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Demographic and clinical correlates of suicidal ideation in individuals with at-risk mental state (ARMS): A study from Pakistan

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Abstract

Background: Suicide is a major public health concern and one of the leading causes of mortality worldwide. People with an at-risk-mental-state (ARMS) for psychosis are more vulnerable to psychiatric co-morbidity and suicide, however, there are limited data from low-middle-income countries. The present study aimed to identify the prevalence of depressive symptoms and suicidal ideation along with sociodemographic and clinical correlates of suicidal ideation in individuals with ARMS from Pakistan.

Method: Participants between the age of 16 and 35 years who met the criteria for ARMS based on the Comprehensive Assessment of At-Risk Mental State (CAARMS), were recruited from the community, general practitioner clinics and psychiatric units across Pakistan ($n = 326$). Montgomery and Asberg Depression Rating Scale (MADRS) and Social-Occupational-Functional-Assessment-Scale (SOFAS) were administered to participants.

Results: The prevalence of depressive symptoms and suicidal thoughts in the sample at baseline were 91.1% ($n = 297$) and 61.0% ($n = 199$), respectively. There were significant mean differences between groups (mean difference [95% CI]; p-value) without suicidal ideation and with suicidal ideation on measures of MADRS (−5.47 [−7.14, −3.81]; $p < .001$), CAARMS non-bizarre ideas (−0.29 [−0.47, −0.11]; $p = .002$) and perceptual abnormalities (−0.23 [−0.41, −0.04]; $p = .015$).

Conclusion: These findings indicate that suicidal ideation and depressive symptoms are highly prevalent in individuals with ARMS in Pakistan. Given the pivotal developmental stages that ARMS presents, and the poor outcomes associated with co-morbid depression, there is an urgent need to prioritize the development of low-cost and scalable evidence-based interventions to address psychiatric comorbidity and suicidality in the ARMS population in Pakistan.

N. Husain and I. Qurashi are Joint Senior Authors.

KEYWORDS
at-risk mental state, clinical correlates, depressive symptoms, socio-demographic, suicidal ideation

1 | INTRODUCTION

The at-risk mental state (ARMS) is a preclinical state describing individuals that are at high-risk of developing several psychiatric disorders, including psychosis (Andreou & Borgwardt, 2020). These individuals experience significant distress, impaired functioning and have a high lifetime risk of self-harm and attempted suicide (Fusar-Poli et al., 2015). Presenting with ARMS does not necessarily indicate affected individuals will develop psychosis, with earlier research showing 36% of ARMS individuals develop psychosis within 3 years while approximately 33% have persistent attenuated psychotic symptoms and the remaining achieve remission (Fusar-Poli et al., 2012). Additionally, there is a high prevalence of comorbid mental disorders in the ARMS population and a meta-analysis identified that over 70% of ARMS individuals ($n = 509$) were found to have another mental disorder in addition to meeting ARMS criteria, with 40% having a comorbid diagnosis of depression and 8% having an anxiety disorder. ARMS individuals with a concurrent diagnosis of depression or anxiety were also found to be at a higher risk of suicide and self-harm (Fusar-Poli et al., 2014). Fewer depressive symptoms, on the other hand, are associated with higher rates of remission in ARMS suggesting that the absence or treatment of depression may be a good prognostic indicator in this population (Kline et al., 2018).

Suicide is a major public health concern across the world, however, a staggering 77% of suicides occur in low- and middle-income countries (LMIC) (WHO, 2014). Depression affects approximately 280 million people around the world (Vos et al., 2015) and 80% of these individuals reside in LMIC (Rathod et al., 2017). It is well established that depression is a risk factor for death by suicide (Bradvik, 2018). The ARMS population is particularly vulnerable to several negative outcomes above and beyond the risk of psychosis. There are limited data available, however, on depression and suicide ideation in individuals with ARMS from LMIC. Such data are essential to inform the development of patient-centred evidence-based health services in these settings. The primary aim of this study is to address this gap in literature and establish the cross-sectional prevalence of depression symptoms and suicide ideation in patients with ARMS from Pakistan. We also aim to establish the sociodemographic and clinical correlates of suicidal ideation in individuals with ARMS from Pakistan.

