

DEPRESSION AND ANXIETY IN ADOLESCENTS AND THEIR CAREGIVERS: A CROSS-SECTIONAL STUDY FROM NORTH MACEDONIA

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ABSTRACT

Introduction: Mental health problems have increased internationally during the COVID-19 pandemic. Adolescents and their caregivers form a vulnerable group for the development of mental health problems. However, most data stems from high-income countries, and there is a clear lack of prevalence rates and potential risk factors from Balkan countries. No data is available on the impact of the COVID-19 pandemic on mental health in adolescents and their caregivers in North Macedonia.

Materials and methods: A cross-sectional study was conducted on adolescents and their caregivers in a school setting in rural and urban areas of North Macedonia. Survey items assessed symptoms of depression, anxiety, and respondents' fear of COVID-19, as well as a number of risk factors, such as gender and living environment.

Results: 506 adolescents and 492 caregivers completed the survey. Symptoms of depression and anxiety were mild to moderate in adolescents and their caregivers. Women and girls generally scored higher than men and boys, and adolescents in high school scored higher than those in elementary school. Prevalence rates for depression were 29.2% for adolescents and 10.4% for caregivers, while rates of anxiety were 23.7% for adolescents and 6.1% for caregivers.

Conclusion: This study provides a first insight into the mental health of adolescents and their caregivers after the COVID-19 pandemic in North Macedonia. Further research is required to investigate the relatively low rates of caregivers' mental health problems compared to data from other countries.

Keywords: COVID-19, depression, anxiety, adolescents, caregivers

INTRODUCTION

Common mental health problems, such as depression and anxiety, have long been identified as leading causes of disease worldwide [1]. Before the outbreak of the global SARS-CoV 19 (COVID-19) pandemic, epidemiological studies estimated lifetime prevalence rates of depressive disorders as high as 20.8%, and that of anxiety

as high as 28.8% [2], and these have remained stable over the past two decades [1, 3]. However, the COVID-19 pandemic has seen a significant increase in mental health problems [4], either through the direct effects and shifts in allocation of (mental health) care resources to dedicated COVID wards, or through indirect pathways cre-

ated by means to reduce the spread of the infectious disease, such as lockdowns [4, 5]. Moreover, it is anticipated that the pandemic will continue to negatively affect the mental health of the population, as a result of long-term consequences for economic stability and employment [4, 5].

Ample research has shown that adolescents form a vulnerable group for mental health problems above and beyond the effects of the pandemic, which has disproportionately affected young people [6, 7]. In addition, mental health conditions, such as depression and anxiety, generally develop and have their peak onset during early to late adolescence [2, 8, 9, 10]. The cumulative effects of these factors therefore pose a severe risk for adolescents' mental health.

By extension and in addition to the aforementioned factors contributing to depression and anxiety in adolescents, it is conceivable that their families, and caregivers in particular, are affected as well. However, while studies have been conducted on mental health across the lifespan of individuals and the associated risk factors, much of this research is skewed towards Western high-income countries [11, 12]. While the COVID-19 pandemic has led to an impetus on publications that investigate the effects of the pandemic on a number of particularly affected groups, such as healthcare workers [13] and students [14], little information so far is available on adolescents and their caregivers from Balkan countries.

However, a reliable assessment of the prevalence of common mental health problems, such as depression and anxiety, is important to prepare targeted healthcare policy actions. Both conditions can have devastating consequences, as they can lead to an increased risk of cardiovascular diseases, stroke, and suicide [15, 16, 17, 18]. On a societal level, both conditions are associated with considerable costs [19, 20], due to both loss of productivity as well as significant healthcare expenditure [21, 22]. This is the case even for subclinical symptoms of depression [19].

In addition, identifying factors that are related to higher rates of mental health problems is important, as it allows for targeted approaches to allocate scarce healthcare resources. For example, while women consistently report higher rates of either condition [23], other factors, such as the distinction between rural and urban living environment, have shown less consistent associations [24, 25].

AIM

The aim of the current study is to investigate the point of prevalence of depressive and anxiety symptoms in adolescents and their caregivers in North Macedonia during the COVID-19 pandemic. In addition, we aim to provide further information on risk factors, such as gender and rural vs. urban living environments.

