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Blood biomarkers in suicide attempts and psychiatric disorders: a pilot study in Bangladesh

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Abstract

Background: Blood biomarkers showed some associations with mental health conditions. However, they remain inconclusive in predicting psychiatric disorders and suicide attempts. Identification of peripheral blood biomarkers for suicide prediction could enable early preventive measures as they are cheap and easy to measure.
Objectives: We aim to compare blood biomarkers between people who have attempted suicide and who have psychiatric disorders.
Methods: Data was collected for this cross-sectional study between July 2021 and November 2023 from 55 hospitalised patients categorised into two groups – suicide attempt (n=29) and psychiatric disorder (n=26). We measured the complete blood count and C-reactive protein (CRP). All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 25 and were tested using a two-sided test, and a p-value of <0.05 was considered statistically significant.
Results: The mean age of the participants was 26.1 (±10.0) years which was significantly lower for people with suicide attempts than for those with psychiatric disorders. The mean CRP level (p=0.011), total leukocyte count (p=0.024), neutrophil (p=0.002), and neutrophil-to-lymphocyte ratio (NLR, p=0.002) were significantly higher among people with suicide attempts, whereas the lymphocyte (p=0.002) and monocyte (0.029) were significantly higher among psychiatric patients.
Conclusion: The findings showed NLR and CRP were more prominent blood biomarkers in suicide attempts than in psychiatric patients. However, due to the small sample size, caution is required when generalising the study results.

Keywords

Neutrophil-to-lymphocyte ratio, C-reactive protein, non-fatal suicidal attempts, suicide in Bangladesh, cross-sectional analysis, psychiatric disorder

INTRODUCTION

Suicide is a global public health problem. According to the latest estimates from the World Health Organization (WHO), more than 720,000 people die by suicide in a year (WHO, 2025). Suicide is affected by multiple factors such as biological factors (genes), environmental factors, socio-cultural factors, religious factors, legal factors, and generally with complex interactions among several factors. Among the risk factors, psychiatric disorders are an important factor affecting suicidal behaviour (Zalsman et al., 2016). However, clear neurobiological explanations of suicidal behaviours are yet limited (Gibbs et al., 2016). Previous studies identified that low-grade systemic inflammation was associated with suicidal behaviour and psychiatric disorders, especially psychoses and mood disorders (Bhikram and Sandor, 2022; Zheng et al., 2022; Cakir et al., 2015; Gibbs et al., 2016; Batty et al., 2016).

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Finding peripheral biomarkers of chronic inflammation may enable early prevention in mental health and suicidology (Ganança et al., 2016). Studies found that blood biomarkers like neutrophil-to-lymphocyte ratio (NLR), monocyte-to-lymphocyte ratio (MLR), platelet-to-lymphocyte ratio (PLR), and C-reactive protein (CRP) have been associated with non-suicidal self-injury (NSSI) and suicidal behaviour (Bhikram and Sandor, 2022; Zheng et al., 2022; Arafat et al., 2021a,b; Brundin et al., 2017; Courtet et al., 2015; Arafat and Kar, 2021; Velasco et al., 2020; Ekinci and Ekinci, 2017; Brinn and Stone, 2020; Ninla-Aesong et al., 2024). These biomarkers also vary based on the method of suicide attempts, where the markers were higher in hanging than overdose (Arafat et al., 2021a), violent and nonviolent methods (Orum et al., 2018). One study found a higher presence of the NLR and other biomarkers among patients with depression than those with suicide attempts. However, the differences were not statistically significant (Gundogdu Meydaneri and Meydaneri, 2018). Another study reported higher levels of NLR and CRP among depressed patients with suicide attempts (Kumar et al., 2021) and patients with depression (Uma et al., 2022) than normal healthy controls. Velasco et al., (2020) found a significant rise in NLR in suicide attempts than in non-suicidal depressive patients, and NLR was associated with suicide attempts after controlling for age, sex and depression. It indicates NLR could be a precise biomarker of suicide attempts in psychiatric disorders.