2 | METHODS

2.1 | Research design

This is a secondary analysis from the NAYAB study, a large ($n = 326$) double-blind placebo controlled randomized trial of minocycline and/or omega-3 fatty acids added to treatment in patients with ARMS. The primary outcome of the NAYAB study was transition to psychosis at 12 months. The detailed methodology of the primary study has been described in the published protocol (Qurashi et al., 2017). In this cross-sectional secondary analysis, we sought to investigate the prevalence of depressive and suicidal ideation in people with ARMS using data collected from the Montgomery and Asberg Depression Rating Scale (MADRS) (Montgomery & Asberg, 1979).

2.2 | Participants

Participants were recruited from participating sites across Pakistan, which included cities of Karachi, Lahore and Rawalpindi. Participants were recruited from the community, general practitioner clinics and psychiatric units in Pakistan. To facilitate the recruitment of help-seeking individuals from community settings, the study team set up drop-in mental health camps. Individuals who accessed mental health support from these camps were screened for eligibility and invited for the study. Individuals recruited from the community were not otherwise connected to mental health supports or a family physician. Eligible participants were help-seeking individuals aged 16–35 years, who met one or more of the ARMS criteria (state vulnerability, attenuated psychotic symptoms or brief limited intermittent psychotic symptoms group) assessed using the Comprehensive Assessment of At-Risk Mental States (CAARMS) (Yung et al., 2005), and were capable of providing written informed consent. Exclusion criteria consisted of a history of psychotic illness, treatment with antipsychotics or mood stabilizers, organic brain diseases, having IQ < 70 or diagnosed learning disability, and a diagnosis of substance use disorders. The eligibility criteria are also detailed in the published protocol (Qurashi et al., 2017). Following written informed consent and screening, eligible participants completed baseline demographic and clinical assessments.

2.3 | Measures

2.3.1 | Comprehensive Assessment of At-risk Mental State

The CAARMS is a semi-structured interview for the identification of individuals at increased risk of developing a first-episode psychotic disorder, with good to excellent concurrent, discriminant and predictive validity and excellent inter-rater reliability (Yung et al., 2005). The psychosis-like symptoms ratings of the CAARMS were used in the present study for the following items: (i) unusual thought content; (ii) non-bizarre ideas; (iii) perceptual abnormalities; (iv) disorganized speech. The CAARMS is an instrument to both operationalize the at-risk mental state but to also measure severity of psychosis-like symptoms in ARMS (Morrison et al., 2011). Each of these items are rated on a 0–6 point scale, lower scores indicating lower severity of psychosis-like symptoms.

2.3.2 | Montgomery and Asberg Depression Rating Scale (Montgomery & Asberg, 1979)

MADRS is a 10-item rater-administered depression rating scale, with total scores ranging from 0 to 60, and higher scores indicating greater depression severity. MADRS evaluates depressive symptoms in the previous week and has been used in youth populations as well as individuals with at-risk mental state and early psychosis (Chang et al., 2021; Herniman et al., 2021; Ntini et al., 2020). Herniman et al. (2021) examined the psychometric properties of the MADRS in early psychosis and determined that the MADRS had sufficient predictive validity for 'caseness' of a major depressive episode based on SCAN, but the optimal cut-off differed in those with and without positive psychotic symptoms (MADRS ≥ 18 vs. MADRS ≥ 11). In the present study we have used the upper cut-off to conservatively operationalize depressive symptoms. The MADRS demonstrates strong reliability (Cronbach's alpha of .84 and an interclass correlation coefficient [ICC] of .78), validity, and sensitivity to change (Davidson et al., 1986; Fantino & Moore, 2009).