MATERIALS AND METHODS

Design

The design entailed a cross-sectional survey study on the mental health problems and sociodemographic environment of adolescents and their caregivers during the COVID-19 pandemic and the perceived effects of the pandemic on their mental health. The survey was provided in the Macedonian, Albanian, and Turkish languages. Data was collected through a nationally representative sample of primary (covering ages 12-14) and secondary schools (covering ages 15-18), and by extension of adolescent-caregiver dyads with different socioeconomic backgrounds. Within the selected schools, sampling occurred at the classroom level.

Participants and recruitment

Adolescent participants between the ages of 12 and 18 and their caregivers (≥ 18) were eligible for inclusion in the study if they 1) lived in the same household, 2) had access to a telephone, 3) were sufficiently fluent in Macedonian, Albanian, or Turkish, and 4) provided written informed consent (IC). No specific exclusion criteria were handled.

Participants were recruited through public primary and secondary schools with the support of the Bureau for the Development of Education. Information was shared to school personnel, caregivers and adolescents by field researchers. From the participants who signed the IC, the field researchers collected basic contact information, which were solely used for contacting participants and were stored independently from the data of the main parameters of the study.

Procedure

Before the start of recruitment and in the absence of available translations of the original versions of validated questionnaires, these underwent a trans-cultural translation and adaptation process into Macedonian, Albanian, and Turkish. This included translation and adaptation by bilingual experts and a review by mental health experts. The final step, the instruments and the sampling procedure, was piloted in one classroom, allowing for potential adaptations regarding the wording of three items in the instruments.

Field researchers then approached classrooms in selected schools to provide study information and IC forms to adolescents. The adolescents were then given the same materials to be shared with their caregivers. Following provision of IC, the adolescents and caregivers received a paper version of the questionnaire battery. The participants were given two days to complete the questionnaires, which were then collected by the field researchers. Both adolescents and caregivers could withdraw from participation at any moment without indicating reasons.

Variables and instruments

Sociodemographic

Both adolescents and their caregivers were asked to provide information on their age and sex (male, female), their place of residence (urban vs. rural), ethnicity, education level, employment status, number of family members in household (children, adults), and experiences with COVID-19. In addition, caregivers were asked to indicate their relationship with the adolescent.

Depression

Symptoms of depression were measured using the 9-item Patient Health Questionnaire and its specific version for adolescents (PHQ-9) [26, 27]. The self-report instrument assesses the frequency of experiencing major depressive disorder symptoms in the previous two weeks on a 4-point Likert scale ranging from 0 (= not at all) to 3 (= nearly every day). The PHQ-9 has established cut-off scores of 4 (no depression), 5-9 (mild depression), 10-14 (moderate depression), 15-19 (moderately severe depression), and 20-27 (severe depression) [27]. The instrument has been validated in a number of subpopulations, including adolescents [28, 29, 30], and a recent review has indicated good psychometric properties [31].

In this study, the internal consistency of the PHQ for caregivers was found to be $\alpha=0.83$, and for adolescents it was found to be $\alpha=0.86$.

Anxiety

The 7-item Generalized Anxiety Disorder scale (GAD-7) [32] was used to measure self-reported symptoms of anxiety. Referring to how often these were present during the past two weeks, they were scored on a 4-point Likert scale ranging from 0 (= not at all) to 3 (= nearly every day). The GAD-7 has good psychometric properties, including its cut-off scores of 0-4 (no/mild anxiety), 5-9 (mild anxiety), 10-14 (moderate anxiety), and 15-21 (severe anxiety) [32]. In addition, the GAD-7 has been validated in adolescent populations [33]. In this study, the reliability coefficient of the GAD-7 registered in the subsamples of adolescents and caregivers had value of $\alpha=0.89$ and $\alpha=0.88$, respectively.

Fear of COVID-19

The Fear of COVID-19 Scale (FCV-19S) [34] was used to assess self-reported fear related to the COVID-19 pandemic. The FCV-19S consists of seven items that are answered on a 5-point Likert scale ranging from 1 (= strongly disagree) to 5 (= strongly agree). Due to its recent development, extensive psychometric evaluations of the scale have not been published yet. Internal consistency of this scale was $\alpha=0.86$ on the subsample of adolescents, and $\alpha=0.92$ on the subsample of caregivers.

