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Mental Health Distress and Delayed Contraception Among Older Adolescents and Young Adults

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Publication Date

2024-03-11

DOI

10.1089/jwh.2023.0549

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Peer reviewed

Title: Mental health distress and delayed contraception among older adolescents and young adults

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Short running title: Mental health distress and delayed contraception

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Keywords: Symptoms of Depression, Anxiety, and Stress, delayed contraception, adolescent and young adult contraception

Words: 3,117

Abstract (250 Words)

Background: Symptoms of mental distress increased sharply during the COVID-19 pandemic, especially among older adolescents and young adults. Mental health distress may make it more challenging for young people to seek other needed health care, including contraception. This study explored the association of symptoms of depression, anxiety and stress with delays in getting a contraceptive method or prescription.

Materials and Methods: We used data from a supplementary study (May 15, 2020 - March 20, 2023) to a cluster randomized trial in 29 sites in Texas and California. The diverse study sample was community college students assigned female at birth ages 18-29 years (N=1,665 with 7,023 observations over time). We measured the association of depression (CES-D) or anxiety and stress (DASS-21) symptoms with delayed contraceptive care-seeking with mixed effects multivariable regression with random effects for individual and site. We controlled for age and sociodemographic factors important for access to care.

Results: Over one-third of participants (35%) reported they delayed getting a contraceptive method they needed. Multivariable regression results showed increased odds of delayed contraceptive care among participants with symptoms of depression (adjusted odds ratio [aOR] 1.58, 95% confidence interval [CI] 1.27-1.96). Likewise, delays were associated with anxiety and stress symptoms (aOR 1.46, 95% CI 1.17-1.82). Adolescents were more likely to delay seeking contraception than young adults (aOR 1.32, 95% CI 1.07-1.63).

Conclusions: Results showed a strong association between mental distress and delayed contraception. Interventions are needed to increase contraceptive access for young people delaying care, along with supportive mental healthcare services, including for adolescents who face elevated odds of delay.

Introduction

Mental health distress among young people soared during the COVID-19 pandemic, with national estimates showing the highest rates of depression, anxiety and stress among older adolescents and young adults.^{1,2} Gender differences are notable, with depression far more common among young women.³ High depression, anxiety and stress has also been documented among college-age populations.⁴⁻⁶ Notably, community college students are less studied than students at four-year colleges, yet represent a high-need youth population, including for increased mental health and reproductive health needs.⁷⁻¹⁰ Studies have shown less use of services for both mental health and contraception among students at community colleges.^{10,11} Many come from non-English-speaking households, face economic adversity, and have cost concerns about accessing care.¹²⁻¹⁵ This study examined data from young women, including cisgender and gender non-binary individuals, in community college. By using data from a community setting, this study includes the experiences of young people in need of care who may have not yet sought care in a clinic, unlike a clinic-based sample that would miss them. Many young people with elevated depressive, anxiety, or stress symptoms may need but not yet have received mental health services; and experiences of depression, anxiety and stress may impact other areas of their health.¹⁶

Prior research has shown depression and anxiety can impact contraceptive method use, with those experiencing symptoms having higher discontinuation, inconsistent use, or dissatisfaction with their method.¹⁷⁻¹⁹ Research has also shown depression and stress symptoms to be associated with selection of contraceptive method, with some studies showing selection of less effective methods,²⁰⁻²² and other studies

showing mixed results^{23,24} or even selection of more effective methods, which may have been a reflection of different study samples, *i.e.* post-partum or post-abortion.^{25,26} It may also be that depression, anxiety and stress have a greater impact early on, making it more difficult to even seek care or to follow through. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), individuals experiencing depression often have lower levels of motivation or energy, which could presumably stand in the way of care-seeking, including making and keeping appointments or picking up prescriptions.²⁷ However, research has not yet examined this question related to contraceptive care.

This study addresses a gap in the literature by assessing the association between depression, anxiety and stress and delays in getting d contraception among young people. We hypothesized that young people with depressive, anxiety or stress symptoms are more likely to delay getting contraception that they think they need.

