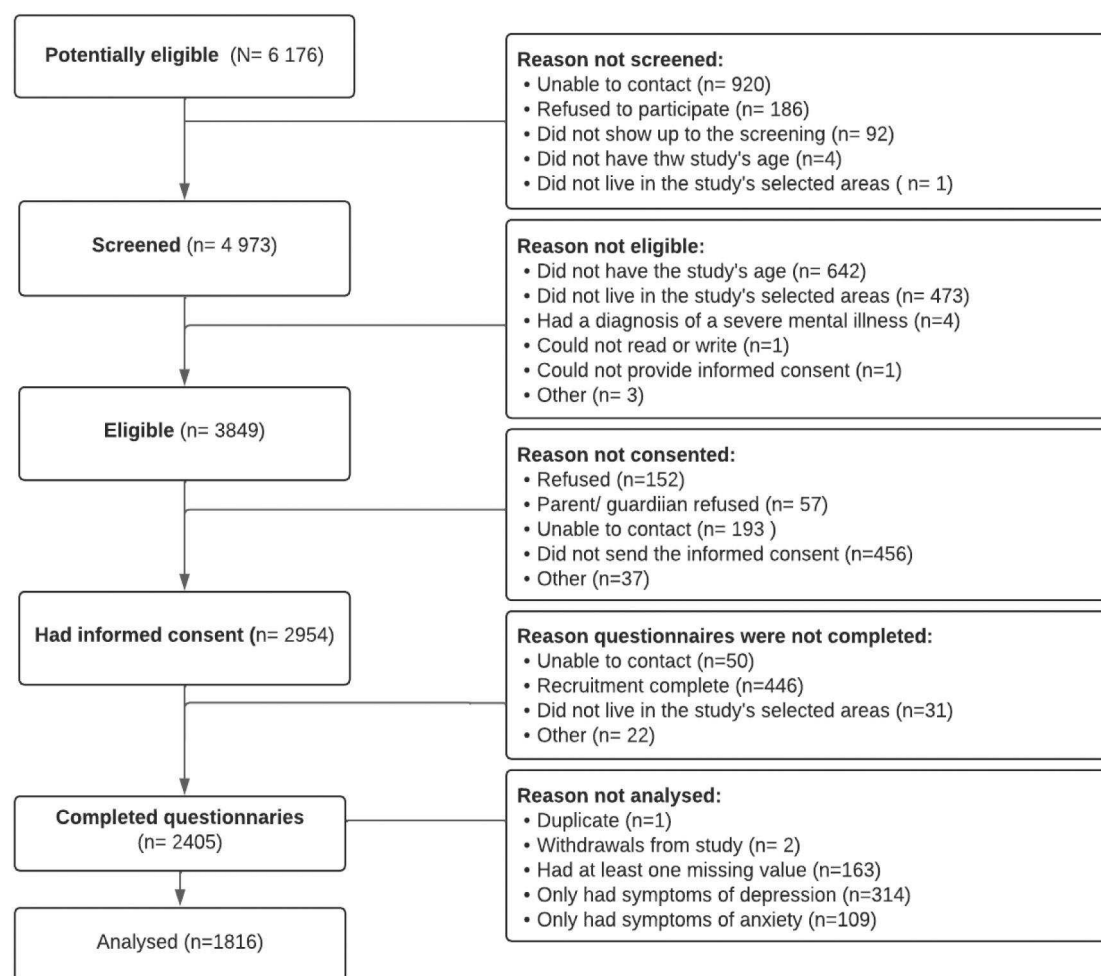


Fig. 1. Flowchart of the number of participants at each stage of recruitment.

Table 1
Sociodemographic characteristics of the sample.