2.3.3 | Social Occupational Functional Assessment Scale

The SOFAS is a rater-administered instrument that assesses current social and occupational functioning independent of psychiatric symptom severity (Goldman et al., 1992). It is a reliable and valid 10-point scale with scores range from 0–100, as '1' = 'Persistent hygiene problems' to 91–100 as '10' = 'Superior functioning' for the current period at baseline. Low scores showing high level of impairment (Goldman et al., 1992). In assessing social and occupational functioning, this measure also considers the consequences of the individual's overall medical condition. The Social and Occupational Functioning Assessment Scale's reliability intraclass correlation coefficients are in the excellent range (ICC > 0.74) (Hilsenroth et al., 2000).

2.4 | Suicidal ideation

Suicidal ideation was assessed using item 10 (suicidal thoughts) on the MADRS. Suicidal thoughts were scored as 0 to indicate no suicidal thought, scores of 1 and 2 indicated mild suicidal thought, scores of 3 and 4 indicated moderate suicidal thought and scores of 5 and 6 indicated severe suicidal thoughts.

2.5 | Statistical analysis

Statistical analysis was performed using SPSS 23.0 for Windows. The analyses examined the association between suicidal ideation and demographics, psychosis-like symptoms from the CAARMS (unusual thoughts, non-bizarre ideas, perceptual abnormalities, and disorganized speech), social functioning, depression scores (MADRS). We used MADRS item 10 as a categorical variable to define suicidal ideation (scores ≥1 were considered as presence of suicidal ideation; scores of 0 considered no suicidal ideation). Pearson correlation was used to examine the association between continuous variables found to be normally distributed. Independent sample *t*-test was used to examine the differences between groups: (i) suicidal ideation and (ii) no suicidal ideation with continuous variables when data was normally distributed, for example, social functioning, MADRS, CAARMS psychosis-like symptoms (unusual thoughts, non-bizarre ideas, perceptual abnormalities, and disorganized speech). Chi-squared and Fisher's exact test were used to assess differences between binary and categorical variables.

2.6 | Ethical consideration

Informed consent was obtained from all participants. The participants were also explained about the right to withdrawal at any period during the study. Confidentiality of all participants were respected. Ethical approval for this study was obtained from the Ethical & Scientific Review Committee of Karachi Medical and Dental College (Approval Number: 014/15).

3 | RESULTS

A total of 326 participants were included in this study, with no missing data for any participant. The prevalence of depressive symptoms (MADRS total score ≥18) in the sample was 91.1% ($n = 297$). In addition, 61.0% ($n = 199$) of the sample experienced suicidal ideation. The depressive symptoms and suicidal thoughts scores are presented in Table 1.

Socio-demographic characteristics between the groups who endorsed suicidal ideation and those who did not endorse suicidal ideation are shown in Table 2. The mean age of the sample was 24.36 years (SD = 5.29), and no significant difference was found in

TABLE 1 Depression and suicidal ideation severity (descriptive/frequency analysis).

	No depression (0–6)	Mild depression (7–19)	Moderate depression (20–34)	Severe depression (35 and above)
MADRS scores	4 (1.2%)	42 (12.9%)	221 (67.8%)	59 (18.1%)
	No suicidal thoughts (0)	**Mild suicidal thoughts (1 and 2)**	**Moderate suicidal thoughts (3 and 4)**	**Severe suicidal thoughts (5 and 6)**
Suicidal thoughts	127 (39.0%)	139 (42.7%)	56 (17.1%)	4 (1.2%)

TABLE 2 Characteristics of the sample.

