

GENDER, AGE AND DEPRESSIVE SYMPTOMS IN ADOLESCENCE

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Abstract

The objective of this study was to analyze the relationship of gender and age with depressive symptomatology in adolescents. The participants were 1,212 adolescents, from 1st (53.9%) and 2nd (46.1%) year in Compulsory Secondary Education, belonging to seven schools in the Region of Murcia (Spain), and 104 parents. The percentage of adolescents with clinically significant depressive symptoms is similar to that found in other studies in Spain. The girls presented greater depressive symptomatology. The gender difference was greater in the group with high depressive symptomatology. Depressive symptomatology increased with age, consistent with previous research. The difference was highlighted in adolescent self-reports but not in parent reports. The main conclusion is that the development of depression prevention programs should take gender and age into consideration.

KEY WORDS: *depression, gender, age, adolescents, parents.*

Resumen

El objetivo de este estudio fue analizar la relación del sexo y la edad con la sintomatología depresiva en adolescentes. Los participantes fueron 1.212 adolescentes, de 1º (53,9%) y 2º (46,1%) curso de la Educación Secundaria Obligatoria, pertenecientes a siete centros educativos de la Región de Murcia (España). Participaron también 104 padres. El porcentaje de adolescentes con sintomatología depresiva clínicamente significativa es similar al encontrado en otros estudios en España. Las chicas presentaron mayor sintomatología depresiva. La diferencia de sexo fue mayor en el grupo de alta sintomatología depresiva. La sintomatología depresiva aumentó con la edad en consonancia con investigaciones previas. La diferencia se puso de relieve en los autoinformes de los adolescentes, pero no en los informes de los padres. Se concluye la relevancia de tomar en consideración el sexo y la edad al elaborar programas de prevención de la depresión para adolescentes.

PALABRAS CLAVE: *depresión, sexo, edad, adolescentes, padres.*

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Introduction

Depression is a psychological disorder produced by multiple causes that is characterized by feelings of dysphoria and hopelessness (also irritability in children and adolescents), decreased ability to enjoy environmental events, pessimistic thoughts, reduced enjoyment of pleasant activities and increased avoidance behaviors that can lead to social isolation. The disorder has a negative impact on personal, family, school and social levels (Sánchez-Hernández, 2012). It is characterized as the most disabling individual disorder, contributing to 7.2% of the overall burden of disease in Europe (Wittchen et al., 2011). Depression is common, recurrent, sometimes chronic, and often comorbid with anxiety and substance and alcohol use problems (Méndez et al., 2021).

In Europe, the major study Saving and Empowering Young Lives in Europe (SEYLE), carried out in ten countries plus Israel with a sample of 12,395 adolescents, average age 14.81 years, revealed a high prevalence of depression. The percentage per country in decreasing order was Israel 19.4%, France 15.4%, Germany 12.9%, Slovenia 11.4%, Italy 9.2%, Spain 8.6%, Ireland 8.5%, Estonia 7.9%, Romania 7.6%, Austria 7.6% and Hungary 7.1% (Balazs et al., 2012). An increase in mood disorders has been found from 2006 to 2010 in Spain (Gili et al., 2013). The Working Group of the Clinical Practice Guideline Update on Major Depression in Childhood and Adolescence (2018) reviews epidemiological studies conducted in our country and finds a prevalence range of adolescent depression of 2.3%-9.4%, estimating severe cases between 1.8% and 3.8%. It is noteworthy that in recent decades the risk of depression has increased at younger and younger ages (Gallego et al., 2020). The meta-analytic study by Shore et al. (2018) conducted with 20 longitudinal studies with children and adolescents finds that those characterized by a "high" or "increasing" pattern in depressive symptomatology were eminently predicted by female gender, greater reactivity to stress, low socioeconomic status, problems in peer and parental relationships, behavioral problems, and substance abuse.

Adolescents with elevated, although subclinical, levels of depression experience interpersonal and academic difficulties analogous to those diagnosed with depressive disorders (Ferreira et al., 1995; Gotlib et al., 1995). They are also more likely to use drugs, smoke and even attempt suicide (Covey et al., 1998; Garrison et al., 1991). However, utilization of health services is low among adolescents with subclinical depression (Crockett et al., 2020). There is evidence of the continuity of depressive disorder from adolescence into adulthood, which is reflected in the high rates of psychiatric consultations and hospitalizations and the future work and relationship problems it causes (Weissman et al., 1999). Adolescent girls' exposure to depressed peers has even been shown to affect their own depression in adulthood and to negatively affect the likelihood of attending college and the likelihood of working, leading to a reduction in adult women's earnings. Further analysis reveals that individuals from families with lower socioeconomic backgrounds are more susceptible to peer influence, suggesting that the family may

function as a buffer (Giulietti et al., 2022). It has also been found that long-term depression in women may be an important condition for cognitive impairment later in life (Zheng and Jia, 2022). But of all the problems, the most tragic consequence is suicide. Major depression is one of the main risk factors for suicide in adolescents (Kann et al., 2000; Brent, 2001). In the study by Tabares et al. (2019) the following variables were found to predict suicidal risk: history of mental disorder and suicide attempt in the family, suicide attempt, depression, hopelessness, and impulsiveness.

