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ABO BLOOD GROUP AS A PREDICTOR OF DEPRESSION: A CROSS-SECTIONAL STUDY AMONG EMERGING ADULTS IN PAKISTAN

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Abstract

Background: *Depression is one of the most prevalent and functionally disabling mental health conditions worldwide, with significant personal, social, and economic consequences. Blood group, as a constitutive biological marker, has been theorized to correlate with personality traits and psychological conditions; however, empirical evidence for such an association remains limited and inconsistent, particularly within South Asian clinical populations.*

Objective: *The present study aimed to examine the relationship between ABO blood group classification and depression severity among clinically diagnosed emerging adults and adults. Additionally, the influence of demographic variables—namely, gender and age—on depression was explored.*

Method: *A cross-sectional research design was employed. Using a convenient sampling technique, a total of 240 clinically diagnosed depression patients (males = 115; females = 125), aged 18–29 years, were recruited from multiple hospitals in Multan, Pakistan. The Urdu-validated version of the Patient Health Questionnaire-9 (PHQ-9; Kroenke & Spitzer, 2002) was administered alongside a structured demographic information sheet. Data were analyzed using one-way ANOVA, independent samples t-test, and Pearson product-moment correlation.*

Results: *One-way ANOVA revealed no statistically significant variation in PHQ-9 scores across the eight blood group categories ($F[7, 232] = 0.279$, $p = .962$). However, independent samples t-test demonstrated a significant gender difference in depression severity ($t[238] = -8.50$, $p < .001$), with females exhibiting markedly higher scores than males ($M = 16.70$ vs. $M = 12.82$). Pearson correlation revealed a significant negative association between age and depression scores ($r = -.242$, $p < .05$).*

Conclusion: *ABO blood group does not predict depression severity within this clinical sample. Gender and age, however, are significant demographic correlates of depressive symptomatology, consistent with established epidemiological literature.*

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INTRODUCTION

Mental health disorders represent a significant public health burden worldwide, with depression recognized as one of the most prevalent and disabling conditions across the lifespan (World Health Organization [WHO], 2009). Depression is a complex clinical syndrome characterized by persistent low mood, anhedonia, cognitive dysfunction, and somatic disturbances that substantially impair daily functioning (Abakah, 2015). The WHO (2009) projected that by 2020, depression would rank as the second leading cause of global disability-adjusted life years, irrespective of age or gender. This projection underscores the urgency of advancing our understanding of the biological and psychosocial determinants of depression.

Human development proceeds through a sequence of progressively complex stages, each marked by distinct biopsychosocial demands (Cherry, 2013). Among these, the transitional period between adolescence and established adulthood has attracted considerable scholarly attention as an interval of heightened vulnerability to psychopathology. Arnett (2000) conceptualized this as a developmentally distinct phase—"emerging adulthood"—spanning approximately 18 to 25 years of age and characterized by identity exploration, pervasive instability, and self-focused development. Cote and Bynner (2008) extended Arnett's model by situating emerging adulthood within broader structural changes in Western and non-Western societies, arguing that evolving labour markets and educational demands have prolonged the transition to full adult roles. Reifman, Arnett, and Colwell (2007) further substantiated the theoretical and empirical distinctiveness of emerging adulthood as a developmental stage, differentiating it from both adolescence and established young adulthood, which Arnett posited begins around age 25 and extends through the mid-30s.

Epidemiological evidence consistently documents elevated rates of depression during this developmental transition. Kessler et al. (1994) reported that the lifetime prevalence of DSM-III-R psychiatric disorders peaks during early adulthood following a progressive increase from childhood through adolescence. Among children and adolescents, Birmaher et al. (1996) documented major depressive episode prevalence rates of 0.4%–2.5% and 0.4%–8.3%, respectively. Among late adolescents and young adults, prevalence estimates range from 3.6% to 24% (Jonsson et al., 2011; Oldehinkel et al., 1999). In adult populations, the American Psychiatric Association (1994) estimated lifetime depression prevalence at 10–25% for females and 5–12% for males, with point prevalence rates of 5–9% and 2–3%, respectively. Pini et al. (1997) additionally reported that approximately 12% of Americans experience clinical depression for periods exceeding 12 consecutive months. Collectively, these figures affirm that depression constitutes a major public health priority demanding continued investigation into its determinants.