Statistical analysis

Data were analyzed using the statistical software STATISTICA [35]. Descriptive statistics were calculated for adolescents and caregivers separately. Dichotomous variables for the potential presence of clinical depression and anxiety disorder were created by the established cut-off scores of 8 on the PHQ-9 for caregivers [36], a score of 10 for adolescents [37], and 10 on the GAD-7 for both caregivers and adolescents [32]. Associations between sociodemographic data, mental health, and fear of COVID-19 were calculated with nonparametric tests. Mann-Whitney U Tests were used for calculating differences between the two groups, while associations between two or more groups were calculated with the Kruskal-Wallis H Test. Analyses were done on an aggregate level and comparatively

for specific subcategories. Statistical significance was set at $\alpha = 0.05$.

RESULTS

Sample

In total, 506 adolescents (68% female) and 492 caregivers (70.1% female) completed the survey. On average, adolescents were 15.9 years (range: 12-18; SD = 1.39), and their caregivers 43.6 years old (range: 20-63; SD = 5.52). Regarding caregivers' relationship with the adolescent, a majority of 332 were their mothers (67.5%), and most responders (> 83%) lived in an urban environment. With around 70%, most adolescents and their caregivers reported being of Macedonian origin, and the majority of caregivers had some form of employment contract (73%). Table 1 provides an overview of descriptive statistics of the sample.

Depression and anxiety symptoms

While on average, adolescents reported moderate symptoms of depression, 148 (29.2%) exceeded the threshold on the PHQ-9 for the potential presence of a clinical depression. However, there was a significant difference between male and female responders, with females reporting higher scores on the PHQ-9 than males ($\chi^2 =$

22.99, $p < 0.01$). Moreover, high school students reported more depressive symptoms compared to primary school students ($\chi^2 = 9.76$, $p < 0.01$), and adolescents enrolled in primary education showed lower depression scores compared to adolescents in secondary school ($\chi^2 = 9.45$, $p < 0.01$). No differences between place of residence were found for adolescents, $\chi^2 = 1.02$, $p < 0.31$. Caregivers, too, reported mild symptoms of depression on average, while 51 (10.4%) of them might qualify for the presence of a clinical disorder. There were no differences on any of the potential risk factors (all $p \leq 0.09$).

A similar pattern was found for symptoms of anxiety, which were generally mild to moderate in adolescents, although in 120 (23.7%) these exceeded the cut-off for a potential clinical diagnosis. Again, girls reported higher scores on the GAD-7 than boys ($\chi^2 = 22.18$, $p < 0.01$), and high school students had higher scores than primary school students ($\chi^2 = 9.45$, $p < 0.01$). Caregivers on average exhibited mild to moderate anxiety symptoms, with 30 (6.1%) scoring above the cut-off point for a potential clinical disorder. Mirroring the results of depressive symptoms, women scored higher on the GAD-7 compared to men ($\chi^2 = 4.17$, $p = 0.04$). Moreover, caregivers living in an urban environment reported slightly higher scores on the GAD-7 than those in a rural environment ($\chi^2 = 4.17$, $p < 0.04$). No other risk factors, such as education and employment status, were significantly associated with either symptoms of

Table 1. Sociodemographic characteristics of the sample

	Adolescents		Caregivers	
	N	%	N	%
Gender				
Male	159	31.4	147	29.9
Female	344	68.0	345	70.1
Place of residence				
Urban	421	83.2	409	83.1
Rural	85	16.8	83	16.9
Ethnic background				
Macedonian	356	70.4	345	70.1
Albanian	68	13.4	65	13.2
Turkish	63	12.4	57	6
Other	18	3.7	25	5.0
Educational level				
Primary	81	16.0	34	6.9
Secondary	324	64.0	242	49.2
Graduate			152	30.9
Other			15	3.0
Relationship to adolescent				
Mother			332	67.5
Father			131	26.6
Legal guardian			9	1.8
Other			20	4.1
Employment status				
Permanent			220	44.7
Temporary			139	28.3
Unemployed			83	16.9
Other			49	10.0

depression or anxiety in caregivers (all $p > 0.21$). Table 2 provides associations between risk factors and depression and anxiety, presented separately for adolescents and caregivers.