	No suicidal ideation	Suicidal ideation	Total	
	n (%)	*n* (%)	*n* (%)	*p*-value
Gender				
Male	93 (73.2%)	99 (49.7%)	192 (58.9%)	<.001[a]
Female	34 (26.80%)	100 (50.3%)	134 (41.1%)	
Age (years)				
17–22	54 (42.5%)	91 (45.7%)	145 (44.5%)	.947[b]
23–27	32 (25.2%)	49 (24.6%)	81 (24.8%)	
28–31	30 (23.6%)	43 (21.6%)	73 (22.4%)	
32–35	11 (8.7%)	16 (8.0%)	27 (8.3%)	
Marital status				
Single	84 (66.10%)	132 (66.3%)	216 (66.3%)	.998[b]
Married	41 (32.30%)	64 (32.2%)	105 (32.2%)	
Divorced	2 (1.60%)	3 (1.5%)	5 (1.5%)	
Family system				
Nuclear	60 (47.2%)	97 (48.7%)	157 (48.2%)	.821[a]
Joint	67 (52.8%)	102 (51.3%)	169 (51.8%)	
Employment				
Unemployed	11 (8.7%)	29 (14.6%)	40 (12.3%)	.021[b]
Employed	61 (48.0%)	70 (35.2%)	131 (40.2%)	
Housewife	18 (14.2%)	52 (26.1%)	70 (21.5%)	
Students	37 (29.1%)	48 (24.1%)	85 (26.1%)	
History of psychiatric illness				
No	76 (59.8%)	126 (63.3%)	202 (62.0%)	.560[a]
Yes	51 (40.2%)	73 (36.7%)	124 (38.0%)	
Depressive symptoms				
No	26 (20.5%)	3 (1.5%)	29 (8.9%)	<.001[a]
Yes	101 (79.5%)	196 (98.5%)	297 (91.1%)	

[a]Fisher's exact test.
[b]Pearson Chi square test.

age between individuals endorsing suicidal ideation and those who did not. Similarly, there was no difference in mean years of education between individuals endorsing suicidal ideation and those who did not. Most participants ($n = 145$; 44.5%) were between 17 and 22 years of age and were single ($n = 216$; 66.3%). The sample consisted of mostly males ($n = 192$; 58.9%). Females proportionally reported more suicidal ideation than males. Most of the participants were employed and belonged to a joint family system. Suicidal ideation was not found to be significantly associated with history of psychiatric illness ($p = .56$).

Differences in social functioning (SOFAS), depressive symptoms (MADRS) and psychosis-like symptoms (CAARMS) between individuals who endorsed suicidal ideation and those who did not are shown in Table 3. Participants with suicidal ideation exhibited significantly higher MADRS scores, as well as higher CAARMS non-bizarre ideas and CAARMS perceptual abnormalities scores. We removed the item related to suicidal ideation to examine group differences in MADRS scores, which remained significant (Table 3). However, there were no differences in CAARMS unusual thoughts, CAARMS disorganized speech and SOFA scores in individuals endorsing suicidal ideation and those who did not.

Multiple linear regression with suicidal ideation as the outcome yielded largely insignificant associations with predictors: SOFAS ($\beta = .089$, $p = .070$), unusual thoughts ($\beta = -.045$, $p = .415$), non-bizarre ideas ($\beta = .099$, $p = .079$), perceptual abnormalities ($\beta = .089$, $p = .106$) and disorganized speech ($\beta = -.086$, $p = .098$), only MADRS ($\beta = .435$, $p < .001$) was a statistically significant variable associated with suicidal ideation scores, explained by a 23.9% variance in the suicidal ideation score (Table 4).

4 | DISCUSSION

This study aimed to explore the prevalence of suicidal ideation in individuals with ARMS in Pakistan. Additionally, the study explored the prevalence and severity of depressive symptoms in this population. To our knowledge this is the first study from a lower-middle income country to explore the prevalence of suicidal ideation along with

TABLE 3 Differences in clinical characteristics between individuals expressing suicidal ideation and those who were not.

	No suicidal ideation	Suicidal ideation	Difference	
Outcomes	Mean ± SD	Mean ± SD	Mean (95% CI)	*p*-value
SOFAS: Functioning	65.4 ± 6.27	66.5 ± 6.10	−1.04 (−2.42, 0.33)	.135[a]
MADRS without suicide	22.65 ± 7.20	28.12 ± 7.36	−5.47 (−7.14, −3.81)	<.001[a]
CAARMS: Unusual thoughts	3.84 ± 0.90	3.96 ± 0.89	−0.12 (−0.32, 0.08)	.249[a]
CAARMS: Non-bizarre ideas	3.46 ± 0.85	3.75 ± 0.76	−0.29 (−0.47, −0.11)	.002[a]
CAARMS: Perceptual abnormalities	3.56 ± 0.93	3.78 ± 0.57	−0.23 (−0.41, −0.04)	.015[a]
CAARMS: Disorganized speech	2.76 ± 1.15	2.54 ± 1.16	−0.22 (−0.04, 0.48)	.097[a]

[a]Independent sample *t*-test.