Blood Group

The ABO blood group system, first identified by Karl Landsteiner (1900, 1901) at the University of Vienna, classifies human blood according to immunological specificity based on the presence or absence of specific antigenic glycoproteins on the surface of erythrocytes. The ABO system remains the most clinically significant blood typing classification and has underpinned advances in safe blood transfusion and organ transplantation (Yamamoto, 1999). Beyond its physiological relevance, blood group has been employed in forensic science for paternity determination and criminal investigations (Jolly, 2000). Blood group is a constitutive biological characteristic, fixed at conception and remaining immutable throughout the lifespan (Jogawar, 1983).

Beyond its biomedical applications, blood type has been theorized as a potential biomarker for psychological predispositions. Kuhlberg (2000) proposed that blood typing could serve as a supplementary clinical tool for anticipating susceptibility to both physical and emotional illness, thereby enabling proactive health management. According to the American Heritage Dictionary (2017), blood group is formally defined as any of the various classes into which human blood may be divided according to immunological

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characteristics, based on the presence or absence of specific antigens on erythrocytes—a definition operationalized in the present study according to the International ABO and Rh blood typing classification system.

Literature Review

The inquiry into the relationship between blood group and psychological characteristics dates back nearly a century. Furukawa (1930) conducted foundational research on the relationship between blood group and temperament, reporting that individuals with blood groups O and B tend to exhibit optimistic, constructive, and assertive personality characteristics, whereas those with blood groups A and AB tend towards passivity, self-protectiveness, and pessimism. Although methodologically limited by contemporary standards, this research stimulated subsequent investigation into blood type as a psychological variable.

Building on this foundation, Jogawar (1983) demonstrated that individuals with blood group B exhibit higher levels of neuroticism relative to individuals with other blood groups. Eysenck (1982) similarly reported elevated anxiety and neurotic traits among blood group B individuals, drawing on biological accounts of personality variation. Boyer (1986) extended this line of inquiry by proposing that blood type A is associated with greater susceptibility to obsessive-compulsive symptomatology and psychotic features.

With respect to the gender–depression relationship, the literature consistently establishes females as more vulnerable to depressive disorders than males. Abakah (2015) reported that at least seven million American females and 5.3 million American males meet clinical criteria for a major depressive episode annually. The disproportionate prevalence of depression among females is corroborated across cross-cultural studies and is attributed to an interplay of hormonal, cognitive, interpersonal, and sociocultural factors (Digman, 1990; Goldberg, 1992). Bitsika, Sharpley, and Melhem (2010) found significantly higher depression and anxiety factor scores among female university students compared to their male counterparts, independent of other demographic variables.

From a developmental perspective, Galambos, Barker, and Krahn (2006) tracked seven-year trajectories of depression, self-esteem, and anger in a community sample of emerging adults, finding that depression was most pronounced in younger individuals and declined progressively as psychosocial stability increased. This negative association between age and depression has been linked to factors including unemployment, identity diffusion, low self-esteem, and disrupted social support networks that disproportionately affect younger individuals during the emerging adult years. These findings collectively provide the theoretical and empirical rationale for the hypotheses examined in the present study.

Rationale of the Study

Despite theoretical interest in the relationship between blood group and psychological variables, empirical research examining this association within clinical psychiatric samples remains scarce, particularly in South Asian contexts. The limited available literature yields inconclusive findings, and no Pakistani study has directly investigated the blood group–depression relationship in a clinically diagnosed sample. In Pakistan, depression is frequently underdiagnosed and carries significant social stigma, making it imperative to identify reliable biological and demographic correlates that could inform screening and intervention. The present study addresses this gap by empirically examining ABO blood group, gender, and age as correlates of depression severity in a sample of clinically diagnosed Pakistani patients.

Objectives of the Study

The present study was guided by the following objectives:

1. To examine differences in depression severity across ABO blood group categories among clinically diagnosed patients.
2. To investigate gender differences in depression severity.
3. To determine the association between age and depression severity.

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Hypotheses

Based on the review of extant literature, the following directional hypotheses were formulated:

H_1: Individuals with blood group O will exhibit significantly higher PHQ-9 scores compared to individuals with other blood groups.

H_2: Females will report significantly higher PHQ-9 scores than males.

H_3: Age will be significantly and negatively correlated with PHQ-9 scores (i.e., depression severity will decrease as age increases).