Most studies, both with Spanish and foreign samples, find no gender difference in the prevalence of childhood depression, the few studies that find a gender difference highlight that the disorder is slightly more frequent in boys. In contrast, in adolescence depression is clearly more prevalent in girls (Del Barrio, 2007; García-Ramos et al., 2018; Meyer and Curry, 2020; Rey et al., 2015; Ruiz-Cárdenas et al., 2020). Thus, recent longitudinal studies with Spanish adolescents find greater depressive symptomatology in girls (Gómez-Baya, Mendoza, Paino, Gaspar de Matos, 2017; Gómez-Baya, Mendoza, Paino, Gillham, 2017).

With respect to age, the rate of depression increases significantly throughout adolescence (Del Barrio, 2008; Ekbäck et al., 2021; Méndez, 2011; Pu et al., 2017; Weersing et al., 2017). Avenevoli et al. (2015) found that the largest increase occurs between the age groups 14 and 15 years. The gender difference in depression may begin to emerge most obviously and significantly in the transition from early to middle adolescence (between ages 13 and 15) and has been shown for both depressive symptoms and diagnosis (Crockett et al., 2020; Hankin et al., 1998; Twenge and Nolen-Hoeksema, 2002). Although the gender difference in depression has been well documented from adolescence onward, researchers have limited understanding of the processes responsible for its onset (Mezulis et al., 2010). Salk et al. (2017) conducted two meta-analyses, on diagnosis and depressive symptomatology to study gender differences. They reviewed 65 and 95 articles, respectively, that computed 1,716,195 and 1,922,064 participants from over 90 different countries. Age was the strongest predictor of effect size. The gender difference for diagnoses emerged earlier than previously thought, specifically at age 12 years. For both meta-analyses, the gender difference peaked in adolescence (for diagnosis between ages 13 to 15 years and for symptomatology at 16 years), but then declined and remained stable in adulthood. At age 18, females are twice as likely as males to have depression (Mezulis et al., 2010). On the other hand, the study presented here falls within the framework of multisource assessment, since the degree of agreement among informants is usually lower in internalized disorders compared to externalized disorders (Inchausti, 2021), thus, in the study *Young Minds Matter: The second Australian Child and Adolescent Survey of Mental Health and Wellbeing*, carried out with a large sample of 6,310 children and adolescents was found a prevalence of depression in the last twelve months, in the age group 12-17 years, of 5.0%, 4.7% if the informant was the parent or primary caregiver, and 7.7% if it was the adolescent (Lawrence et al, 2015). Depression studies in which the same version, or combinations of the full and abbreviated versions, of the

Children's Depression Inventory (CDI; Kovacs, 1992) have been administered to the adolescent and the parents also obtain conflicting data. Luking et al. (2019) used the brief version of the CDI with 69 children and adolescents, mean age 12.95, and found that the parent score was significantly lower, whereas Shelo and Kamfar (2015) found no significant difference with the CDI score of 60 children and adolescents, mean age 11.77. Correlations between adolescent self-report and parent report are usually low. Meehan et al. (2008) examined 796 dyads of schoolchildren, aged 10-13 years, and their parents, and obtained a correlation coefficient of 0.23, and Cavendish et al. (2012) a correlation coefficient of 0.26 in a longitudinal study.

A first objective of the study was to analyze the percentage of the sample that exceeds the clinical cut-off point for measures of depressive symptomatology. Since the increase in depressive symptomatology with age is associated with gender, that is, it is mainly explained by the increase in depression in girls, our study aims to investigate whether the gender difference is present at the beginning of adolescence or appears in later stages of adolescence and whether the age difference is already observed in early adolescence or, on the contrary, occurs in the transition to late adolescence. Gender and age differences are also explored from a multisource perspective (adolescent self-reports and parental reports) along the lines indicated by several studies (Meehan et al., 2008; Olmedo et al., 2000), studying the degree of agreement between them.

Method

Participants

The participants were 1,212 adolescents (51% male and 49% female) aged between 12 and 14 years ($M= 12.71$ years, $SD= 0.67$), belonging to seven schools in the Region of Murcia in the 7th (53.9%) and 8th (46.1%) year of High School. The schools are located in the city of Murcia, except for one located in the town of Abanilla. Three centers were considered of low social status, three of high social status and one of medium social status (see Sánchez-Hernández & Méndez, 2018). There was also a sample of 104 parents who participated in the assessments of their children's level of depressive symptomatology.

Instruments

- a) *Children's Depression Inventory* (CDI; Kovacs, 1992), Spanish adaptation by Del Barrio and Carrasco (2004). The CDI assesses depressive symptomatology in early adolescence and is widely used. It consists of 27 items with three response options (from 0= absence of symptoms to 2= severe symptoms), grouped into two scales: dysphoria (16 items) and self-esteem (11 items). Del Barrio and Carrasco (2004), in their translation and adaptation of the CDI into Spanish,

found a cut-off point of 19 in a sample of 7,759 participants. They distinguish, with respect to the total score, the following intervals with their corresponding interpretation: from 0 to 18, without depressive symptoms, from 19 to 26, mild depression and from 27 to 54 would correspond to severe depression. The study by Figueras et al. (2010) found an internal consistency (Cronbach's alpha) of .82, in 1,705 participants (ages 10 to 18 years).