Fear of COVID-19

On average, adolescents reported low level fear of COVID-19. Synchronous to mental health symptoms, girls reported having more fear than boys ($\chi^2 = 4.53$, $p < 0.03$). No differences between other risk factors, such as living environment and school level were found (all $p > 0.09$). Caregivers similarly reported low levels of COVID-19 related fear, with women again scoring slightly higher compared to men ($\chi^2 = 0.02$, $p < 0.04$). No significant differences were found for caregivers' level of fear of COVID-19 between other risk factors (all $p > 0.1$). Table 3 shows associations between risk factors and fear of COVID-19.

DISCUSSION

The aim of the present study was to assess prevalence rates of depressive and anxiety symptoms in adolescents and their caregivers after the COVID-19 pandemic in North Macedonia. In addition, their fear of COVID-19 and associations of mental health symptoms with a number of risk factors, such as gender and living environment, were assessed.

On average, adolescents reported mild to moderate symptoms of depression and anxiety. However, almost 30% exceeded the cut-off score for the potential presence of a clinical diagnosis of depression, and more than 23% did so for an anxiety disorder. This is in line with research

Table 2. Associations between risk factors and depression and anxiety in adolescents and caregivers

Risk factor	PHQ-9				GAD-7			
	Adolescents		Caregivers		Adolescents		Caregivers	
Gender	χ^2	p	χ^2	p	χ^2	p	χ^2	p
Male	22.99	< 0.001	2.86	0.09	22.99	< 0.001	4.17	0.04
Female								
Place of residence								
Urban	1.02	0.31	2.87	0.09	0.36	0.55	4.17	0.04
Rural								
Educational level								
Primary	9.45	0.002			9.45	0.002		
High school			1.9	0.59			1.9	0.59
Graduate								
Other								
Employment status								
Permanent								
Temporary			4.58	0.21			2.59	0.47
Unemployed								
Other								

Note. PHQ-9= 9 item Patient Health Questionnaire; GAD-7= 7 item Generalised Anxiety Disorder scale

Table 3. Associations between risk factors and fear of COVID-19 in adolescents and caregivers.

Risk factor	Adolescents		Caregivers	
	χ^2	p	χ^2	p
Gender				
Male	4.53	0.03	0.02	0.04
Female				
Place of residence				
Urban	0.19	0.66	0.02	0.9
Rural				
Educational level				
Primary				
High school	2.74	0.1	4.63	0.2
University				
Other				
Employment status				
Permanent				
Temporary			6.17	0.1
Unemployed				
Other				

Note. FCV-19S= Fear of COVID-19 Scale

from different national contexts conducted during the COVID-19 pandemic, which suggests prevalence rates of depression between 25% - 29%, and those of anxiety at around 20% - 26% [38, 39]. Moreover, these rates correspond to statistics reported pre-pandemic, although these largely stem from Western contexts [21].

In the present study, a number of risk factors were associated with increased mental health problems. The confirmed common finding was that, compared to boys, girls show higher internalizing problems, such as depression and anxiety [40]. While some studies indicate the equalizing of mental health symptoms between gender during the pandemic [41], this difference seemed to persist in our study, in line with other reports on this age group [42]. Moreover, while adolescents expressed relatively low fear of COVID-19, girls reported higher rates than boys, mirroring the general observation of anxiety symptoms. Furthermore, high school students reported significantly more symptoms of both depression and anxiety compared to their younger primary school peers. This confirms ample research showing that these mental health problems have a steep increase in early adolescence [43]. However, it is also conceivable that social restrictions, such as lockdowns and school closures, which had been implemented to limit the spread of the virus, exerted a significantly larger effect on high school students. As outlined by Rao and Rao [41], this group has received particular attention in the literature due to its vulnerability to the effects of social restriction measures.