However, currently, there is no reliable biomarker to predict suicide attempts (Morena et al., 2024). Replicative studies across cultures and countries are needed to identify an easily measurable and reliable blood biomarker for suicide attempts. Therefore, we aimed to determine and compare the blood biomarkers between hospitalised people with suicide attempts and psychiatric disorders.

METHODS

Data collection

This was a cross-sectional comparative study. Data was collected between July 2021 and November 2023 from 55 hospitalised patients at the psychiatry department of a tertiary care hospital in Dhaka. Among the participants, 29 were admitted with immediate non-fatal suicide attempts and the other 26 patients were admitted due to mental disorders.

We measured the complete blood count (CBC) and CRP from the blood sample. We considered hospitalised patients with a non-fatal suicide attempt within the last 48 hours and psychiatric patients who were not manageable at home and needed hospitalisation. The blood sample was collected within a day of hospitalisation.

Laboratory measurement and values

An automated haematology analyser (XT-2000 I, SYSMEX, Japan) analysed the blood sample to determine the outcome variables of the blood profile. An automated biochemistry analyser, cobas c311 (Roche-Hitachi, Japan), was utilised to determine the CRP values. The reference values of the parameters are mentioned here. Leukocyte/white blood Cell (WBC) 4000-11000/μL, neutrophil 40-80%, lymphocyte 20-40%, monocyte 1-6%, platelet 150,000-450,000/μL, and CRP <6 mg/L. We calculated NLR, MLR and PLR from the values of neutrophils, lymphocytes and monocytes.

Data analysis

All statistical analyses were performed using SPSS version 25. Frequencies and percentages were used to summarise the basic characteristics and biochemical markers of the study sample. Means and standard deviations (SDs) were calculated

for the continuous variables. We used the chi-square test of independence to determine the bivariate associations between the categorical variables. Fisher's exact test was conducted for those categorical variables that had an expected frequency of less than 5 observations in a cell. We used an independent samples t-test to ascertain the bivariate associations between the continuous variables. All statistics were tested using a two-sided test, and a *p*-value of <0.05 was considered statistically significant.

Ethical approval

The ethical approval for this study was obtained from the ethical review committee of Enam Medical College (EMC/ERC/2020/08-1). Samples were collected after securing written informed consent from the adult patients and the legal guardians of adolescents.

RESULTS

Demographic characteristics

The mean age of the participants was 26.1 (±10.0) years, which was significantly lower for people with a suicide attempt than for those with psychiatric disorders (p=0.007, independent samples t-test, Table 1). The majority of the participants were females (61.8%), age between 19 to 35 years, had secondary education (49.1%), were students (30.9%), were married (45.5%), lived semi-urban (70.9%) and had a nuclear family (69.1%) (Table 1). The proportion of adolescents was higher in the suicide attempt group than in psychiatric patients (41.4 versus 19.2%), whereas low academic attainment was noted among psychiatric patients. Suicide attempts were higher among students and unmarried people. However, these differences were not statistically significant.

Table 1. Sociodemographic characteristics.

Variable	Suicide attempt (n=29)	Psychiatric disorder (n=26)	Total (n=55)
Sex	n (%)	n (%)	n (%)
Male	11 (37.9)	10 (38.5)	21 (38.2)
Female	18 (62.1)	16 (61.5)	34 (61.8)
Age mean (SD)	22.7 (8.3)	29.9 (10.7)	26.1 (10.0)
Age group			
≤18 years	12 (41.4)	5 (19.2)	17 (30.9)
19 to 35 years	15 (51.7)	15 (57.7)	30 (54.5)
>35 years	2 (6.9)	6 (23.1)	8 (14.5)
Education level			
Illiterate/primary	8 (27.6)	14 (53.8)	22 (40.0)
Secondary/higher secondary	19 (65.5)	8 (30.8)	27 (49.1)
Bachelor's degree and above	2 (6.9)	4 (15.4)	6 (10.9)
Occupation			
Housewife	7 (24.1)	9 (34.6)	16 (29.1)
Student	12 (41.4)	5 (19.2)	17 (30.9)
Employed	7 (24.1)	4 (15.4)	11 (20.0)
Unemployed	3 (10.3)	8 (30.8)	11 (20.0)
Marital status			
Married	10 (34.5)	15 (57.7)	25 (45.5)
Unmarried	16 (55.2)	8 (30.8)	24 (43.6)
Divorced/widowed/separated	3 (10.3)	3 (11.5)	6 (10.9)