TABLE 4 Multiple linear regression model for suicidal ideation.

Predictors	r^a	*B*	SE	β	*t*	*p*	R^2
MADRS	.441**	0.025[b]	.003	.435	8.780	<.001	.235
SOFAS	.100	0.007[b]	.004	.089	1.819	.070	
CAARMS: Unusual thought	.053	−0.025[b]	.030	−.045	−.816	.415	
CAARMS: Non-bizarre ideas	.165**	0.059[b]	.034	.099	1.762	.079	
CAARMS: Perceptual abnormalities	.113*	0.059[b]	.036	.089	1.619	.106	
CAARMS: Disorganized speech	−.100	−0.036[b]	.022	−.086	−1.661	.098	

[a]Correlation analysis.
[b]Multiple regression analysis.
**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

clinical and sociodemographic correlates in individuals with ARMS. Our findings indicate that suicidal ideation is highly prevalent in individuals with ARMS in Pakistan. Our results suggest that women with ARMS who are unemployed are a particularly vulnerable group in this setting. The prevalence of suicidal ideation in our sample was consistent with reports from elsewhere. However, our study found a higher prevalence of depressive symptoms when compared with other populations. Most individuals with ARMS endorsed moderate to severe depression symptoms.

Although largely scarce, literature on suicide from Pakistan indicates a higher prevalence of suicide attempts in young people who are under the age of 30, who are exposed to domestic violence and experience mental illness (Shekhani et al., 2018). A confluence of risk factors including lower literacy rates, unemployment, lower socio-economic status, health inequality and stigma towards mental illness are ubiquitous risk factors of suicidal ideation and suicide attempts in LMICs, making individuals in these settings particularly vulnerable (Kao et al., 2012). Data from a community-based sample from Pakistan also indicates that suicidal ideation is more common in married and unemployed women compared with those who are unmarried and employed (Shekhani et al., 2018). Research from rural areas of India identified low literacy rates, unemployment, debt, along with a confluence of other factors as risks for suicide (Gajalakshmi & Peto, 2007). The association between poverty and suicide has been established in community-based sample of LMIC settings, though not specifically in individuals with ARMS (Iemmi et al., 2016). There are limited comparable data on the prevalence of suicidal ideation in ARMS from Pakistan, and indeed, other lower-middle income countries. Studies of psychiatric samples from Pakistan report that depression is a strong predictor of suicidal ideation, with 87% of people who attempt suicide showing symptoms of depression (Shekhani et al., 2018). The high rates of psychiatric co-morbidity in the ARMs population suggests that this population is at comparatively higher risk of suicide ideation and attempts. The prevalence of suicidal ideation (61%) reported in the present study comparable to the prevalence rates of suicidal ideation in ARMS described in individuals from Italy (Pelizza et al., 2020). Pelizza et al. (2020) investigated the prevalence of suicidal ideation in 273 help-seeking adults and adolescents with ARMS, as defined by CAARMS criteria, presenting to mental health services. The sample included individuals between the ages of 13–35 years, and 60% of participants in this study endorsed suicidal thoughts (Pelizza et al., 2020). D'Angelo et al. (2017) recruited 86 youth participants at clinical high risk (CHR) for psychosis between the ages of 7–18 years from community, outpatient clinics, and psychiatry services at participating hospitals in Boston (US), 40 met criteria for ARMS as defined by the SIPS. All 40 participants completed the Suicide Behaviours Questionnaire-Revised (SBQ-R) and significantly higher levels of suicidal behaviour were reported among CHR with 17.5% reporting a history of attempted suicide (D'Angelo et al., 2017). The study found a strong correlation between suicide behaviour and psychosis-like symptoms including odd behaviour or appearance (D'Angelo et al., 2017). Another study from the US recruiting help-seeking individuals at CHR for psychosis described the prevalence of

