



Brief Communication

Psychological impact of first admission with cardiovascular disease in a tertiary hospital in Oman

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المخلص

أهداف البحث: ترتبط أمراض القلب والأوعية الدموية بتأثيرات نفسية كبيرة يمكن أن تكون لها تأثير سلبي على التوقعات طويلة الأجل. هدفت هذه الدراسة إلى تحديد التأثير النفسي لأول قبول مستشفى مع متلازمة الجلطة القلبية الحادة أو القصور القلبي الاحتقاني في السكان العمانيين البالغين.

طرق البحث: كانت هذه دراسة استقصائية مقطعية تستخدم مقياس القلق والاكتئاب في المستشفى. تم إشراك المرضى من أقسام الأمراض القلبية والطبية في المستشفى لدينا. تم استبعاد الأشخاص الذين تمت إضافتهم إلى المستشفى للشكاوى المماثلة. تم تقديم الاستبانة بين اليوم الثالث والسابع من قبولهم، بمجرد أن يكونوا مستقرين سريريًا.

النتائج: تم تضمين ما مجموعه 116 مريضاً (متوسط العمر 60.3+13.8 سنة)؛ 78 ذكور (67.8%)؛ 52 مريضاً مع متلازمة الجلطة القلبية الحادة و64 مريضاً مع مرض القصور القلبي الاحتقاني في الدراسة. 45 (38.8%) من المرضى كان لديهم قلق متوسط إلى شديد و32 (27.6%) كان لديهم اكتئاب متوسط إلى شديد. كان الأشخاص الذين يعانون من القلق الشديد أصغر سناً. لم يكن هناك أي عوامل أخرى يمكن أن تتنبأ بالقلق أو الاكتئاب. كان لدى الأشخاص الذين يعانون من القصور القلبي الاحتقاني نسبة أكبر من الأشخاص الذين يعانون من الاكتئاب الشديد (31.4%). لم تكن هناك اختلافات أخرى بين الأشخاص الذين يعانون من متلازمة الجلطة القلبية الحادة أو القصور القلبي الاحتقاني.

الاستنتاجات: يعاني نسبة كبيرة من المرضى الذين يتم قبولهم في مستشفانا في عمان، من أمراض القلب والأوعية الدموية من القلق الشديد والاكتئاب. يجب أن يكون الأطباء المعالجون ومقدمو الرعاية أكثر انفتاحاً على تحديد هؤلاء المرضى

ويجب اتخاذ خطوات لمعالجة رفاهيتهم النفسية إلى جانب الإدارة الطبية لمرضهم.

الكلمات المفتاحية: مرض الشريان التاجي؛ قصور القلب؛ الأوعية الدموية؛ القلق؛ الاكتئاب

Abstract

Background and objectives: Cardiovascular diseases (CVD) are associated with substantial psychological effects that can adversely influence long term prognosis. The aim of this study was to determine the psychological effect of the first hospital admission for acute coronary syndrome (ACS) or congestive heart failure (CHF) in an adult Omani population.

Methods: This cross-sectional questionnaire based study used the Hospital Anxiety and Depression Scale. Patients were recruited from the in-patient cardiology and medical wards of our institution. Patients with a prior hospital admission for CHF and ACS were excluded. The questionnaire was administered between days 3 and 7 after admission once patients were clinically stable.

Results: The study included 116 patients (mean age 60.3 + 13.8 years; 78 (67.8%) men), comprising 52 patients with ACS and 64 patients with CHF. Based on the scores, a total of 45 (38.8%) patients had moderate to severe anxiety, and 32 (27.6%) had moderate to severe depression. Patients with severe anxiety tended to be younger, and no other factors predicted anxiety or depression. The proportion of patients with severe depression was higher among patients with CHF (31.4%), and no other differences were observed between patients with ACS or CHF.

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Conclusion: A substantial proportion of patients admitted to our institution in Oman with CVD had severe anxiety and depression. Treating physicians and caregivers should be more open to identifying these patients, and steps should be taken to address their psychological wellbeing along with the medical management of their illness.