- b) *Children's Depression Inventory - Short form* (CDI-S; Kovacs, 1992), Spanish adaptation by Del Barrio et al. (2002). The CDI-S was used for the parents. It consists of 10 items with three response options (from 0= absence of symptoms to 2= severe symptoms). The questionnaire was adapted for parents, so the wording of the items was modified by changing their reference from first person to third person as in the study by Olmedo et al. (2000). The total score can go from 0 to 20 points. The internal consistency, Cronbach's alpha, in the Spanish adaptation was .71.
- c) *Reynolds Adolescent Depression Scale-2* (RADS-2; Reynolds, 2002), Spanish version by Figueras-Masip et al. (2008). The RADS assesses depressive symptomatology in adolescents and is frequently used. The first version is aimed at adolescents aged between 13 and 18 years, and between 11 and 20 years in the second version, maintaining both the wording of the items and the format for collecting the responses, although the second version presents new standardization samples and four factors (dysphoria, anhedonia, negative self-evaluation, and somatic complaints), instead of the five factors of the first version, although the unifactorial model has been shown to be the most parsimonious. The RADS-2 consists of 30 items with four response options (from 1= almost never to 4= almost always). The total RADS score can range from 30 to 120 points. Studies conducted with Spanish adolescents indicate a cut-off point of 66, a score that corresponds to the 96th and 97th centiles (Del Barrio et al., 1996). The study in Spanish population by Figueras-Masip et al. (2008) found internal consistency values between .81 and .89.

Procedure

Initial contact was made with 12 public and private schools, mostly located in the center of the city of Murcia, with seven schools finally agreeing to participate in the study. Parents were asked for permission to participate, informing them that we wanted to investigate emotional problems in adolescents in the Region of Murcia, achieving a participation rate of 99%. The only condition for participation in the study was to be in the 7th or 8th year of High School in these centers and to have parental consent. The evaluation was carried out during school hours. First, the CDI (Kovacs, 1992) and then the RADS-2 (Reynolds, 2002) were applied, since the aim was to analyze a correlation difference according to the type of measure used with the adolescents (CDI and RADS-2) with respect to the measure used with the parents (CDI-S), following the line of the study by Olmedo et al. (2000). Parents were

summoned to an informative meeting outside school hours and were invited to carry out an evaluation of their children. Optionally, they could get information by telephone and ask to fill out the questionnaires at home, picking them up previously at their child's school. There was a sample of 104 parents. The CDI-S (Kovacs, 1992) was applied. The evaluations were carried out before the COVID-19 pandemic and are therefore not affected by this variable. More information on the sample can be found by consulting the study by Sánchez-Hernández and Méndez (2018).

Data analysis

Mean differences were performed to study the influence of gender and age on depressive symptomatology. Hypothesis tests on independent sample means were applied using Student's *t*-tests and ANOVA *F*-tests. As a complement to the ANOVA *F* test, which provides a global comparison between a series of means, and a posteriori comparison technique was applied, the aim of which was to check between which means of a set of groups significant differences are observed; specifically, Tukey's method was used for the comparison of pairs of means. The hypothesis tests on means were accompanied by the calculation of an effect size. To study the magnitude of the effect size of the differences of two means, we used the "standardized mean difference" (*d*), which is the difference of the groups' means divided by an estimator of the pooled within-group standard deviation (Lipsey and Wilson, 2001). For the *d* index, a value of 0.2 is considered low, 0.5 medium and 0.8 high, with practical significance reached at 0.2 and above. Partial eta squared (η^2_p) was used to calculate the effect sizes in the ANOVA. For this index a value of 0.1 is low and 0.25 high, reaching practical significance at 0.1 (Cohen, 1988). Pearson correlation analyses were also performed.

Results

Percentage of adolescents with clinically significant depressive symptomatology

The percentage of adolescents with clinically significant depressive symptomatology in the CDI was 9.2% of the sample (7.4% in boys and 11.3% in girls). In RADS-2 it was 7.8% of the sample (6.9% in boys and 9% in girls). The cut-off points for the measure used in the parents were not available, so this analysis could not be performed.

Gender differences in depressive symptomatology

With respect to the questionnaires completed by the adolescents, statistically significant differences were found in the total score and in the self-esteem dimension of the CDI, which would indicate that girls present greater depressive symptomatology (Table 1). A marginally significant difference also appeared in the

dysphoria dimension in the same sense. The magnitude of the effect size of these differences was very low according to Cohen (1988). On the RADS-2 measure, no statistically significant differences were found. In the parent questionnaires, statistically significant differences appeared in the self-esteem dimension of the CDI-S and marginally significant in the total score, also reflecting greater depressive symptomatology in girls. The magnitude of the effect size of these differences is medium-low (Cohen, 1988).