Operational Definitions

Blood Group

Conceptual Definition. Blood group is defined as any of the various classes into which human blood is categorized according to immunological characteristics, based on the presence or absence of specific antigenic proteins on the surface of erythrocytes (The American Heritage Dictionary, 2017).

Operational Definition. Blood group was operationalized in accordance with the International ABO and Rh blood typing classification system, as documented in participants' clinical records.

Depression

Conceptual Definition. Depression is defined as a clinical condition characterized by persistent feelings of sadness, hopelessness, and loss of interest or pleasure in activities, significantly impairing an individual's occupational, social, and everyday functioning (Abakah, 2015).

Operational Definition. Depression was operationalized as the total score obtained on the Patient Health Questionnaire-9 (PHQ-9). Scores range from 0 to 27, with established severity thresholds of 5 (minimal), 10 (mild), 15 (moderately severe), and 20 (severe) indicating progressively greater depressive symptomatology.

Method

Research Design

A cross-sectional, descriptive research design was employed in the present study, consistent with the study's aim of examining group differences and correlational associations at a single point in time.

Sample

The target population comprised clinically diagnosed depression patients presenting at inpatient and outpatient psychiatric units in Multan, Pakistan. Using a convenient sampling technique, a total of 240 participants (males = 115, females = 125) were recruited from multiple public and private hospitals. Participants ranged in age from 18 to 29 years (M and SD not reported), encompassing both emerging adults and young adults as defined by Arnett's (2000) developmental framework. Participants' ABO and Rh blood group classifications were obtained from their clinical medical records.

Instruments

Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 (Kroenke & Spitzer, 2002) is a widely employed, psychometrically robust self-report instrument designed for the screening and severity assessment of major depressive disorder in clinical and community settings. The scale comprises nine items derived from the DSM-IV criteria for major depressive episode, each rated on a four-point frequency scale ranging from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 27, with established cutoffs corresponding to minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27) depression. The Urdu-language adaptation of the PHQ-9, rigorously validated by Ahmer, Faruqui, and Aijaz (2007) for use with Pakistani populations, was administered in the present study.

Demographic Information Sheet

A structured demographic information sheet was developed by the research team to collect data on participants' age, gender, and ABO blood group classification.

Procedure

Data collection was conducted in accordance with ethical principles governing research with human participants. Institutional permission was obtained from hospital administrations prior to recruitment. Participants were approached individually in clinical settings and provided with a clear explanation of the study's purpose,

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procedures, voluntary nature, and confidentiality protections. Written informed consent was obtained from all participants prior to administration of the instruments. Participants were assured that their responses would be kept strictly confidential and used exclusively for research purposes. The PHQ-9 (Urdu version) and demographic information sheet were administered in a quiet clinical environment, with approximately 10 minutes allocated for completion. All completed questionnaires were retained securely, and the resulting data were subjected to statistical analysis using IBM SPSS Statistics.

Results

Descriptive and inferential statistical analyses were conducted using IBM SPSS Statistics. One-way ANOVA was performed to examine differences in depression severity across blood groups, an independent samples t-test was used to assess gender differences, and Pearson product-moment correlation was computed to determine the association between age and depression scores.

Table 1 One-Way Analysis of Variance for Comparison of Blood Groups on PHQ-9 (N = 240)

Variable		SS	df	MS	F	p
PHQ-9	Between groups	33.41	7	4.77	.279	.962
	Within groups	3974.05	232	17.13		
	Total	4007.45	239			

Note. PHQ-9 = Patient Health Questionnaire-9. $p > .05$.

Table 1 presents the results of a one-way ANOVA examining PHQ-9 scores across the eight blood group categories. The analysis yielded a non-significant F-ratio, $F(7, 232) = 0.279$, $p = .962$, indicating the absence of statistically significant differences in depression severity among blood groups. Accordingly, H_1 was rejected.

Table 2 Independent Samples t-Test for Gender Differences on PHQ-9 (N = 240)

Variable	Males (n = 115)		Females (n = 125)		t	p	95% CI [LL, UL]	
	M	SD	M	SD				
PHQ-9	12.82	3.21	16.70	3.91	−8.50	< .001	[−4.80, −3.00]	

Note. CI = confidence interval; LL = lower limit; UL = upper limit; PHQ-9 = Patient Health Questionnaire-9. **p < .001.