Variable	Suicide attempt (n=29)	Psychiatric disorder (n=26)	Total (n=55)
Place of residence (assessed subjectively based on local understanding)			
Urban	3 (10.3)	7 (26.9)	10 (18.2)
Semi-urban	23 (79.3)	16 (61.5)	39 (70.9)
Rural	3 (10.3)	3 (11.5)	6 (10.9)
Family structure			
Nuclear	19 (65.5)	19 (73.1)	38 (69.1)
Joint	10 (34.5)	7 (26.9)	17 (30.9)
BMI (as per World Obesity Federation classification)			
Underweight (<18.5 kg/m^2)	6 (20.7)	4 (15.4)	10 (18.2)
Normal (18.5-24.99 kg/m^2)	14 (48.3)	14 (53.8)	28 (50.9)
Overweight (≥25.00 kg/m^2)	7 (24.1)	6 (23.1)	13 (23.6)
Obesity (≥30.00 kg/m^2)	2 (6.9)	2 (7.7)	4 (7.3)
Smoking status (current)			
Smoker	9 (31.0)	8 (30.8)	17 (30.9)
Non-smoker	20 (69.0)	18 (69.2)	38 (69.1)

Biomarkers

The mean CRP level was significantly higher among people with suicide attempts (p=0.011). The mean CRP was 17.9 in suicide attempts and 3.30 in psychiatric patients (Table 2). The total WBC count (p=0.024), neutrophil (p=0.002), and NLR (p=0.002) were significantly higher among people with suicide attempts. Lymphocyte (p=0.002) and monocyte (0.029) were significantly higher among psychiatric patients (Table 2). No significant associations were found between the two groups in the case of MLR (p=0.2) and PLR (p=0.1). A comparison with normal values of blood biomarkers between the two groups revealed that CRP (p=0.013), WBC count (p=0.004), and proportion of neutrophil (p=0.027) were significantly increased, whereas lymphocyte (p=0.006) significantly decreased than the normal values among the people with suicide attempts (Table 3). No significant change was noted in platelet count and monocyte proportion (Table 3).

Table 2. Comparison of blood biomarkers between suicide attempts and psychiatric disorders measured by independent samples t-test

Variable	Suicide attempt (n=29)	Psychiatric disorder (n=26)	P value
	Mean (SD)	Mean (SD)	
CRP‡ (mg/L)	17.9 (27.2)‡	3.3 (3.7)	0.010
WBC count (per cumm)	12827.9 (4851.6)	10069.2 (3815.7)	0.020
Neutrophil (per cumm)	78.1 (14.5)	64.7 (15.3)	0.002
Lymphocyte (per cumm)	17.1 (12.1)	27.4 (11.9)	0.002
Platelet (per µL)	246655.2 (74085.0)	267807.7 (119686.6)	0.430
Monocyte (per cumm)	3.2 (1.8)	4.2 (1.4)	0.030
NLR	9.0 (7.8)	3.8 (3.9)	0.002
MLR	0.2 (0.1)	0.2 (0.1)	0.220
PLR	181.6 (112.3)	131.6 (21.7)	0.100

Notes: ‡n= 27 [a], lost in two cases

Table 3. Changes of blood markers between suicide attempts and psychiatric disorders compared with normal values.