Table 1

Mean differences between genders in the different dimensions of the CDI, RADS-2, and CDI-S ($N= 1,212$ adolescents and 104 parents)

| Dimension | Gender | <i>M</i> | <i>SD</i> | <i>SE</i> | <i>t</i> | <i>gl</i> | <i>p</i> | <i>d</i> |
|------------------------------------|--------|----------|-----------|-----------|----------|-----------|----------|----------|
| Dysphoria (CDI) | Girls | 3.90 | 3.79 | 0.16 | 1.67 | 1059 | .094 | -- |
| | Boys | 3.54 | 3.29 | 0.14 | | | | |
| | Total | 3.72 | 3.54 | 0.11 | | | | |
| Negative self-esteem (CDI) | Girls | 6.85 | 3.35 | 0.15 | 2.04 | 1059 | .041 | -0.12 |
| | Boys | 6.44 | 3.26 | 0.14 | | | | |
| | Total | 6.64 | 3.31 | 0.10 | | | | |
| Depressive symptomatology (CDI) | Girls | 10.87 | 6.98 | 0.30 | 2.32 | 1059 | .020 | -0.14 |
| | Boys | 9.97 | 5.58 | 0.24 | | | | |
| | Total | 10.41 | 6.32 | 0.19 | | | | |
| Depressive symptomatology (RADS-2) | Girls | 48.79 | 1.16 | 0.49 | 0.52 | 1049 | .602 | -- |
| | Boys | 48.44 | 10.74 | 0.46 | | | | |
| | Total | 48.61 | 10.94 | 0.34 | | | | |
| Dysphoria (CDI-S) | Girls | 1.90 | 1.59 | 0.22 | 1.40 | 92 | .164 | -- |
| | Boys | 1.48 | 1.31 | 0.20 | | | | |
| | Total | 1.71 | 1.48 | 0.15 | | | | |
| Negative self-esteem (CDI-S) | Girls | 2.83 | 1.40 | 0.19 | 2.29 | 92 | .024 | -0.47 |
| | Boys | 2.09 | 1.69 | 0.26 | | | | |
| | Total | 2.50 | 1.57 | 0.16 | | | | |
| Depressive symptomatology (CDI-S) | Girls | 4.56 | 2.56 | 0.35 | 1.86 | 92 | .066 | -- |
| | Boys | 3.57 | 2.55 | 0.39 | | | | |
| | Total | 4.12 | 2.59 | 0.27 | | | | |

Note: CDI= Children's Depression Inventory; RADS-2= Reynolds Adolescent Depression Scale-2; CDI-S= Children's Depression Inventory - Short form (adapted for its application to parents). Interpretation of the effect size: $d= 0.2$ low, $d= 0.5$ medium and $d= 0.8$ high (Cohen, 1988). Effect size where positive sign indicates greater depressive symptomatology in boys and negative sign indicates greater depressive symptomatology in girls.

It was decided to perform a more specific analysis of the percentage of the sample with higher depressive symptomatology. Therefore, it was hypothesized that, if girls are compared with boys, scoring 75th percentile or higher, then a gender difference would be found when depressive symptomatology is high. The 75th percentile corresponds to a score of 14. In the following tables corresponding to the calculations with participants with CDI scores equal to or higher than 14, it could be seen that there were statistically significant differences in the dysphoria

dimension and in the total CDI score, indicating that girls had more depressive symptomatology than boys (Table 2). In Figure 1 it can be clearly seen. These differences also occurred at a practical level in the dysphoria dimension and in the CDI total score, and in the self-esteem dimension and the CDI-S total score.

Table 2

Mean differences between genders in the different dimensions of the CDI, RADS-2 and CDI-S in participants scoring 14 or higher on the CDI

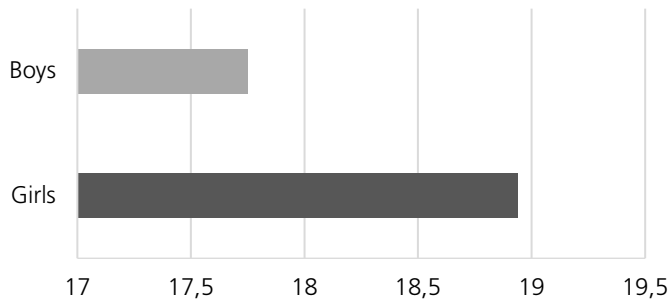
| Dimension | Gender | <i>M</i> | <i>SD</i> | <i>SE</i> | <i>t</i> | <i>gl</i> | <i>p</i> | <i>d</i> |
|------------------------------------|--------|----------|-----------|-----------|----------|-----------|----------|----------|
| Dysphoria (CDI) | Girls | 8.59 | 3.64 | 0.30 | 2.25 | 267 | .025 | - |
| | Boys | 7.61 | 3.49 | 0.31 | | | | |
| | Total | 8.13 | 3.60 | 0.22 | | | | |
| Negative self-esteem (CDI) | Girls | 10.35 | 2.44 | 0.20 | 0.71 | 267 | .477 | -- |
| | Boys | 10.15 | 2.17 | 0.19 | | | | |
| | Total | 10.26 | 2.32 | 0.14 | | | | |
| Depressive symptomatology (CDI) | Girls | 18.94 | 4.68 | 0.39 | 2.19 | 267 | .030 | - |
| | Boys | 17.75 | 4.18 | 0.37 | | | | |
| | Total | 18.60 | 5.88 | 0.36 | | | | |
| Depressive symptomatology (RADS-2) | Girls | 60.60 | 10.90 | 0.91 | 0.90 | 265 | .368 | -- |
| | Boys | 59.29 | 12.82 | 1.15 | | | | |
| | Total | 59.98 | 11.83 | 0.72 | | | | |
| Dysphoria (CDI-S) | Girls | 1.91 | 1.54 | 0.26 | 0.10 | 48 | .922 | -- |
| | Boys | 1.87 | 1.60 | 0.41 | | | | |
| | Total | 1.90 | 1.54 | 0.22 | | | | |
| Negative self-esteem (CDI-S) | Girls | 2.88 | 1.53 | 0.26 | 1.29 | 48 | .204 | -- |
| | Boys | 2.27 | 1.62 | 0.42 | | | | |
| | Total | 2.70 | 1.57 | 0.22 | | | | |
| Depressive symptomatology (CDI-S) | Girls | 4.80 | 2.74 | 0.46 | 0.80 | 48 | .425 | -- |
| | Boys | 4.13 | 2.53 | 0.65 | | | | |
| | Total | 4.60 | 2.67 | 0.38 | | | | |