Keywords: Anxiety; Cardiovascular disease; Coronary artery disease; Depression; Heart failure

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Introduction

Cardiovascular diseases (CVDs) encompass a wide spectrum of conditions such as congestive heart failure (CHF), arrhythmias, and ischemic heart disease (IHD). CVDs are associated with high morbidity and mortality, and account for a high proportion of hospital admissions.^{1,2} Globally, in 2019, more than half a billion people were estimated to have some form of CVD, and CVD accounted for approximately 18.6 million deaths.² The incidence of CVD is increasing and has been estimated to be responsible for more than 23 million deaths by 2030.¹

The CHF course often requires repeated hospitalization and prolonged hospital stays. More than 37.7 million individuals globally have CHF, and approximately 5%–42% are hospitalized each year.³ As a result of repeated hospitalizations and physical restrictions, CHF can cause severe psychological distress in patients.⁴ Similarly, patients with IHD, particularly after hospital admission for their first heart attack, can have substantial stress and anxiety regarding their illness and its implications, including effects on their future lifestyle, job, career, and insurance.⁵

The psychological effects of IHD or CHF, and the importance of eliciting this information, have been well documented. The reported incidence of severe depression and anxiety after hospitalization for ACS or heart failure ranges from 10% to 30%, but rises to almost 50% when mild anxiety or depression are included.^{6–8} Anxiety and depression have been shown to be an independent risk factor for poorer prognosis in these patients over long term: studies have reported an approximately two-to three-fold increase in major adverse cardiac events over 1–2 years' follow-up in patients with high anxiety and depression scores.⁹ Despite a wealth of available information, the psychological aspects of CVD, as with those of most illnesses, are often ignored by treating clinicians.^{10,11} The reasons for this lack of attention have not been studied but may include a lack of awareness, lack of training, and perhaps even discomfort in discussing these aspects with patients.

Although multiple studies on CVD have been conducted in the Gulf region, studies specifically focusing on psychological effects are lacking. Socio-economic status, social support received from family members, and cultural aspects of life in the Gulf region differ from those in the Western

world and even other Asian countries. However, whether these factors have a bearing on the psychological welfare of patients hospitalized with CVD remains unclear. Thus, this study was aimed at determining psychological effects in patients hospitalized for either acute coronary syndrome (ACS) (acute myocardial infarction (MI) or unstable angina) or CHF at a tertiary care hospital in Muscat, Oman. We also sought to determine factors potentially influencing the psychological wellbeing of these patients.

Materials and Methods

This cross-sectional study enrolled eligible patients admitted to the medical wards at the Sultan Qaboos University Hospital over 6 months from July to December of 2020. The Hospital Anxiety and Depression Scale (HADS) questionnaire was administered to participants to assess their anxiety and depression levels. This study was approved by the ethics committee of the hospital (Ref: 1284, June 1, 2016). All patients provided informed consent before being enrolled in the study. The study was performed in accordance with the Declaration of Helsinki.

We included patients older than 18 years who met the criteria for CHF and/or ACS or MI during the study period. A diagnosis of heart failure or MI was made if patients met the European Society of Cardiology criteria for heart failure¹² or the fourth universal definition of MI, respectively.¹³ We included patients undergoing their first hospital admission for either condition and who were clinically stable. We excluded patients with coexisting debilitating illness, such as malignancy or other terminal illnesses; patients who were bedbound because of previous strokes or frailty; patients who were clinically unstable; patients previously diagnosed with depression (on the basis of a definitive diagnosis described in their case records) or who were already taking antidepressant medications; and patients with previous hospital admission for either CHF or IHD.

The questionnaire was administered once between day 3 and 7 after admission, after patients became clinically stable. Patients were asked to complete the questionnaire by themselves from the privacy of their hospital bed (cardiology ward or medical ward or coronary care unit) with no relatives or staff nearby. For those who were unable to read, the questionnaire was read by an independent staff member who was not involved in the routine care of the patient, to avoid bias.

To assess levels of anxiety or depression, we used the HADS questionnaire, a self-administered questionnaire developed almost 30 years ago by Zigmond and Snaith.¹⁴ The HADS questionnaire has been extensively used and validated to assess anxiety and depression in hospital settings. It consists of seven questions regarding anxiety and seven questions regarding depression. We chose this questionnaire because of its ease of administration and prior validation.

This questionnaire consists of two scales: an anxiety scale (seven items) and a depression scale (seven items). A 4-point scale for anxiety (0 = not at all; 1 = from time to time, occasionally; 2 = often; and 3 = most of the time) and for depression (0 = definitely as much; 1 = not quite so much; 2 = only a little; and 3 = hardly at all) was used in this

questionnaire. The total score was calculated as follows: normal = 0–7; borderline abnormal = 8–10; and abnormal = 11–21. Higher scores indicated severe anxiety and depression. During the administration of the questionnaire, patients were asked to assess each problem according to their experience. An Arabic version of the HADS score is freely available and has been validated in a different setting.^{15–17} Because this instrument was previously validated and has been used extensively, we did not perform revalidation. Cronbach's alpha for consistency in the current study was $\alpha = .85$ for HADS-A, $\alpha = .81$ for HADS-D, and $\alpha = .89$ for the entire scale.