Characteristics	n (%)
Gender	
Male	618 (34.0)
Female	1175 (64.7)
Other	23 (1.3)
Age group	
Adolescents	811 (44.7)
Young adults	1005 (55.3)
City	
Bogotá	719 (39.6)
Buenos Aires	439 (24.2)
Lima	658 (36.2)
Educational degree of participants	
No formal education	13 (0.8)
Completed primary education	865 (47.6)
Secondary education	812 (44.7)
Higher education	126 (6.9)
Main occupation	
No occupation	120 (6.6)
Work	247 (13.6)
Study	1373 (75.6)
Homemaker	76 (4.2)
Highest educational degree of parents	
No formal education	118 (6.5)
Completed primary education	390 (21.5)
Secondary education	752 (41.4)
Higher education	556 (30.6)
Self-reported stressful life events in the past year	
0–2 events	947 (52.2)
3 or more events	869 (47.8)
Poverty rate for the districts of residence	
Lowest 25 %	712 (39.2)
Lowest 50 %	1104 (60.8)
Perceived social support	
Low	169 (9.3)
Medium	478 (41.2)
High	899 (49.5)
QoL ^a	4.64 ± 1.11
Use of MH services	
No	1547 (85.2)
Yes	269 (14.8)
Comorbidity of anxiety and depression symptoms	
No symptoms	904 (49.8)
Comorbidity of anxiety-depression symptoms	912 (50.2)

^a Mean ± SD: media and standard deviation; n: frequency; %: percentage; QoL: Quality of life; MH: Mental Health.

service utilisation compared to those without comorbidity (PR = 1.98; 95 % CI: 1.45, 2.72; $p < 0.001$). QoL showed a significant inverse association with MH service use, with each unit increase in QoL corresponding to a reduced prevalence of service utilisation (PR = 0.75; 95 % CI: 0.67, 0.83; $p < 0.001$).

Additionally, an interaction analysis was conducted to assess whether QoL modified the association between the comorbidity of anxiety and depression symptoms and the use of MH services. The likelihood ratio test yielded $\chi^2(1) = 3.45$, $p = 0.063$, indicating no significant effect modification. In the adjusted Poisson model including the interaction term, the estimated interaction effect was also not statistically significant (IPR = 0.88; 95 % CI: 0.66–1.16; $p = 0.365$). The main effect of comorbidity on service use remained substantial in magnitude (IPR = 3.64; 95 % CI: 0.93–14.23), although this association did not reach statistical significance ($p = 0.063$). These results are presented according to the conventional statistical significance threshold of $p \leq 0.05$.

4. Discussion

4.1. Main findings

This study highlights a significant association between the

Table 2
Association between the comorbidity of anxiety and depression, perceived social support and QoL.

Exposure	Unadjusted estimates			Adjusted estimates ^a		
	β^b	95 % CI ^c	p-Value	β	95 % CI ^c	p-Value
<i>Comorbidity of anxiety and depression symptoms</i>						
Without comorbidity (Reference)						
With comorbidity	−1.04	−1.13; −0.95	<0.001	−0.71	−0.81; −0.62	<0.001
<i>Perceived social support^d</i>						
Low support (Reference)						
Moderate support	0.57	0.37; 0.76	<0.001	0.48	0.29; 0.68	<0.001
High support	1.42	1.23; 1.62	<0.001	1.15	0.95; 1.34	<0.001

^a The model was adjusted for city, gender, age group, educational degree of participants, main occupation, highest educational degree of parents, educational degree, self-reported stressful life events in the past year, poverty rate for the districts of residence, and use of MH services. Perceived social support was also included as a confounder in this model, and its adjusted estimates are presented in the table.

^b β = Regression coefficient.

^c CI = 95 % confidence interval.

^d We divided the MSPSS score into three levels of perceived social support.

Table 3
Predicted margins of QoL by the presence of the comorbidity of symptoms anxiety, and depression, and perceived social support.

Predicted margins for quality of life ^b	Perceived social support ^a					
	Low		Moderate		High	
	Mean (SD)	95 % CI	Mean (SD)	95 % CI	Mean (SD)	95 % CI
No symptoms	4.35 ± 0.27	3.82, 4.88	4.73 ± 0.05	4.63, 4.83	5.37 ± 0.04	5.29, 5.45
Comorbidity of anxiety-depression symptoms	3.49 ± 0.09	3.32, 3.66	4.00 ± 0.04	3.91, 4.08	4.69 ± 0.05	4.59, 4.78

^a We divided the MSPSS score into three levels of perceived social support.