suicidal ideation in a sample of 42 participants (13–27 years) from New York who met the criteria for CHR as defined by the SIPS (Gill et al., 2015). Most individuals from this study were ascertained from schools and clinicians, and approximately 43% of the participants reported suicide ideation (Gill et al., 2015). The prevalence of suicidal ideation was reported as 59% in a cross-sectional study from the UK which included 34 individuals with ARMS as defined by the CAARMS from psychiatric services (Hutton et al., 2011). The above studies recruited participants from psychiatric and community settings, and the disparities in the prevalence of suicidal ideation maybe a consequence of using different instruments to establish suicidal ideation as well as sociocultural and demographic factors. Largely, published literature indicates ARMS individuals recruited from community and health care settings commonly experience suicidal ideation and the results from the present study suggest that prevalence rates are comparable across the world. The results of the present study can be put into context by understanding the prevalence of suicidal ideation in the general population in LMIC. Data from five LMICs showed that the prevalence of suicidal ideation within the community ranged from 3.5% to 11.1% and in health care facilities was 5.0%–14.8% (Jordans et al., 2018). Data from a systematic review estimated the prevalence of suicidal ideation in women and girls from South Asia at 17% (Mazumder et al., 2022). These data suggest that the prevalence of suicidal ideation in non-clinical populations in LMIC is high. More than three-quarters of suicide deaths occur in LMIC (Uddin et al., 2019), however, individuals with ARMS represent a particularly vulnerable group. Early identification and appropriate interventions targeting suicidal ideation in this population may need to be considered as a part of national suicide prevention strategies in Pakistan.

The prevalence of depressive symptoms in individuals with ARMS was higher than expected in the present study. The NAPLS study recruited a large cohort of ARMS individuals from clinical settings across North America and included 764 participants between the ages 12–35 years. They found that 60% ($n = 444$) had an established history of unipolar depressive disorder, 42% ($n = 314$) met criteria for a current depressive disorder and the remaining 130 meeting the criteria for remitted depressive disorder (Kline et al., 2018). A study from the UK conducted in 2014 found that 40% of ARMS patients ($n = 509$) also had a diagnosis of depression (Fusar-Poli et al., 2014). Another study which consisted of participants from multiple sites in Europe recruited 331 subjects with ARMS as defined by CAARMS and found that that 33.2% had current depressive episode and 46.8% reported past depression (Schirmbeck et al., 2022). Literature from across the globe describes a high prevalence of depression in individuals with ARMS. There are several factors that perhaps contribute to the higher rates of depressive symptoms identified in this sample. One possible explanation is the use of the MADRS to operationalize 'depressive symptoms' rather than a gold-standard diagnostic structured clinical interview using the DSM-V or ICD-10 criteria. The MADRS was designed to be a tool to measure changes in depression symptoms over time, making it a very helpful tool for tracking response to treatment (Quilty et al., 2013) as opposed to diagnosing depression. Although there are several cut-off scores that show validity and reliability in establishing prevalence of depression, the validity of appropriate cut-offs in the ARMS population is yet to be established. Pragmatically, in the present study a cut-off of ≥18 was used based on the psychometric properties of the MADRS in early psychosis (Herniman et al., 2021). The MADRS was designed for use in adult populations (>18 years of age), however, validity has been established in youth populations as well (Ntini et al., 2020). In the present study only 31 participants were below 18 years of age, and this population is unlikely to have skewed our findings. The MADRS was designed for use in western cultures, however, it has widely been used to measure depression in South Asia including a randomized control trial by our group (Afridi et al., 2020; Husain et al., 2019). Young people in LMIC, including Pakistan, are especially vulnerable to developing mental disorders (Kieling et al., 2011; Patel, 2007) in the context of high rates of poverty, violence, political instability, trauma, stigma, and humanitarian crises. Literature from Pakistan indicates that there is an increase in the prevalence of mental health problems in the general population in the context of violence and trauma (Khalily, 2011). Pakistan is a largely conservative and patriarchal society where women have a socially restricted role and encounter social discrimination, leaving them particularly vulnerable to developing depression (Gajalakshmi & Peto, 2007). In Pakistani women, depression has been closely associated with various social factors including stressful life events, few years of education, low social support for women (Demyttenaere et al., 2004). More broadly, the constant instability and threat to life towards the population in Pakistan has had a detrimental effect on population mental health. The prevalence of depression in young people from LMICs is estimated at 24.4% and political instability, poverty, unequal distribution of resources, unemployment, and lack of awareness about mental illness are the major determinants of mental health in young people from these settings (Kao et al., 2012). Further complicating matters in LMICs is the substantial mental health treatment gap, with reports indicating that approximately 85% of the population in LMICs have no access to treatment (Demyttenaere et al., 2004). Resources in LMICs must be used judiciously and focusing interventions that target depression and other psychiatric co-morbidities may help to improve functioning and reduce distress in the ARMS population in Pakistan. This in turn could have an impact on risk of transition to psychosis (Kline et al., 2018). Kline et al. suggested that individuals with ARMS who endorsed less severe depressive symptoms or no depressive symptoms were more likely to achieve ARMS remission over time, suggesting the absence of depression is a good prognostic marker.