Sample size was calculated with the formula for cross-sectional studies, $N = Z^2(1-P)/d^2$, where n is the sample size, Z is the level of confidence (95% herein), d is the level of precision (0.05 herein), and p the expected prevalence (demonstrated in previous studies to be approximately 20%). With this formula, a sample size of 61.4 was obtained.

Analysis was performed in Statistical Package for the Social Sciences software, version 23. Data are expressed as number (percentage) or mean \pm standard deviation or median (interquartile range) as appropriate. Student's t-test or

Mann–Whitney test were used to determine significance, as appropriate. Chi-square test was used to determine significance in grouped data. Binary logistic regression was performed by using severe anxiety or severe depression as the endpoint, and the other variables as possible predictors. A p value of <0.05 was considered significant.

Results

A total of 130 patients were approached to participate in the study, of whom 122 returned the questionnaire (response rate 93.8%). Six questionnaires were excluded because of incomplete or unclear responses. Consequently, 116 patients (mean age 60.3 ± 13.8 years; 78 (67.8%) men) were included in the final analysis. Most of the cohort was married, and more than half (54.4%) had studied until secondary school or beyond. The prevalence of diabetes (63%) and hypertension (75%) was high. The median number of household members was six (range 4–9). The cohort included 52 patients (mean age 61.2 ± 13.7 years; 69.2% men) with ACS and 64 patients (mean age 59.6 ± 14 years; 65.6% women) with CHF. The baseline characteristics of patients with ACS

Table 1: Demographic features of the patients.

	Total cohort (n = 116)	Acute coronary syndrome (n = 52)	Heart failure (n = 64)	P value
Age (years)	60.3 \pm 13.8	61.33 \pm 13.7	59.6 \pm 14	0.3*
Sex				
Male	78 (67.8%)	36 (69.2%)	42 (65.6%)	
Female	38 (32.2%)	16 (31.8%)	22 (34.4%)	0.68
Married	99 (85.3%)	45 (86.5%)	54 (84.3%)	0.74
Education				
Primary school or below	53 (45.6%)	22 (42.3%)	31 (48.4%)	
Secondary school or above	63 (54.4%)	30 (57.7%)	33 (51.6%)	0.32
Employed				
Yes	36 (31.1%)	19 (36.5%)	17 (26.5%)	0.18
No/retired/homemaker	80 (68.9%)	33 (73.5%)	47 (73.5%)	
Diabetes	74 (63.7%)	32 (61.5%)	42 (65.6%)	0.64
Hypertension	87 (75%)	48 (92.3%)	39 (60.9%)	<0.001
Hypercholesterolemia	37 (31.8%)	20 (38.4%)	17 (26.5%)	0.18
Members of household	6 (4–9)	8 (5–10)	5.5 (4–8)	0.01
DSS	8 (5–11)	8 (3–10)	9 (6–11)	0.14
ASS	8 (5–14)	8 (5–13)	9 (6–16)	0.15

ASS, Anxiety scale score; DSS, Depression scale score.

Analysis by chi-square test except * which indicates analysis by Student's t-test.

Table 2: Differences in anxiety and depression scores.

	Total cohort (n = 116)	Acute coronary syndrome (n = 52)	Heart failure (n = 64)	P value
Anxiety score category				
Normal	50 (43.2%)	24 (46.2%)	26 (40.6%)	
Mild	21 (18.1%)	9 (17.3%)	12 (18.7%)	
Moderate	19 (16.3%)	13 (25%)	6 (9.3%)	
Severe	26 (22.4%)	6 (11.5%)	20 (31.4%)	0.02
Depression score category				
Normal	48 (41.3%)	25 (48%)	23 (35.9%)	
Mild	36 (31.1%)	14 (26.9%)	22 (34.3%)	0.5
Moderate	26 (22.4%)	10 (19.4%)	16 (25%)	
Severe	6 (5.2%)	3 (5.7%)	3 (4.8%)	

Analysis by chi-square test.

Table 3: Analysis based on the anxiety score.