Table 2 presents the results of the independent samples t-test examining gender differences on PHQ-9 scores. A statistically significant difference was observed between males and females, $t(238) = -8.50$, $p < .001$, 95% CI [−4.80, −3.00]. Females ($M = 16.70$, $SD = 3.91$) reported significantly higher depression severity than males ($M = 12.82$, $SD = 3.21$). H_2 was accordingly accepted.

Table 3 Pearson Correlation Between Age and PHQ-9 Scores (N = 240)

Variable	1	2
1. Age	—	
2. PHQ-9	−.242**	—

Note. PHQ-9 = Patient Health Questionnaire-9. **p < .05.

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Table 3 presents the Pearson product-moment correlation between age and PHQ-9 scores. A statistically significant negative correlation was observed, $r(238) = -.242$, $p < .05$, indicating that higher age was associated with lower depression severity. H_3 was therefore accepted.

Discussion

The present study examined the relationship between ABO blood group and depression severity in a clinical sample of Pakistani emerging adults and adults, while also investigating the associations of gender and age with depressive symptomatology. Three hypotheses were tested, of which two were supported by the empirical data.

Regarding H_1, one-way ANOVA revealed no statistically significant difference in PHQ-9 scores across the eight blood group categories, $F(7, 232) = 0.279$, $p = .962$. This null finding is consistent with the conclusions of Dibajnia and Moghadasin (2014), who similarly observed no significant association between ABO blood type and depression or obsessive-compulsive disorder in a clinical sample. The absence of a meaningful blood group–depression relationship in the present study suggests that depression, as a multifactorial condition, is not reliably differentiated by a single hereditary biological marker. Theoretical frameworks linking blood type to psychological states (Furukawa, 1930; Boyer, 1986) have largely not been corroborated by controlled empirical research, and the present findings add to the body of evidence questioning the clinical utility of blood group as a psychological predictor.

With respect to H_2, a significant gender difference in depression severity was found, with females reporting substantially higher PHQ-9 scores than males. This finding is consistent with the extensive epidemiological literature documenting a disproportionate prevalence of depression among women (Bitsika et al., 2010; Digman, 1990; Goldberg, 1992; Pini et al., 1997). Several mechanisms have been proposed to account for this disparity, including biological factors such as hormonal fluctuations across the menstrual cycle, pregnancy, and postpartum periods; psychological factors including higher rates of rumination and interpersonal stress reactivity; and sociocultural factors involving differential gender role expectations and exposure to gender-based stressors. These findings reinforce the importance of incorporating gender as a key variable in depression screening and clinical formulation within Pakistani healthcare settings.

The acceptance of H_3, demonstrating a significant negative correlation between age and depression severity ($r = -.242$, $p < .05$), aligns with the developmental trajectory reported by Galambos et al. (2006), who tracked declining depression across a seven-year longitudinal period in emerging adulthood. Younger participants in this sample, navigating the normative developmental challenges of early adulthood—including career uncertainty, identity exploration, interpersonal instability, and economic dependence—may be more susceptible to depressive symptomatology. As individuals progress through their twenties and achieve greater psychosocial consolidation, depression severity appears to attenuate. This finding has implications for targeted early intervention, suggesting that mental health support systems should be particularly responsive to individuals in the younger emerging adult age range.

Conclusion

The present study provides empirical evidence that ABO blood group classification is not a significant correlate of depression severity in a clinically diagnosed Pakistani sample, as no meaningful differences in PHQ-9 scores were observed across blood groups. These findings challenge theorized associations between blood type and psychological states and suggest that blood typing does not constitute a clinically useful screening variable for depression.

Conversely, gender emerged as a significant and practically important predictor of depression, with females demonstrating markedly higher depressive symptomatology than males. Additionally, age was inversely associated with depression severity, indicating that younger individuals in the emerging adult period are at heightened risk. Collectively, these findings emphasize the primacy of demographic factors over blood type in

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understanding depression epidemiology, and underscore the need for gender-sensitive and developmentally informed mental health services in Pakistan.

Future research should consider employing larger, randomly selected samples to enhance generalizability, incorporating longitudinal designs to capture developmental trajectories, and exploring additional biological (e.g., genetic polymorphisms, inflammatory biomarkers) and psychosocial correlates of depression within Pakistani clinical populations. Replication of these findings across diverse geographical and cultural settings would further advance the evidence base for depression prevention and intervention in low- and middle-income countries.

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