On average, caregivers also reported mild to moderate mental health symptoms. Prevalence rates of potential clinical presentations of these disorders, which were found to be around 10% and 6% for depression and anxiety, respectively, were largely in line with pre-pandemic point prevalence rates found in the general population [44]. However, these were significantly lower than estimates established during the COVID-19 pandemic in other national contexts, suggesting rates of depression in more than half, and anxiety in about a quarter of respondents [45]. Differences in procedures and measurement instruments likely account for some of these discrepancies but cannot fully explain them. Only symptoms of anxiety were distributed differently between subgroups of the caregiver population. Again,

women expressed higher symptoms than men, and this was also reflected in their slightly higher fear of COVID-19. Moreover, those caregivers living in rural environments scored higher on the GAD-7 than those living in urban areas. While gender differences were commonly observed before COVID-19 and women's mental health has been shown to be more negatively affected as a result of the pandemic [46], the rural-urban distinction exerted more varied effects on mental health [47, 48]. However, it is noteworthy that the average difference between rural and urban inhabitants' anxiety symptoms was only marginal.

The results of this study need to be considered in light of its strengths and limitations. First and foremost, to the best of our knowledge, this is the first study reporting on prevalence rates of mental health symptoms in North Macedonia, thereby adding to a lack of data on this topic from Central and Eastern Europe. Moreover, we used established and routinely used instruments, which allows for greater comparability in national and international contexts. Given the cross-sectional nature of the study, causal inferences between risk factors and mental health outcomes cannot be drawn, thereby limiting the evidence to descriptive accounts. Lastly, while the self-report measures used in this study have been shown to allow for reliable and valid screening for depression and anxiety [49], establishing precise prevalence rates requires the use of clinical interviews.

CONCLUSION

Our research showed that both adolescents and their caregivers experienced mild to moderate symptoms of depression and anxiety during the COVID-19 pandemic and were only moderately afraid of it. Further research, which is beyond the scope of this study, should put these results in the context of national responses to the pandemic, such as lockdown measures and other social restrictions. This would allow for a further investigation of the relatively low rates of mental health problems reported particularly by caregivers in our study. Moreover, long-term follow-up assessments are required to establish causal relationships between risk factors and mental health outcomes.

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Резиме

ДЕПРЕСИЈА И АНКСИОЗНОСТ КАЈ АДОЛЕСЦЕНТИТЕ И НИВНИТЕ СТАРАТЕЛИ: ПРЕСЕЧНА СТУДИЈА ОД СЕВЕРНА МАКЕДОНИЈА

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Вовед: За време на пандемијата со вирусот COVID-19, се бележеше влошување во однос на менталноздравствените проблеми на глобално ниво. Адољесцентите и нивните старатели се сметаат за особено ранлива група за развој на менталноздравствени проблеми. Но, повеќето податоци доаѓаат од државите со висок економски приход и постои недостиг од податоци за стапките на застапеност и потенцијалните фактори на ризик за земјите од Балканскиот Полуостров. Особено недостасуваат податоци за влијанието на пандемијата со COVID-19 врз менталното здравје на адољесцентите и на нивните старатели во РС Македонија.

Материјали и методи: Спроведена беше пресечна студија со адољесценти и нивните старатели, регрутирани преку училиштата од рурални и од урбани области од РС Македонија. Поделена беше батерија со прашалници за процена на депресијата, на анксиозноста и на стравот од вирусот COVID-19, како и различни фактори на ризик, вклучително родовите разлики и средината на опкружување.

Резултати: 506 адољесценти и 492 старатели ги пополнија прашалниците. Симптомите на депресија и анксиозност беа благи до умерени кај адољесцентите и кај старателите. Повисок степен на депресија и анксиозност беше забележан кај жените и девојчињата во споредба со мажите и момчињата. Дополнително, адољесцентите во средното образование изјавија повисок степен на анксиозност и депресија во споредба со адољесцентите во основното образование. Стапките на застапеност на депресија беа 29,2 % кај адољесцентите и 10,4 % кај старателите, додека стапките на застапеност на анксиозност беа 23,7 % кај адољесцентите и 6,1 % кај старателите.

Заклучок: Студијата нуди податоци за менталното здравје на адољесцентите и на нивните старатели по пандемијата со COVID-19 во РС Македонија. Дополнителни истражувања се потребни за да се истражат релативно ниските стапки на ментално здравствени проблеми кај старателите во споредба со податоците од другите држави.

Клучни зборови: COVID-19, депресија, анксиозност, адољесценти, старатели