	Mild or no anxiety* (n = 71)	Moderate to severe anxiety** (n = 45)	P value
Age (years)	61.3 ± 12.4	58.8 ± 15.1	0.008***
Sex			
<i>Male</i>	52 (73.2%)	26 (57.7%)	
<i>Female</i>	19 (26.8%)	19 (42.3%)	0.08
Married	61 (85.9%)	37 (82.2%)	0.4
Education			
<i>Primary school or below</i>	41 (57.7%)	31 (68.8%)	
<i>Secondary school or above</i>	30 (42.3%)	14 (31.2%)	0.2
Employed			
<i>Yes</i>	10 (14%)	6 (13.3%)	
<i>No/retired/homemaker</i>	61 (86%)	39 (86.7%)	0.8
Diabetes	44 (61.9%)	30 (66.6%)	0.6
Hypertension	50 (70.4%)	37 (82.2%)	0.1
Hypercholesterolemia	24 (33.8%)	19 (42.3%)	0.6
Members of household	7 ± 3	7 ± 4	0.4
Diagnosis			
<i>Myocardial infarction</i>	33 (46.4%)	19 (42.3%)	
<i>Heart failure</i>	38 (53.6%)	26 (57.7%)	0.6

*Score less than 8; **Score 8 or above.

Analysis by chi-square test except *** which indicates analysis by Student's t-test.

and CHF were similar, although the group with ACS included more patients with hypertension and with larger households (Table 1).

The median (IQR) anxiety score for the entire group was 8.5,⁵⁻¹⁴ and the median (IQR) depression score for the entire group was 8.5.⁵⁻¹¹ Analysis on the basis of the total score indicated that 71 (61.2%) patients had either a normal or mild anxiety (score <8), and 45 (38.8%) patients had a moderate to severe anxiety (score >8). Similarly, 84 (72.4%) patients had normal or mild depression (score <8), and 32 (27.6%) patients had moderate to severe depression. Table 2 shows the differences between the groups with ACS and CHF. The group with ACS had a non-significantly higher percentage of patients with normal anxiety scores (46.2% vs 40.6%

$p = 0.5$), whereas the heart failure group had a much higher percentage of patients with severe anxiety (31.4% vs 11.5%; $p = 0.01$). However, when the moderate and severe categories were considered together, no difference was observed between groups.

The group of patients admitted with ACS also had a higher percentage of patients with normal depression scores, but the difference was not significant (48% vs 35.9%; $p = 0.1$); however, the total normal and mild depression scores were similar in both patient groups.

The patients with moderate to severe anxiety were younger than those with mild or no anxiety (Table 3). However, no other factors were associated with moderate or severe anxiety or depression (Tables 3 and 4). As expected, the anxiety and depression scores correlated

Table 4: Analysis based on depression score.

	Mild or no depression* (n = 84)	Moderate to severe depression ** (n = 32)	P value
Age (years)	60 ± 13	61 ± 15	0.28***
Sex			
<i>Male</i>	60 (71.4%)	18 (56.2%)	
<i>Female</i>	24 (28.6%)	14 (43.8%)	0.12
Married	73 (86.9%)	25 (78.1%)	0.1
Education			
<i>Primary school or below</i>	53 (63.1%)	19 (59.3%)	
<i>Secondary school or above</i>	31 (36.9%)	13 (40.7%)	0.18
Employed			
<i>Yes</i>	12 (14.2%)	4 (12.5%)	
<i>No/retired/homemaker</i>	72 (85.8%)	28 (87.5%)	0.8
Diabetes	53 (63.1%)	21 (65.6%)	0.8
Hypertension	61 (72.6%)	26 (81.2%)	0.3
Hypercholesterolemia	33 (39.2%)	10 (31.2%)	0.67
Members of household	7.3 ± 4	6.9 ± 3.4	0.1
Diagnosis			
<i>Myocardial infarction</i>	39 (46.4%)	13 (40.7%)	
<i>Heart failure</i>	45 (53.6%)	19 (59.3%)	0.5

*Score less than 8; **Score 8 or above; analysis by chi-square test except *** which indicates analysis by Student's t-test.

strongly with each other ($r = 0.55$, $p < 0.001$). However, the other continuous variables (age and number of family members) did not correlate with the anxiety and depression scores in either the entire cohort or in the individual disease groups.

Binary logistic regression indicated that the only factor that predicted severe anxiety was married status ($p = 0.03$), but no factors predicted severe depression.