^b The predicted margins were obtained from the adjusted regression model (adjusted by city, gender, age group, educational degree of participants, main occupation, highest educational degree completed of parents, self-reported stressful life events in the past year, poverty rate for the districts of residence, and use of MH services) with an interaction between perceived social support.

comorbidity of anxiety and depressive symptoms and lower QoL among adolescents and young adults from economically disadvantaged backgrounds in Bogotá, Buenos Aires, and Lima. Higher levels of perceived social support were associated with better QoL, and the analysis indicated that perceived support modified the relationship between comorbidity and QoL, acting as a protective factor by attenuating its negative impact.

In addition, the study found that young people experiencing comorbid symptoms were more likely to utilise MH services, suggesting that symptom severity may play a key role in driving help-seeking behaviours in this population. QoL also showed a strong inverse association with service use, indicating that lower wellbeing may prompt greater engagement with services. Although the interaction between QoL and comorbidity in predicting service use was not statistically significant, the direction and magnitude of the estimates suggest a potentially meaningful moderation effect that merits further investigation.

Table 4
Association between the comorbidity of anxiety and depression, QoL and use of MH services.

Exposure	Unadjusted estimates			Adjusted estimates ^a		
	PR ^b	95 % CI ^c	p-Value	PR	95 % CI ^c	p-Value
<i>Comorbidity of anxiety and depression symptoms</i>						
Without comorbidity (Reference)						
With comorbidity	2.38	1.83; 3.10	<0.001	1.98	1.45; 2.72	<0.001
QoL	0.75	0.67; 0.83	<0.001	0.81	0.71; 0.94	0.006

^a The model was adjusted for city, gender, age group, educational level of participants, main occupation, highest educational level completed by parents, educational degree, self-reported stressful life events in the past year, poverty rate for the districts of residence, and perceived social support. QoL was also included as a confounder in this model, and its adjusted estimates are presented in the table.

^b PR prevalence ratio.

^c CI = 95 % confidence interval.

4.2. Comparison with the literature

The comorbidity of anxiety and depressive symptoms is common in young populations, and it has been reported that up to 50 % of adolescents with anxiety disorders also have depressive symptoms. This relationship is well documented in the literature, which indicates that up to 45.7 % of people with a lifetime history of depression have also had an anxiety disorder, highlighting the interconnectedness of these disorders (Rogers et al., 2020). This relationship can be understood as a recursive cycle in which anxiety exacerbates the symptoms of sadness and hopelessness associated with depression, making recovery more difficult. This phenomenon is particularly evident in generalised anxiety disorder (GAD), which has a comorbidity rate with depression of over 80 % (Ruscio et al., 2017).

Our findings align with previous studies showing that the co-occurrence of anxiety and depressive symptoms is linked to substantially lower QoL among adolescents and young adults. Evidence suggests that individuals experiencing comorbidity tend to report a reduced QoL even before the formal onset of these conditions, pointing to a broader vulnerability that is likely intensified when both types of symptoms are present (Damon et al., 2006; Solmi et al., 2022; Zhou et al., 2017). Recent research conducted during the COVID-19 pandemic has echoed these findings, highlighting a marked decline in QoL among young people, especially in settings of chronic stress and socioeconomic hardship (Nobari et al., 2021; Ravens-Sieberer et al., 2022). These contextual stressors appear to amplify the effects of MH difficulties, underlining the importance of considering both individual symptomatology and structural inequalities when addressing youth MH in vulnerable urban areas.

It is worth noting that, our analytic sample was limited to people with comorbid symptoms of anxiety and depression or without significant symptoms of either condition. Although this contrast was not pre-defined in the original study design, these exclusions allowed for a more focused exploration of how comorbidity affects perceived QoL. Although this approach does not capture the full spectrum of symptom severity in the general population, it provides valuable insight into the differences between the clinical extremes.

Regarding the effect modifier, perceived social support was a key factor in improving QoL, even in the presence of emotional distress. This finding is consistent with the literature highlighting the protective role of social support in the MH of young people, particularly in vulnerable contexts (Connell et al., 2012; Gariépy et al., 2016). Furthermore, there is evidence that perceived social support has a positive influence on QoL, as having multiple sources of support can improve perceptions of well-

being among young people in vulnerable situations (Singstad et al., 2021). This support is not only associated with better QoL but also with reduced symptoms of anxiety and depression in adverse contexts (9). High levels of social support act as a buffer against the effects of depression, helping young people to feel less alone and reducing hopelessness, which promotes self-care and emotional well-being (Howard et al., 2010).