Materials and Methods

This study used data from a supplementary study on the impact of COVID-19 in an ongoing cluster randomized controlled trial of a contraceptive intervention among young people attending community college (ClinicalTrials.gov: NCT03519685). The overall study was launched in April 2018 and is following participants for five years to measure reproductive health, educational and economic outcomes. We also included measures of mental health. We have included community input and feedback into the research process throughout the study with our advisory board of stakeholders and with students through a 'Student Voices' component, where

students and staff at participating community colleges provided insights on the research in their educational setting.

We recruited participants from 29 community college sites across California and Texas, including urban and rural areas, as well as border areas. Community colleges provide affordable access to higher education for many students from historically marginalized populations, including those from non-English-speaking families, with about 10 million students enrolled in 2019-2020.²⁸ California and Texas are both populous and racially and ethnically diverse states, with the highest number of women in the U.S. who likely need publicly funded contraceptive services.²⁹

Participants were eligible if they were 18-25 years, assigned female at birth (gender inclusive), spoke English, had vaginal sex with a male partner in the last year, not currently pregnant or wanting to become pregnant, and students at the community college site at enrollment. Research assistants made classroom announcement, presentations to student organizations, and recruited participants by setting up a table with study flyers in a central campus location, briefly introducing the study, and setting appointments in a private area to enroll. In March 2020 at the pandemic outset, study recruitment and enrollment switched from in-person to remote. We disseminated study information through electronic newsletters, campus websites and online resources (e.g., events calendars), and conducted enrollment with an online appointment with a Research Assistant. All participants were given a written consent form and provided electronic consent to participate. Participants completed an online survey at baseline and follow-up surveys every 3 months for the first year, and every 6 months thereafter until study completion at 5 years follow-up.

Participant remuneration for the baseline survey was \$50 for baseline and \$20-\$30 gift cards for follow-up surveys.

In May of 2020, we added a series of items to each survey on the impact of COVID-19 on their health and well-being, including measures of mental health, reproductive health, and access to healthcare during the pandemic (see Yarger et al. 2023).³⁰ The current analysis uses data from surveys administered from May 2020 to March 2023, with data on 1,665 participants, with a total of 7,023 observations over time.

The study was approved by the Institutional Review Boards at the University of California, San Francisco and the University of Texas at Austin; participating college sites either approved the study with their IRB or used the corresponding state university's IRB approval.

Measures

Delayed Contraception: The study outcome was whether the participant reported delays in getting contraception. To measure this outcome, we used the survey item asked of all participants, “*Since your last survey, did you delay getting a birth control method or prescription that you felt you needed?*” We measured delayed contraception at the survey following the one with mental health measures, and the item was coded dichotomously (yes/no).

Symptoms of Depression, Anxiety and Stress: Our independent measures were symptoms of depression, from the 10-item Center for Epidemiological Studies

Depression Scale (CESD-10),^{31,32} and anxiety and stress, with 7-items from the Depression Anxiety Stress Scales (DASS-21).³³ For survey brevity, we used three DASS items from anxiety (heart, difficulty breathing, and trembling) and four from stress (wind down, overreacted, nervous energy, agitated/upset), to have a measure of stress and anxiety similar to ICD-10 which assesses anxiety and stress disorders (ICD F codes F40 to F48). Participants rated how frequently they experienced symptoms in the past two weeks on a slightly modified scale (0=never, 1=rarely, 2=sometimes, 3=often). Items were summed over the response categories. To have a CESD score, participants had to respond to at least seven of the 10 items, and for the DASS score, five of seven items, or were coded as missing.²⁵ We coded each scale to have elevated symptoms if one standard deviation or greater above the means.²⁵ We also explored using a value of 10 or higher, the recommended cut-off, to code depressive symptoms as elevated.³²

Covariates: We included reproductive and sociodemographic factors in the models that are associated with mental health, as well as factors associated with contraception, including age (adolescents 18-19 years, young adults 20-29 years) sexual orientation (straight/heterosexual, bisexual, lesbian/gay, other),³⁴ feelings about getting pregnant (very unhappy, unhappy, happy, very happy),³⁵ and parous.³⁶ To take into account impacts of racism or language barriers on care-seeking,³⁷⁻³⁹ we included self-reported race and ethnicity (Black non-Hispanic, Asian/Pacific Islander non-Hispanic, White non-Hispanic, Hispanic/Latinx, American Indian/Multiracial/other non-Hispanic) and language spoken at home (English, language other than English). We also included health insurance as a measure of access to care (private, public, none, don't know). For economic insecurity, which has been

associated with delayed contraception,^{40,41} we measured basic needs with a food insecurity item adapted from the U.S. Department of Agriculture household food security module, of how often their household worried if food would run out (never, sometimes/often).⁴² We included state of residence (Texas, California) in the models, as well as a year variable to show any changes over the course of the pandemic.