Variable	Total	Suicide attempt (n=29)	Psychiatric disorder (n=26)	P value
	n (%)	n (%)	n (%)	
CRP				
Normal (<6 mg/L)	34 (64.2)	13 (48.1)	21 (80.8)	0.013‡
High (>6 mg/L)	19 (35.8)	14 (51.9)	5 (19.2)	
WBC count				
Normal (4,000-11,000/cumm)	29 (52.7)	10 (34.5)	19 (73.1)	0.004‡
High (>11,000/cumm)	26 (47.3)	19 (65.5)	7 (26.9)	
Neutrophil				
Normal (40- 80%)	32 (58.2)	13 (44.8)	19 (73.1)	0.027
High (>80%)	22 (40.0)	16 (55.2)	6 (23.1)	
Low (<40%)	1 (1.8)	0 (0.0)	1 (3.8)	
Lymphocyte				
Normal (20 -40%)	28 (50.9)	12 (41.4)	16 (61.5)	0.006
High (>40%)	4 (7.3)	0 (0.0)	4 (15.4)	
Low (<20%)	23 (41.8)	17 (58.6)	6 (23.1)	
Platelet				
Normal (150,000-450,000/ µL)	49 (89.1)	26 (89.7)	23 (88.5)	0.822
High (>450,000/ µL)	1 (1.8)	0 (0.0)	1 (3.8)	
Low (<150,000/ µL)	5 (9.1)	3 (10.3)	2 (7.7)	
Monocyte				
Normal (1-6%)	51 (92.7)	27 (93.1)	24 (92.3)	1.000
High (>6%)	4 (7.3)	2 (6.9)	2 (7.7)	

Notes: †Fisher's exact test; ‡Pearson chi-square test.

DISCUSSION

Variations in blood biomarkers in the two groups

The mean age was significantly lower for people with suicide attempts than for those with psychiatric disorders (p=.007), and the proportion of adolescents was higher in the suicide attempt group than in psychiatric patients. The mean CRP level (p=0.01), total WBC count (p=0.02), neutrophil (p=0.002), and NLR (p=0.002) were significantly higher among people with suicide attempts, whereas the lymphocyte was significantly higher (p=0.002) among psychiatric patients.

The CRP (p=0.013), WBC count (p=0.004), and proportion of neutrophil (p=0.027) were significantly increased, whereas lymphocyte (p=0.006) significantly decreased from the normal values among the people with suicide attempts. No significant change was noted in platelet count and the monocyte proportion.

The NLR has shown potential as an efficient and inexpensive biomarker indicating the presence of inflammation, as it can be obtained from routine blood counts without expensive immunoassays (Bhikram and Sandor, 2022; Velasco et al., 2020). Our findings are supported by a previous study that assessed CRP in three groups of hospitalised patients (suicide attempt, suicide ideation and psychiatric patients). It was found that CRP was raised in patients with suicidal ideation and then in patients with psychiatric disorders (Gibbs et al.,

2016). Other studies found both NLR and CRP were significantly higher among patients with suicide attempts and depression (n=40) and the healthy controls (n=40, Kumar et al., 2021), single episode, and recurrent depression (Uma et al., 2022), suicide attempt with depression and depression only (Ekinci and Ekinci, 2017). In our study, the parameters were higher among people with suicide attempts (without psychiatric illness, n=29) than among the patients with mental disorders (n=26). This finding was replicated in a study conducted by Velasco et al., (2020), where there was a significant rise in NLR in suicide attempts than non-suicidal depressive patients, indicating NLR could be a precise biomarker of suicide attempts.

Our study did not find any difference in MLR and PLR. One study found MLR and PLR were significantly higher among adolescents with mood disorders and NSSI than the non-NSSI group (Zheng et al., 2022). Another study recommended MLR as both an acute and enduring marker for suicide risk, as it is not affected by the actions of antidepressant medications (Petho et al., 2024).

Finding implications

The findings may indicate several implications. Firstly, a low-grade inflammatory reaction may precede a suicide attempt, which may have similarities with psychiatric illness, however, with greater intensity. There may be overlaps in the molecular process of psychiatric disorders; especially depression is a major risk factor for suicide (Zalsman et al., 2016). However, further replicative studies are warranted. Additionally, the markers are non-specific without any association with a timeline which challenges the consideration of preventive measures for psychiatric disorders and suicide attempts. Further studies are warranted to ascertain the aspects precisely. Secondly, being cheap and easy to measure, blood biomarkers could be potential universal biomarkers for early prevention.

LIMITATIONS

The study has several limitations. First, the sample size is relatively small in both groups, which may restrict the generalisation of the findings. Second, data was collected by convenient sampling, which may be a source of sampling bias. Third, data was collected from a single tertiary care hospital, which may not reflect the whole country's population and social class. Fourth, the sample was collected at a single point in time, which restricts cause-and-effect associations. Fifth, the medication, duration of illness and comorbidity of the patients were not controlled during the analysis, which can work as confounders. Sixth, we did not control the sociodemographic variables like age and gender during analysis, which may be a source of bias.