Notes: CDI= Children's Depression Inventory; RADS-2= Reynolds Adolescent Depression Scale-2; CDI-S= Children's Depression Inventory - Short form (adapted for its application to parents). Interpretation of the effect size: $d= 0.2$ low, $d= 0.5$ medium and $d= 0.8$ high (Cohen, 1988). Effect size where positive sign indicates greater depressive symptomatology in boys and negative sign indicates greater depressive symptomatology in girls.

Differences in depressive symptomatology according to age

Analyses of variance indicated that there were statistically significant differences between means on the dysphoria, self-esteem, and CDI total score dimensions, as well as on the RADS-2, indicating that older adolescents had greater depressive symptomatology compared to younger adolescents (Table 3). However, the effect size of these differences was practically null. No statistically significant differences were found in the parental questionnaires.

Figure 1
Mean scores, by gender, on the total score of the Childhood Depression Inventory (CDI) in participants scoring ≥ 14



It was decided to perform multiple comparison calculations with Tukey's honestly significant difference (HSD) method, in order to test between which ages the differences would occur, in the dimensions where the ANOVA was statistically significant. The analyses indicated that statistically significant differences occurred between all ages, except between the 13- and 14-year-old groups. Figure 2 clearly shows that, as age increases, scores on depressive symptomatology become higher. However, the effect size η^2_p of the ANOVAS was not of practical significance so that, although there were differences in depressive symptomatology according to age, they did not reach practical significance overall. As Tukey's analyses indicated that differences occurred between all two-by-two comparisons except between the 13- and 14-year-old age groups, it was decided to calculate the effect size, in this case standardized mean differences, to find the practical significance when comparing the age groups two by two. Table 4 shows that, in general, there is practical significance in such comparisons, although, when comparing the 13- and 14-year-old age groups, the practical significance is low or null. In general, the magnitude of the effect sizes of these differences was low, approaching, in some cases, the medium practical significance. It can be concluded that, as age increases in adolescence, depressive symptomatology increases in a statistically significant way and with practical significance when comparing the 12-year-old age group with the older groups.

Table 3

Mean differences in depressive symptomatology according to age ($N= 1,212$ adolescents and 104 parents)

| Dimension | Age | <i>M</i> | <i>SD</i> | <i>SE</i> | <i>gl</i> | <i>F</i> | <i>p</i> | η^2_p |
|------------------------------------|-------|----------|-----------|-----------|-----------|----------|----------|------------|
| Dysphoria (CDI) | 12 | 3.25 | 3.34 | 0.16 | 2 | 8.410 | .000 | 0.02 |
| | 13 | 3.88 | 3.59 | 0.17 | | | | |
| | 14 | 4.66 | 3.92 | 0.35 | 979 | | | |
| | Total | 3.72 | 3.56 | 0.11 | 981 | | | |
| Negative self-esteem (CDI) | 12 | 6.01 | 3.41 | 0.17 | 2 | 11.470 | .000 | 0.02 |
| | 13 | 6.95 | 3.15 | 0.15 | | | | |
| | 14 | 7.24 | 3.23 | 0.29 | 979 | | | |
| | Total | 6.59 | 3.31 | 0.10 | 981 | | | |
| Depressive symptomatology (CDI) | 12 | 9.28 | 5.92 | 0.29 | 2 | 12.506 | .000 | 0.02 |
| | 13 | 10.83 | 5.78 | 0.27 | | | | |
| | 14 | 11.90 | 6.19 | 0.56 | 979 | | | |
| | Total | 10.32 | 5.96 | 0.19 | 981 | | | |
| Depressive symptomatology (RADS-2) | 12 | 46.52 | 10.48 | 0.52 | 2 | 11.52 | .000 | 0.02 |
| | 13 | 49.49 | 11.21 | 0.53 | | | | |
| | 14 | 50.91 | 11.07 | 0.99 | 973 | | | |
| | Total | 48.44 | 11.01 | 0.35 | 975 | | | |
| Dysphoria (CDI-S) | 12 | 1.61 | 1.63 | 0.28 | 2 | 0.33 | .718 | -- |
| | 13 | 1.81 | 1.43 | 0.22 | | | | |
| | 14 | 1.45 | 1.03 | 0.31 | 85 | | | |
| | Total | 1.69 | 1.46 | 0.15 | 87 | | | |
| Negative self-esteem (CDI-S) | 12 | 2.47 | 1.86 | 0.31 | 2 | 0.00 | .997 | -- |
| | 13 | 2.48 | 1.32 | 0.20 | | | | |
| | 14 | 2.45 | 1.29 | 0.38 | 85 | | | |
| | Total | 2.48 | 1.53 | 0.16 | 87 | | | |
| Depressive symptomatology (CDI-S) | 12 | 4.08 | 3.20 | 0.55 | 2 | 0.02 | .975 | -- |
| | 13 | 4.09 | 2.00 | 0.30 | | | | |
| | 14 | 3.90 | 1.97 | 0.59 | 85 | | | |
| | Total | 4.07 | 2.50 | 0.27 | 87 | | | |