Our findings also revealed that the presence of comorbid symptoms was associated with increased use of MH services. This supports the hypothesis that greater symptom severity may heighten individuals perceived need, thereby facilitating help-seeking behaviour. This trend aligns with previous research showing that psychiatric comorbidity significantly increases the likelihood of accessing MH care, as the co-occurrence of multiple disorders often results in more complex and severe clinical presentations (Bijl and Ravelli, 2000; Kessler et al., 1999; Mackenzie et al., 2012; Richardson et al., 2008; Rodriguez-Seijas et al., 2017; Zhou et al., 2017).

However, within the specific context of our study (Bogotá, Buenos Aires, and Lima), these patterns may also reflect structural characteristics of MH service provision. In these settings, access to specialised services is often regulated by eligibility criteria that prioritise individuals with more severe clinical conditions. Consequently, reported service use may act more as an indirect marker of symptom severity than as an indicator of broad or equitable access. This interpretation is consistent with prior studies suggesting that specialist MH services tend to be concentrated among those with more severe or treatment-resistant conditions (Alonso et al., 2004; Minsky et al., 2011; Vargas Lopes and Llena-Nozal, 2025).

Regarding QoL, individuals reporting lower QoL were more likely to seek professional support, which is consistent with previous studies highlighting that reduced QoL can act as a motivator for help-seeking (Chiang et al., 2021). Although the interaction analysis did not provide statistically conclusive evidence that QoL modifies the association between comorbidity and MH service use ($p = 0.063$), the observed main effect suggests differences in magnitude that may be clinically relevant (IRP = 3.64; 95 % CI: 0.93–14.23). Although the results were just above the conventional threshold for statistical significance, the observed effect sizes could still be important, especially considering that, in observational studies, statistical power is often more limited to detect interaction effects (Hernandez et al., 2006). Future research with larger samples may provide more clarity on whether QoL significantly moderates this relationship in juvenile populations.

A systematic review identified several common barriers to accessing MH services, including stigma, concerns about confidentiality, and mistrust in health care providers, particularly among young people and in socioeconomically disadvantaged settings. In addition, poor recognition of symptoms, limited awareness of available services, and barriers related to geographical or financial inaccessibility further exacerbate the problem (Gulliver et al., 2010). These obstacles, which persist despite high perceived need, may significantly hinder the translation of that need into actual help-seeking behaviour.

4.3. Policy implications

These findings highlight the need to design interventions that not only address clinical symptoms but also strengthen the social and community resources available to young people. Our results suggest that the presence of such resources has a positive effect on perceived well-being, even in the context of emotional distress. In this regard, public policies could focus on fostering environments that encourage the development of support networks among peers, families, and communities, particularly in settings where structural conditions of poverty or exclusion often limit these resources (Patel et al., 2007).

In addition, we found that young people with more severe symptoms and lower QoL are more likely to use MH services. This may indicate that existing systems are prioritising more complex cases, in line with the

eligibility criteria currently in place in the studied cities. However, this focus on severe cases may also imply a care gap for those experiencing emotional distress that does not meet such thresholds. Policies should consider mechanisms to expand access to preventive and early intervention services, without compromising care for those with higher levels of need.

While the interaction between QoL and comorbidity in relation to MH service use was not statistically significant by conventional standards, the observed pattern and effect size may nonetheless have relevant implications for public policy. The negative association found between QoL and MH service use suggests that enhancing the overall QoL among young people could help prevent the progression of psychological difficulties. Investing in these protective dimensions may function not only as a form of early support but also to alleviate the burden on overstretched MH systems.

As such, policy responses aimed at youth MH should incorporate strategies that promote wellbeing, particularly in socially disadvantaged settings where emotional challenges often remain unaddressed until they reach clinical thresholds for care. Moreover, although QoL did not moderate the relationship between symptoms and service use, lower levels of QoL still emerged as a reason for seeking help. This underlines the importance of strengthening institutional responses to subjective distress within primary care, reinforcing the need to move toward MH services that are accessible, context-sensitive, and culturally appropriate (World Health Organisation, 2022).