Statistical Analysis

We presented descriptive statistics of the study sample, including current contraceptive method use, by elevated symptoms of depression, anxiety and stress. As the data are clustered by site, we used univariate logistic regression models with cluster robust standard errors to compare the sample participant characteristics by elevated symptoms of depression, anxiety and stress.

We ran a series of multivariable models, using mixed-effects logistic regression with random effects for individual and site, to estimate delayed contraception by depression, anxiety and stress. We estimated two separate models with symptoms of depression and with symptoms of anxiety and stress as the main independent variables. We used one or more standard deviation above the mean for our measure of elevated symptoms of depression, anxiety and stress, and the also ran models with the numerical scale measures to check for consistency. All models controlled for age, sexual orientation, pregnancy desire, parous, race/ethnicity, language spoken at home, health insurance status, food insecurity, state of residence, and year.

The outcome variable, delayed contraception since the last survey, was time-varying (measured at time t). Predictor variables of elevated symptoms of depression, anxiety and stress were also time-varying and lagged to the prior survey (time t-1). Time-varying control variables were also measured at prior survey (age, pregnancy desire, parous, health insurance, food insecurity, year). For control variables that did not vary over time (sexual orientation, race and ethnicity, language spoken at home, and state), we used baseline values. Finally, we conducted sensitivity analyses by excluding the observations from models of delayed getting contraception where participants reported a preference for no method use (2%), in case it made a difference in the results. We used listwise deletion to handle the missing data. Analyses were conducted with Stata version 18 and significance was reported at the $p \leq 0.05$ level.

Results

One-third of study participants were adolescents aged 18-19 years (33%), and 67% adults aged 20-29 years (Table 1). Ninety-nine percent identified as cis-gender women and 1% as transgender or other. Seventy-seven percent identified as straight. The sample was largely nulliparous (92%), and over half of participants were currently using condoms or barriers (26%) or withdrawal or none (30%). Forty-four percent were currently using prescription methods. The sample was diverse and reflective of the community college populations in Texas and California, with 59% identifying as Latinx/Hispanic; 20% White; 10% Asian/Pacific Islander, 6% Black, and 6% American Indian, Multiracial or other.^{15,43} About half (52%) reported they spoke a language other than English at home. Half of participants were either

uninsured (17%) or publicly insured (33%). Over one-quarter were food insecure (28%).

There were high rates of elevated depressive, anxiety and stress symptoms in this sample. The depression scale ranged from 0 to 30, with a mean of 15.1 (sd 6.4). The anxiety and stress scale ranged from 0 to 21, with a mean of 9.5 (sd 5.5). Eighty percent, or nearly all of our sample, were at or above the suggested cutoff of 10 for the CESD-10³². Using one or more standard deviations above the mean of mental health symptoms as a cut-off, 18% had elevated symptoms of depression, and 19% had elevated symptoms of anxiety and stress.

Over one-third of participants (35%) reported that they delayed getting contraception they felt they needed during the study, and 14% delayed since their last survey, on average over the surveys. There was a slight decrease over time in delays during the course of the pandemic, from 16% in 2020 to 14% in 2021 and 2022, and 13% in 2023. Among participants with elevated scores for depression, 21% delayed contraception since last survey compared to 13% of participants who did not have elevated depression symptoms. Among those with elevated symptoms of anxiety and stress, 20% delayed compared to 13% of those who did not have elevated anxiety or stress symptoms (Figure 1). Adolescent participants ages 18-19 were more likely to delay getting contraception (16%) than young adult participants (13%). Several variables associated with structural inequities and barriers to care, including sexual orientation, race/ethnicity, language spoken at home, did not vary with delayed contraception. However, a higher proportion of participants

experiencing food insecurity delayed getting contraception (20%) than those not experiencing food insecurity (12%).