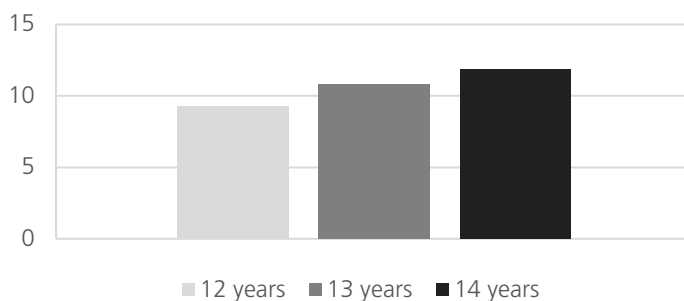
Notes: CDI= Children's Depression Inventory; RADS-2= Reynolds Adolescent Depression Scale-2; CDI-S= Children's Depression Inventory - Short form (adapted for its application to parents). Interpretation of the effect size: $\eta^2_p= 0,1$ low y $\eta^2_p= 0,25$ high.

Correspondence between adolescent and parental measures of depression

Statistically significant correlations were found between adolescent and parental measures of depression. The magnitude of the correlation between CDI and CDI-S total scores ($r= .32$; $p= .001$; $n= 103$) was medium and between CDI-S and RADS-2 was low ($r= .21$; $p= .034$; $n= 102$).

Figure 2

Mean total scores by age in the Childhood Depression Inventory (CDI)

**Table 4**

Multiple comparisons in depressive symptomatology by age (Tukey's HDS) and effect size according to Cohen (1988)

| Dimension | I | J | I-J | SEM | <i>p</i> | <i>d</i> |
|--|----------|----------|-------|------|----------|----------|
| Dysphoria (CDI) Adolescents | 12 years | 13 years | -0.63 | 0.24 | .025* | 0.18 |
| | | 14 years | -1.41 | 0.36 | .000* | 0.40 |
| | 13 years | 12 years | 0.63 | 0.24 | .025* | 0.18 |
| | | 14 years | -0.77 | 0.36 | .079 | -- |
| | 14 years | 12 years | 1.41 | 0.36 | .000* | 0.40 |
| | | 13 years | 0.77 | 0.36 | .079 | -- |
| Negative self-esteem (CDI) Adolescents | 12 years | 13 years | -0.93 | 0.22 | .000* | 0.28 |
| | | 14 years | -1.23 | 0.33 | .001* | 0.36 |
| | 13 years | 12 years | 0.93 | 0.22 | .000* | 0.28 |
| | | 14 years | -0.29 | 0.33 | .648 | -- |
| | 14 years | 12 years | 1.23 | 0.34 | .001* | 0.36 |
| | | 13 years | 0.29 | 0.33 | .648 | -- |
| Depressive symptomatology (CDI) Adolescents | 12 years | 13 years | -1.55 | 0.40 | .000* | 0.27 |
| | | 14 years | -2.62 | 0.60 | .000* | 0.44 |
| | 13 years | 12 years | 1.55 | 0.40 | .000* | 0.27 |
| | | 14 years | -1.06 | 0.60 | .178 | -- |
| | 14 years | 12 years | 2.62 | 0.60 | .000* | 0.44 |
| | | 13 years | 1.06 | 0.60 | .178 | -- |
| Depressive symptomatology (RADS-2) Adolescents | 12 years | 13 years | -2.96 | 0.74 | .000* | 0.27 |
| | | 14 years | -4.39 | 1.12 | .000* | 0.41 |
| | 13 years | 12 years | 2.96 | 0.74 | .000* | 0.27 |
| | | 14 years | -1.42 | 1.10 | .402 | -- |
| | 14 years | 12 years | 4.39 | 1.12 | .000* | 0.41 |
| | | 13 years | 1.42 | 1.10 | .402 | -- |

Notes: CDI= Children's Depression Inventory; RADS-2= Reynolds Adolescent Depression Scale-2; I= Age cluster to be compared with the remaining two; J= age clusters with which I is compared; I-J= Difference in means between the corresponding clusters. Interpretation of the effect size: *d*= 0.2 low, *d*= 0.5 medium and *d*= 0.8 high (Cohen, 1988). Effect size where positive sign indicates that those of older age present more depressive symptomatology. **p*< .05.