CONCLUSION

The findings showed that NLR and CRP were more prominent peripheral blood biomarkers in suicide attempts than in psychiatric patients. The changes found in this study among the Bangladeshi sample in the peripheral blood biomarkers are consistent with those in other ethnicities. However, due to the small sample size, caution is warranted while generalising the study results. Studies assessing the cause-and-effect associations would be warranted to understand the phenomenon comprehensively. Additionally, assessment of blood biomarkers among people with suicide attempts and psychiatric disorders only may be a potential area of research.

DECLARATIONS

Acknowledgement: None.

Authors' contribution:

Conceptualisation: SMY Arafat.

Data curation: SMY Arafat

Formal analysis: MG Kibria

Writing and original draft preparation: SMY Arafat, ST Khan, MG Kibria, R Kabir

Writing, reviewing and editing: SMY Arafat, ST Khan, MG Kibria, R Kabir.

All authors seen and approved the final manuscript.

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Informed consent: We collected informed written consent from the patients, and their legal guardians in the case of adolescents, before conducting the interview for data collection.

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REFERENCES

Arafat SMY, Karim AKMB, Hossain MF, Menon V, Shoib S. Neutrophil-to-lymphocyte ratio and C-reactive protein in non-fatal suicidal attempts: A cross-sectional pilot study in Bangladesh. Health Sci Rep. 2021 Aug 5;4(3):e347. https://doi.org/10.1002/hsr2.347.

Arafat SMY, Kar SK. Raised C-reactive protein in medication overdose: a report of two cases. SAGE Open Med Case Rep. 2021 Aug 25;9:2050313X211042225. https://doi.org/10.1177/2050313X211042225.

Arafat SMY, Kar SK, Menon V, Ransing RS, Karim AKMB. Neutrophilic Leukocytosis in Nonfatal Suicidal Hanging: A Case Series. Psychiatr Danub. 2021 Spring;33(1):pp69–71. https://doi.org/10.24869/psyd.2021.69.

Batty GD, Bell S, Stamatakis E, Kivimäki M. Association of Systemic Inflammation With Risk of Completed Suicide in the General Population. JAMA Psychiatry. 2016 Sep 1;73(9):pp993–5. https://doi.org/10.1001/jamapsychiatry.2016.1805.

Bhikram T, Sandor P. Neutrophil-lymphocyte ratios as inflammatory biomarkers in psychiatric patients. Brain Behav Immun. 2022 Oct;105, pp237–246. https://doi.org/10.1016/j.bbi.2022.07.006

Brinn A, Stone J. Neutrophil-lymphocyte ratio across psychiatric diagnoses: a cross-sectional study using electronic health records. BMJ Open. 2020 Jul 19;10(7):e036859. https://doi.org/10.1136/bmjopen-2020-036859.

Brundin L, Bryleva EY, Thirtamara Rajamani K. Role of Inflammation in Suicide: From mechanisms to treatment. Neuropsychopharmacology. 2017;Jan;42(1):pp271–283. https://doi.org/10.1038/npp.2016.116.

Çakır U, Tuman TC, Yıldırım O. Increased neutrophil/lymphoctye ratio in patients with bipolar disorder: a preliminary study. Psychiatr Danub. 2015 Jun;27(2):pp180–184. https://pubmed.ncbi.nlm.nih.gov/26057314/.

Courtet P, Jaussent I, Genty C, Dupuy AM, Guillaume S, Ducasse D, Olié E. Increased CRP levels may be a trait marker of suicidal attempt. Eur Neuropsychopharmacol. 2015 Oct;25(10):pp1824–1831. https://doi.org/10.1016/j.euroneuro.2015.05.003.

Ekinci O, Ekinci A. The connections among suicidal behavior, lipid profile and low-grade inflammation in patients with major depressive disorder: a specific relationship with the neutrophil-to-lymphocyte ratio. Nord J Psychiatry. 2017 Nov;71(8):pp574–580. https://doi.org/10.1080/08039488.2017.1363285.