Results from multivariable mixed effects logistic regression models showed a highly significant association between mental health distress and delayed contraception (Table 2). Results from the model with elevated symptoms of depression (Table 2, Model 1) showed increased odds of delaying contraception (adjusted odds ratio (aOR) 1.58, 95% confidence interval (CI) (1.27-1.96). Adolescent participants ages 18-19 years were significantly more likely to delay getting contraception they thought they needed than young adults (aOR 1.32, 95% CI 1.07-1.63). Other control variables associated with delayed contraception were food insecurity (aOR 1.83, 95% CI 1.51-2.22), and state, with participants in Texas more likely to delay than those in California (aOR 1.51, 95% CI 1.17-1.95). Those with elevated anxiety and stress symptoms (Table 2, Model 2) also had greater odds of delay (aOR 1.46, 95% CI 1.17-1.82), and adolescents (aOR 1.30, 95% CI 1.05-1.61) and food insecure participants (aOR 1.84, 95% CI 1.51-2.231) were more likely to delay getting contraception they thought they needed, as well as participants in Texas (aOR 1.51, 95% CI 1.17-1.96).

Results from models estimated with the numerical scale variables for symptoms of depression, anxiety and stress were consistent, as were results from sensitivity tests when participants with a preference for no method were not included in the sample.

Discussion

These results from a sample of sexually-active young people revealed a significant association between elevated mental health distress symptoms and delays in getting a contraceptive method or prescription they thought they needed. Prior research among clinic-based samples of reproductive-aged patients has shown an association of elevated depression and anxiety and stress symptoms with inconsistent or discontinued use of contraceptives.¹⁷⁻¹⁹ A population-based study from one U.S. county also showed women with stress symptoms used less effective methods.²⁰ The results from this study build on these results and identify an association earlier in the process, by demonstrating that young people were delayed in getting the contraception they thought they needed. The associations we found might not be evident in a clinic-based sample of individuals who have already presented for healthcare. Individuals who have not yet visited a clinic for contraception may even be more likely to have delayed care. Interestingly, a few recent studies have revealed that depression was associated with delayed healthcare in older adults.^{44,45} Mental health struggles may decrease the motivation or initiative required to seek needed care, or add to feelings of being too overwhelmed to take steps for health protective behaviors.^{27,46} Our findings suggest that young people experiencing symptoms of mental distress may need more resources, or even treatment, to access desired contraception.

Study results also revealed that adolescent participants ages 18-19 years were significantly more likely to delay getting contraception than young adult participants ages 20-29 years. Educating young people on their contraceptive options and the variety of venues that have opened up to access contraception, including telemedicine or pharmacy access, is much needed.⁴⁷⁻⁴⁹ Research has

shown that privacy is an often cited concerns for accessing contraceptives, especially among adolescents.⁵⁰⁻⁵² Our results suggest that outreach to those young people hesitant to seek contraception may be an important complement to clinic-based care. Youth outreach should emphasize confidentiality and include links to mental health services. Alternate modes of accessing contraceptives, including telemedicine, should include confidential mental health resources as well. A recent study has shown that adolescents experiencing an onset of depressive symptoms around the age of initiation of first sex had a greater likelihood of pregnancy than adolescents not experiencing depressive symptoms.⁵³ Making sure that young people find out about easy-to-access, youth-friendly services may help to prevent delays. Affordability of contraception has been shown to be a common concern among young people regardless of their health insurance status, so information on low or no-cost services is important in this age group.¹³