Discussion

The percentage of adolescents with clinically significant depressive symptomatology in the CDI was 9.2% of the total sample (7.4% in boys and 11.3% in girls). In RADS-2 it was 7.8% of the sample (6.9% in boys and 9% in girls). The percentage of adolescents with clinically significant depressive symptomatology is similar to that found in other studies in Spain (Balazs et al., 2012; Figueras et al., 2010; Gallego et al., 2020). It is observed that the percentage of adolescent girls with clinically significant depressive symptomatology is higher than that found in boys. The cut-off points for the measure used in the parents were not available, so this information could not be analyzed.

The analysis of gender differences in depressive symptomatology showed that the self-reports completed by the adolescents reflected statistically significant differences in the total score and in the self-esteem dimension of the CDI, which would indicate that girls present greater depressive symptomatology. A marginally significant difference also appeared in the dysphoria dimension in the same sense. The magnitude of the effect size of these differences was very low according to Cohen (1988). On the RADS-2 measure, no statistically significant differences were found. In the parent questionnaires, statistically significant differences appeared in the self-esteem dimension of the CDI-S and marginally significant in the total score, which also reflected greater depressive symptomatology in girls. The magnitude of the effect size of these differences was medium-low (Cohen, 1988) in the CDI-S dimensions.

It was decided to perform a more specific analysis of the percentage of the sample with higher depressive symptomatology. Therefore, it was hypothesized that, if girls were compared with boys, scoring 75th percentile or higher, then it would be found that there are gender differences when depressive symptomatology is high. The 75th percentile corresponded to a score of 14. In participants with a CDI score of 14 or higher, statistically significant differences were found in the dysphoria dimension and in the CDI total score, indicating that girls had more depressive symptomatology than boys. In fact, the girls' mean CDI total score was practically equal to the cut-off point 19 with clinical significance (Del Barrio and Carrasco, 2004). These differences also occurred at the practical level on the dysphoria dimension and CDI total score, and on the self-esteem dimension and CDI-S total score. According to several studies, the gender difference in depression may begin to emerge most obviously and significantly in early to middle adolescence (between ages 13 and 15) and has been demonstrated for both depressive symptoms and diagnosis (Hankin et al., 1998; Twenge and Nolen-Hoeksema, 2002). In the longitudinal study by Salk et al. (2016), conducted in a sample of 416 adolescents, depressive symptoms were assessed at ages 11, 13, 15, and 18, and depression diagnosis at age 20. They found that gender differences in depression emerged at age 13. Girls' depressive symptoms accelerated in early adolescence and, in contrast, boys' depressive symptoms accelerated later in adolescence. The meta-analytic

review by Salk et al. (2017) points out that gender differences in depressive symptomatology are maximal at age 16. These results should be considered when designing preventive programs. Del Barrio and Carrasco (2004), in a sample of 7,759 Spanish participants aged 7 to 15 years (mean age 11.03 and standard deviation 2.34 years), found statistically significant differences in depressive symptomatology with respect to gender, indicating that girls had higher scores in depression in the CDI, in line with what was found in our study. In the study by Figueras et al. (2010) it was also found that girls had significantly higher CDI scores.

Recent studies confirm this trend of greater depressive symptomatology in adolescent girls than in boys (Crockett et al., 2020; Del Barrio, 2007; García-Ramos et al., 2018; Meyer and Curry, 2020; Rey et al., 2015; Ruiz-Cárdenas et al., 2020). Recent longitudinal studies with Spanish adolescents also find greater depressive symptomatology in girls (Gomez-Baya, Mendoza, Paino, Gaspar de Matos, 2017; Gomez-Baya, Mendoza, Paino, Gillham, 2017). These differences should be considered in the development of preventive and early interventions.

In our study, the mean age was 12.71 years, with significant differences that would also indicate greater depressive symptomatology in girls. Previous research confirms that these differences will become more evident in the years after adolescence, which would also be reflected in the magnitude of the effect size. In any case, the significant onset of a greater tendency to depression among girls is evident, especially when gender differences are studied in participants with high depressive symptomatology.

Regarding the hypothesis studying the effect of age on depressive symptomatology in adolescents, the analyses of variance indicated that there were statistically significant differences between the means in the dimensions of dysphoria, self-esteem and in the total score of the CDI and in the RADS-2, indicating that older adolescents present greater depressive symptomatology compared to younger adolescents. However, the effect size of these differences was practically null. No statistically significant differences were found in the parent questionnaires.

It was decided to perform multiple comparisons calculations with Tukey's honestly significant difference (HSD) method, to test between which ages the differences would occur, regarding the dimensions where the ANOVA was statistically significant. The analyses indicated that statistically significant differences occurred between all ages, except between the 13 and 14 age groups. Thus, as age increases, scores on depressive symptomatology become higher. However, the effect size η^2_p of the ANOVAs was not of practical significance, which led us to calculate the standardized mean differences for the two-by-two age group comparisons, finding practical significance in all comparisons except that of the 13- and 14-year-old age groups, where practical significance was low or null. In general, the magnitude of the effect sizes of these differences was low, approaching, in some cases, the medium practical significance. It can be concluded that, as age increases in adolescence, depressive symptomatology increases in a statistically significant way

and with practical significance when comparing the 12-year-old group with the older groups.