4.4. Strengths, limitations, and future directions

This study presents several strengths. Firstly, it involved a large and diverse sample of over two thousand young people from disadvantaged urban areas in three Latin American cities, enhancing the external validity of the findings and their applicability to similar regional contexts. Adequate statistical power was achieved to address both analytical objectives, even though these were not the original aims of the OLA Project. Furthermore, the use of psychometrically robust instruments strengthened the reliability of the data collected.

However, the cross-sectional, non-experimental design limits the ability to draw causal inferences between variables. The use of self-report measures may also introduce biases such as recall error or social desirability. Nonetheless, the anonymous and digital nature of data collection may have helped reduce these tendencies compared to face-to-face interviews. Another limitation concerns the study's focus on symptoms rather than formal diagnostic categories for anxiety and depression. While this may reduce diagnostic specificity, it also offers certain advantages. By relying on widely validated symptom scales rather than rigid or shifting clinical classifications, the study allows for broader generalisability across diverse populations and contexts.

Regarding socioeconomic status, although all participants resided in disadvantaged areas, individual-level data on socioeconomic conditions were not available. Instead, district-level indicators were used, which may not fully capture the heterogeneity of material living conditions within those areas. This limitation restricts the study's ability to analyse how household-level resources may influence QoL or the use of MH services.

Longitudinal studies would be particularly valuable in exploring the trajectories between anxiety and depressive symptoms, QoL, and service use, enabling an understanding of temporal patterns and change over time. Within the OLA Project framework, future follow-up waves may offer deeper insight into the dynamics among these variables. However, to more rigorously establish causality, experimental studies evaluating the impact of specific MH interventions in vulnerable youth populations are needed.

Future research could examine community-based interventions aimed at strengthening perceived social support, assessing their impact on QoL and potential to reduce emotional distress. Experimental evidence is also needed on programmes that improve access to and the

relevance of MH services in low-resource settings. One promising avenue may involve the development and evaluation of brief, culturally appropriate, and scalable interventions focused on prevention and early response, implemented in school or community settings.

Finally, qualitative studies could complement quantitative analyses by exploring how adolescents and young adults understand and cope with emotional symptoms, how they perceive the usefulness of available services, and the role social support plays in their daily well-being. These approaches could provide a more contextualised and nuanced foundation for the design of future interventions.

5. Conclusions

The findings of this study highlight the importance of addressing both emotional symptoms and social factors in supporting the well-being of young people in disadvantaged urban settings. Social support was consistently associated with better QoL, even in the presence of MH difficulties, while MH service use appeared to be concentrated among those with more severe symptoms. These results point to the need for institutional responses that are sensitive to subclinical distress and for realistic strategies to expand access and strengthen community support networks in highly vulnerable contexts.

CRedit authorship contribution statement

Ana L. Vilela-Estrada: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Maria Lazo-Porras:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization. **Antonio Bernabe-Ortiz:** Writing – review & editing, Validation, Supervision, Methodology, Formal analysis, Conceptualization. **Stefan Priebe:** Writing – review & editing, Supervision, Resources, Methodology, Funding acquisition, Conceptualization. **Victoria J. Bird:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Karen Ariza-Salazar:** Writing – review & editing. **Diliniya Stanislaus Sureshkumar:** Writing – review & editing, Project administration. **Natalia Godoy-Casasbuenas:** Writing – review & editing, Project administration. **Carlos Gómez-Restrepo:** Writing – review & editing, Funding acquisition. **Natividad Olivar:** Writing – review & editing. **Sofia Madero:** Writing – review & editing. **Luis Ignacio Brusco:** Writing – review & editing, Funding acquisition. **Francisco Díez-Canseco:** Writing – review & editing, Visualization, Validation, Supervision, Resources, Funding acquisition.

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Declaration of competing interest

The authors report no conflict of interest when conducting the study, analyzing the data, or writing the manuscript.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jad.2025.120305>.

Data availability

The dataset analysed during the current study will be available beginning 9 months and ending 36 months following article publication to researchers on reasonable request from Professor Victoria Bird. Proposals should be directed to v.j.bird@qmul.ac.uk to gain access, data requestors will need to sign a data access agreement.

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