During the COVID-19 pandemic, barriers to reproductive health services increased, especially for historically marginalized populations.⁵⁴⁻⁵⁶ While access improved somewhat over time and telemedicine visits increased, challenges remained among young people, including those facing basic needs adversity.^{30,57,58} Our results also reflected that basic needs adversity, measured by food insecurity, was associated with delays in seeking contraception, consistent with recent research that has shown economic hardship to be associated with delaying contraception during the pandemic.^{40,41} Food insecurity has also been shown to be associated with negative mental health outcomes in a national adolescent sample.⁵⁹ Clinical interventions have demonstrated the effectiveness of offering navigation for basic needs and social services for pediatric patients and families at the clinic visit.^{60,61} Interventions

to address delayed contraception, especially among adolescents and young adults experiencing mental distress and basic needs adversity, are also needed in educational and community settings to bring them into care. Interventions in community settings can help to reach young people with essential health services, as many delay contraceptive care. Interventions in sexual health education programs in schools have been shown to increase use of clinical services for reproductive health and to reduce concerns about privacy and confidentiality.⁶² Outreach and interventions for reproductive health that take into account youth mental health needs are important,⁶³ as many still remain untreated for depression and anxiety.^{16,64,65}

This study has limitations. Findings are from two large states with diverse populations, and ideally, nationally representative surveys would include items on mental health indicators and delayed contraception, to investigate the needs for preventive care initiatives across the country. Nevertheless, these state findings are interesting because they show increased likelihood of delaying contraception among young people in Texas, likely reflecting a relative lack of funding and state programs for youth-friendly reproductive health services, compared to California.^{66,67} However, across state contexts the strong association of mental distress and delayed contraception holds. We included variables for a wide range of factors that might predict both mental health distress and delayed contraception, however, with the high likelihood of common antecedents of both, there may be omitted variable bias. Nevertheless, we tested many model specifications, and the association of depression, anxiety and stress with delayed contraception remained robust and highly significant.

Conclusions

Access to contraception, an essential preventive service for sexually-active young people, has taken on greater importance across the U.S. this year, after the *Dobbs vs Jackson Women's Health Organization* decision, especially in states with abortion bans such as Texas.⁶⁸ In California, where abortion remains legal, patient volumes have increased and access to early care has been impeded.⁶⁹ These reproductive health restrictions have the greatest implications for the mental health and well-being of marginalized populations.⁷⁰ Over a third of young people in this study delayed contraception, similar to the proportion delaying contraception in a recent national survey.⁷¹ These results highlight the importance of timely initiatives to address essential mental health needs of young people, along with improved contraceptive access.

Acknowledgements: Jill Barr-Walker, Maya Blum, Stephanie de la Melena, Danielle Van Liefde, Marta Cabral, Natalie Croul, Leslie Fung, Kristin Hildreth, Harim Lee, Louisa Alejandra Tello Perez, Iris Wong, HSACCC, Student Voices Community Engagement

Authors' contributions (CRediT format)

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J.Y. Methodology, formal analysis, Project administration, Writing – review and editing

C.M. Writing – review and editing

K.H. Project administration, Writing – review and editing

I.R. Investigation, Data curation, Project administration, Writing – review and editing

S.E. Formal analysis, Data curation, Writing – review and editing

H.K.H. Formal analysis, Software, Validation, Data curation, Writing – review and editing, Visualization

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All authors contributed to the interpretation of results, revising the article, and approved final version.

Authors' disclosure: No competing financial interests exist

Funding: Funding was provided by grants from The JPB Foundation, the William and Flora Hewlett Foundation, and the Eunice Kennedy Shriver National Institute of Child Health and Human Development [P2C HD042849], awarded to the Population

Research Center at The University of Texas at Austin, and National Institute of Diabetes and Digestive and Kidney Diseases [K12DK111028].

The research presented in this paper is that of the authors and does not reflect official policy of the NIH or funders.

IRB# 17-23183

ClinicalTrials.gov Identifier: NCT03519685

Presentations: Preliminary results were presented at the Interdisciplinary Association for Population Health Sciences, MN, Sept 2022

Table 1. Participant Characteristics, by Symptoms of Depression, Anxiety and Stress (N=7,023)