Ganança L, Oquendo MA, Tyrka AR, Cisneros-Trujillo S, Mann JJ, Sublette ME. The role of cytokines in the pathophysiology of suicidal behavior. Psychoneuroendocrinology. 2016 Jan;63:pp296–310. https://doi.org/10.1016/j.psyneuen.2015.10.008.

Gibbs HM, Davis L, Han X, Clothier J, Eads LA, Cáceda R. Association between C-reactive protein and suicidal behavior in an adult inpatient population. J Psychiatr Res. 2016 Aug;79, pp28–33. https://doi.org/10.1016/j.jpsychires.2016.04.002.

Gundogdu Meydaneri G, Meydaneri S. Can Neutrophil Lymphocyte Ratio Predict the Likelihood of Suicide in Patients with Major Depression? Cureus. 2018 Apr 19;10(4):e2510. https://doi.org/10.7759/cureus.2510.

Kumar K, Srivastava S, Sharma B, Avasthi RK, Kotru M. Comparison between inflammatory biomarkers (high-sensitivity C-reactive protein and neutrophil-lymphocyte ratio) and psychological morbidity in suicide attempt survivors brought to medicine emergency. Cureus. 2021 Aug 26;13(8):e17459. https://doi.org/10.7759/cureus.17459.

Morena D, Turillazzi E, Fineschi V. Peripheral Biomarkers and Suicide: The Role of Neurotransmission, Neurotrophism, Neuroinflammation, and Neuroplasticity Dysregulation. Front Biosci (Landmark Ed). 2024 Sep 29;29(10):p346. https://doi.org/10.31083/j.fbl2910346.

Ninla-Aesong P, Kietdumrongwong P, Neupane SP, Puangsri P, Jongkrijak H, Chotipong P, Kaewpijit P. Relative value of novel systemic immune-inflammatory indices and classical hematological parameters in predicting depression, suicide attempts and treatment response. Sci Rep. 2024 Aug 16;14(1):19018. https://doi.org/10.1038/s41598-024-70097-z.

Orum MH, Kara MZ, Egilmez OB. Mean platelet volume and neutrophil to lymphocyte ratio as parameters to indicate the severity of suicide attempt.

J Immunoassay Immunochem. 2018;39(6):pp647–659. https://doi.org/10.1080/15321819.2018.1529682.

Pethő B, Kovács MÁ, Simon D, Tóth T, Hajnal AS, Csulak T, Hebling D et al. Investigation of peripheral inflammatory biomarkers in association with suicide risk in major depressive disorder. Front Psychiatry. 2024 Jan 29;15:1321354. https://doi.org/10.3389/fpsyt.2024.1321354.

Uma, BM, Bondade, S and Rao, SPK. C-reactive protein and neutrophil leucocyte ratio in depressive disorder: a hospital-based cross-sectional study. Archives of Psychiatry and Psychotherapy. 2022;24(2):pp13–20. https://doi.org/10.12740/APP/143022.

Velasco Á, Rodríguez-Revuelta J, Olié E, Abad I, Fernández-Peláez A, Cazals A, Guillaume S, et al. Neutrophil-to-lymphocyte ratio: a potential new peripheral biomarker of suicidal behavior. Eur Psychiatry. 2020 Feb 17;63(1):e14. https://doi.org/10.1192/j.eurpsy.2019.20.

World Health Organization, 2025. Suicide. https://www.who.int/news-room/fact-sheets/detail/suicide (accessed on 16 February 2025).

Zalsman G, Hawton K, Wasserman D, van Heeringen K, Arensman E, Sarchiapone M, Carli V and others. Suicide prevention strategies revisited: 10-year systematic review. Lancet Psychiatry. 2016 Jul;3(7):pp646–59. https://doi.org/10.1016/S2215-0366(16)30030-X.

Zheng Q, Liu J, Ji Y, Zhang Y, Chen X, Liu B. Elevated levels of monocyte-lymphocyte ratio and platelet-lymphocyte ratio in adolescents with non-suicidal self-injury. BMC Psychiatry. 2022 Sep 19;22(1):p618. https://doi.org/10.1186/s12888-022-04260-z.