The results of this study need to be interpreted in the context of several limitations. First, the cross-sectional nature of the study does not allow establishment of causality. We cannot determine whether ARMS increases the risk of depressive symptoms and suicidal ideation or if depressive symptoms and suicide ideation contribute to the risk of developing ARMS. Second, the present study is unable to comment on the prevalence of depression within the ARMS population. Presence of depressive symptoms in this study were operationalization pragmatically based on published literature of psychometric properties of the MADRS. A major limitation of the present study is the inability to confirm 'caseness' of depression using a gold-standard

structured diagnostic interview. Additionally, the prevalence of suicidal ideation was established using 1-item of the MADRS and not by using a validated instrument to assess suicidal ideation. The use of a validated instrument, that is, The Columbia Suicide Severity Rating Scale (Posner et al., 2011) would have strengthened the rigour of this study. Though the CAARMS has been used to establish symptom severity in ARMS (Morrison et al., 2011) the use of additional instruments like the CAPE-P15 (Nunez et al., 2021) and PQ-B (Lang et al., 2020) would have further strengthened the study. There are limited comparative data in healthy control populations from Pakistan to help to contextualize the findings. However, published literature described above does indicate that individuals from Pakistan may be at higher risk of common mental disorders like depression. One of the strengths of this study is the large sample size, possibly being more representative of the ARMS population in Pakistan. To our knowledge this is one of the largest studies exploring the demographic and clinical correlates of suicidal ideation in the ARMS population from a LMIC. The clinical instruments utilized in this study are established instruments for the ascertainment of ARMS and for the assessment of severity of depression.

The high prevalence of suicide ideation described in this study speaks to the vulnerability of ARMS individuals in Pakistan and the importance of assessing suicidality in this population. Incorporating suicide screening into standard clinical practice for ARMS individuals in Pakistan may contribute to suicide prevention strategies in this setting. We acknowledge the limited mental health resources in Pakistan, however, argue that developing robust mental health and service provision is a vital component for the promotion of mental health in any country. The ARMS population is particularly vulnerable to psychiatric comorbidities and is at an elevated risk of suicide. Depression is one of the most prevalent mental health conditions in Pakistan, characterized by a chronic course and associated functional impairment. Given the pivotal developmental stages that ARMS presents, and the poor outcomes associated with co-morbid depression, there is an urgent need to prioritize the development of low-cost and scalable evidence-based interventions to address psychiatric comorbidity and to help improve outcomes in the ARMS population in Pakistan. Future trials of scalable transdiagnostic interventions that address psychiatric comorbidity and improve outcomes in ARMS are needed in this setting.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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