Characteristics	Total	Elevated depressive symptoms (n=1,241)	Elevated anxiety & stress symptoms (n=1,308)
	%	%	%
Age			
18-19 years	33	33	36
20-29 years	67	67	64
Gender			
Cisgender Woman	99	98	98
Transgender/other	1	2	2
Sexual Orientation			
Heterosexual	77	66	63
Bisexual/lesbian/gay/other	23	34***	37***
Parous	8	8	7
Current contraceptive method			
Hormonal, IUD (prescription)	44	42	45
Condoms, barrier (non-prescription)	26	26	26
Withdrawal, none	30	32	29
Pregnancy desire			
Very happy	6	5	5
Happy	20	17**	18
Unhappy	28	26**	26
Very unhappy	46	53	51
Race/Ethnicity			
Hispanic/Latinx	59	58	57
White (non-Hispanic)	20	21	22
Asian/Pacific Islander (non-Hispanic)	10	8	9
Black (non-Hispanic)	6	6	5
American Ind/Multiracial (non-Hisp)	6	7	7
Language other than English	52	49	49
Health insurance			
Private	42	42	43
Medicaid/public	33	31	32
Uninsured	17	18	17
Don't know	9	9	8
Food Insecure	28	41***	39***

State of residence			
California	66	65	65
Texas	34	35	35
Year			
2020	8	8	7
2021	42	43	42
2022	40	41	41
2023	10	8**	10

Notes: *p ≤ .05, **p ≤ .01, ***p ≤ .001. Univariate logistic regression models with cluster robust standard errors were used to compare the sample participant characteristics by elevated symptoms of depression, anxiety and stress (> 1 standard deviation above the mean)

Table 2. Delayed Contraception, by Symptoms of Depression, Anxiety and Stress: results from mixed effects logistic regression models

	<i>Model 1</i> (N=7,023)		<i>Model 2</i> (N=7,015)	
	Adjusted Odds Ratio	95% CI^a	Adjusted Odds Ratio	95% CI^a
Depression symptoms				
Yes	1.58***	[1.27-1.96]	-	-
No (Ref ^b)	-	-	-	-
Anxiety and Stress symptoms				[1.17-
Yes	-	-	1.46***	1.82]
No (Ref)	-	-	-	-
Age		[1.07 -		[1.05 -
18-19 years	1.32*	1.63]	1.30*	1.61]
20-29 years (Ref)	-	-	-	-
Sexual orientation		[0.74 -		[0.75 -
Heterosexual	0.97	1.27]	0.97	1.27]
Bisexual/lesbian/gay/other (Ref)	-	-	-	-
Parous	1.01	[0.68 -	0.99	[0.67 -
Pregnancy desire – how happy if pregnant next yr		1.48]		1.47]
Very happy	1.00	[0.67 -	1.01	[0.67 -
Happy	1.04	1.51]	1.03	1.51]
Unhappy	0.96	[0.81 -	0.95	[0.79 -
Very unhappy (Ref)	-	1.35]	-	1.33]
Race/ethnicity		[0.77 -		[0.76 -
Hispanic/Latinx	1.16	1.19]	1.15	1.18]
White	1.17	[0.70 -	1.14	[0.68 -
Asian/Pacific Islander	0.89	1.94]	0.87	1.92]
Black (Ref)	-	[0.68 -	-	[0.66 -
American Indian/multi/other	1.35	2.01]	1.34	1.96]
Speaks language other than English at home	0.82	[0.47 -	0.82	[0.46 -
Health insurance		1.66]		1.64]
Uninsured	1.03	[0.70 -	1.04	[0.69 -
Medicaid/public	0.88	2.62]	0.88	2.59]
Don't know	1.40*	[0.63 -	1.39*	[0.63 -
Private (Ref)	-	1.08]	-	1.08]
Food insecure	1.83***	[0.78 -	1.84***	[0.78 -
State of residence		1.37]		1.38]
Texas	1.51**	[0.68 -	1.51**	[0.69 -
California (Ref)	-	1.12]	-	1.13]
Year	0.99	[1.01 -	0.98	[1.01 -
		1.92]		1.91]
		[1.51 -		[1.51 -
		2.22]		2.23]
		[1.17 -		[1.17 -
		1.95]		1.96]
		-		-
		[0.88 -		[0.87 -
		1.11]		1.09]

Number of Groups	29	29
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*** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$
^a CI= confidence interval, ^b Ref= reference category

Figure 1. Percentage of Participants Delaying Getting Contraception, by Symptoms of Depression, Anxiety and Stress. aOR, adjusted odds ratio

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