Therefore, our hypothesis was fulfilled in line with one of the most consistent findings in the literature: the frequency of depression increases with age (Domènech et al., 1996; Hankin, et al., 1998; Meltzer et al., 2000), reaching 5 per 100 in adolescence. This increase in both depressive symptomatology and depressive disorders has been observed during adolescence. The prevalence rate of depression increases sixfold from 3% at age 15 to 17% at age 18 (Hankin et al., 1998). This suggests that the transition to adolescence is a period of development that is particularly vulnerable to depression.

Our results corroborate that depressive symptomatology increases markedly with age and that the greatest increase occurs in middle adolescence (Avenevoli et al., 2015; Del Barrio, 2008; Ekbäck et al., 2021; Méndez, 2011; Pu et al., 2017; Weersing et al., 2017). In the cited study by Del Barrio and Carrasco (2004), realized with a Spanish sample, statistically significant differences in depressive symptomatology appeared with respect to age, indicating that older participants had higher scores in depression in the CDI. The same results were also found in the previously cited study by Figueras et al. (2010). Along the same lines, Salk et al. (2017) found that around the age of 13 years, depressive symptomatology increases, and this increase is usually greater in girls. Our study did not reflect statistically significant differences in the parental assessment measure, although the different sample sizes of adolescents and parents should be considered. It has also been pointed out that the concordance between adult and child sources is low (Del Barrio, 2006).

Statistically significant correlations were found between adolescent and parental measures of depression. The magnitude of the correlation between CDI and CDI-S total scores was medium and between CDI-S and RADS-2 was low. Our results are similar to those found in other studies (Meehan et al., 2008; Olmedo et al., 2000), indicating that the relationship between adolescent self-reports and parental reports of depressive symptomatology, without being of high magnitude, is significant, so that multisource assessment is important.

Future research should clarify the mechanisms responsible for these gender differences. The hopelessness theory has been considered as a possible explanatory factor. In the study by Stone et al. (2010) this theory would only be applicable to boys, so that in highly stressful situations and with the interaction of a negative cognitive style, the subsequent depressive symptomatology could be expected. However, in girls, highly stressful situations and negative cognitive style are independent in explaining depressive symptomatology, i.e., a girl who presents a negative cognitive style may become depressed, even if a negative stressful event does not occur or is objectively mild. Rumination is shown to be a factor that could predict the occurrence of higher rates of depression in girls, according to Krause et al. (2018). Apparently, rumination precedes the appearance of depressive symptomatology, however, in boys it is a consequence of such symptomatology. All

these differences should be considered in the design of depression prevention programs in adolescents.

A promising line of animal research is investigating gender differences by studying brain circuits and mechanisms. They are identifying sex differences in neurobiological processes underlying the features of these disorders, including conflict anxiety, fear processing, arousal, social avoidance, learned helplessness, and anhedonia. These findings allow us to conceptualize several types of sex differences in the brain that, in turn, have broader implications for considering sex as a biological variable (Bangasser, and Forty, 2021). Another interesting finding from the Oschry-Bernstein et al. (2020) study seems to indicate that early trauma is a dominant factor that overshadows more recent life events in the onset of depression among adolescents, so the focus of intervention should begin at an early age. Other factors noted in studies would be exposure to depressed peers (Giulietti et al., 2022), response to positive affect (Gomez-Baya, Mendoza, Paino, Gillham, 2017) or differences in emotional intelligence (Gomez-Baya, Mendoza, Paino, Gaspar de Matos, 2017).

Regarding the contribution of our work, it is important to highlight that the last twenty years have been characterized by a remarkable awareness of the importance of replicability and reproducibility of psychological research, associated with the crisis of confidence in results that are not replicated (Cesario, 2014; Nelson et al., 2018; Nosek et al., 2022; Schmidt, 2016). In our study, the need to test whether the results of previous research on the relationship of gender and age with depressive symptomatology are replicated is warranted; especially as these results may change as a function of cultural, climatic, geographic, economic, and social context. To our knowledge, our study is the only large-scale study, carried out in the region of Murcia, on the relationship between the variables, which has found that the gender difference in depressive symptomatology begins at puberty and is especially marked in the most severe cases, as well as that the age difference appears in early adolescence. The fact that the differences by gender and age found in other studies are replicated reinforces the validity and generalizability of our results. The importance of approaching this question from a multisource perspective along the lines indicated by several studies is another strength of the study (Meehan et al., 2008). As limitations of the study, it should be mentioned that data collection was limited to adolescent self-reports and parental reports. Furthermore, the number of parents was small compared to the number of adolescents. Future research should conduct a multimethod evaluation and include teachers (Jaureguizar et al., 2017).

Finally, it should be noted that there are effective interventions to treat and prevent depression in adolescents and young adults that should be offered to the population (Cuijpers et al., 2021; Méndez et al., 2021; Sánchez-Hernández et al., 2019), along with the implementation of gender-sensitive policies to promote gender equality in health (Crespí-Lloréns et al., 2021).

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