Discussion

The psychological effects of hospitalization are recognized as an important part of the evaluation and management of patients with any condition.^{18–20} This aspect is particularly true for patients with CVDs such as CHF and ACS. Multiple studies and meta-analyses of studies worldwide have demonstrated a high prevalence of anxiety and depression in patients admitted for cardiovascular illnesses, such as heart failure and ACS. A follow-up study by Murphy et al. observed the highest prevalence of anxiety (44%) and depression (22%) at the time of hospitalization with an ACS, and has found that these levels remained high (27% and 15%, respectively) 12 months post discharge.⁷ In a similar study by Polikandrioti et al. almost 50% of patients with heart failure had moderate to severe anxiety during their hospital stay.²¹ Recent meta-analyses have reported rates of anxiety and depression ranging from 5.5% to 58.2% and 20%–35%, respectively, during hospitalization for ACS.^{22–24} Meta-analyses for anxiety and depression after hospitalization for heart failure have reported similar rates ranging from 25% to 54% and 19.3%–33.6% for anxiety and depression, respectively.^{25,26} In our study, more than one-third of patients admitted for CVD had moderate to severe anxiety and depression; this fraction is fairly high and is consistent with that in previous studies.

Studies and meta-analyses have also demonstrated that the presence of anxiety and depression in patients with heart failure and ACS is a poor prognostic factor. Depression in patients with heart failure has been associated with a nearly twofold increase in mortality during follow-up.^{26,27} Beyond the poor prognostic effects of anxiety and depression, these psychological effects affect patients' medication adherence and overall quality of life.^{28,29} Quality of life is an important aspect in the management of these patients yet is often ignored.

Despite an abundance of data, psychological aspects among patients admitted with CVD often tend to be ignored.^{10,11,30} A study from the Netherlands has revealed that, although many hospital physicians acknowledge that the psychological wellbeing of patients is important, only approximately half actively seek to assess anxiety or depression in their patients, and physicians often focus on only the physical aspects of the disease.³¹ A similar study from China has revealed the reluctance of hospital physicians to perform psychological assessments and to be involved in the emotional care of their patients.³² In a survey of non-psychiatric Japanese physicians, 100% of participants felt uncomfortable in addressing depression, whereas more than half felt that depression and psychological issues should be handled by psychiatrists or specialist nurses.³³ This sentiment has also been reflected in many published studies from the Middle East regarding risk

factor control and the physical aspects of CVD; however, almost no studies have been conducted on the psychological aspects of CHF and MI.^{34–36} Because our study indicated a high prevalence rate of anxiety and depression, physicians and specialist nurses should be more alert to signs of anxiety and depression in patients with CVD.

Depression in patients with CHF can remain unobserved because of the similarities between symptoms of CHF and depression, such as loss of attention or concentration, and sleep disturbance.^{28,37} Therefore, patients with CHF should be routinely screened for depression through a psychological tool such as the HADS questionnaire. This aspect is important to determine their perceptions regarding their physical, psychological, social, and emotional domains, and to further improve clinical outcomes and overall disease management. Explaining diagnosis and prognosis to patients in a sympathetic and understanding manner can help ease stress and anxiety, because many patients might still be in denial or might be unable to grasp the enormity of their diagnosis.³⁸

Many factors affect patients' psychological wellbeing during hospitalization. Social support is an important factor.³⁹ However, we did not find any correlation between the number of people in the household or marital status with anxiety and depression scores. Moreover, we observed no correlations between any of the demographic factors such as education status or employment status and the anxiety and depression scores either. However, most of the patients in our study were either retired/unemployed or homemakers. These demographic features might not have had any immediate effects on their psychological status because the patients were still hospitalized when the survey was performed. These factors might have had greater effects on patients after discharge, when patients returned to their own homes and usual activities. Follow-up studies would have been beneficial to assess how these psychological effects change over time.

One interesting finding in our study was that younger patients had higher anxiety levels than older patients. This finding has also been observed in a study by Moser et al.,⁴⁰ who have found that older patients tend to be more accepting of their diagnosis, and to make more adjustments to their lifestyles and daily routines to cope with their symptoms. Younger patients, in contrast, try to continue with their current lifestyle and therefore may encounter more anxiety associated with their work and daily routines.⁴⁰

Studies on the psychological effects of hospitalization in the Middle East are sparse. Although studies have examined this subject in other Asian countries, the demographics, culture and socio-economic status differ in Middle Eastern countries; hence, the study findings cannot be generalized across regions. A study from Jordan in patients after MI has revealed higher levels of depression among female than male patients.⁴¹ The same team has also found high anxiety in the same population group.⁴² A similar study from KSA has found depression in more than half of patients with heart failure. Our study findings are fairly similar to those in these reports.

This study has several limitations. First, this was a single center prospective study. We included only patients during their first hospital admission for their condition. Patients with repeated admissions might have different psychological profiles. The HADS score reflects recent depression and

anxiety in hospitalized patients and hence was used in this study. We sought to determine the current levels of anxiety and depression in these patients during their first hospitalization. Follow-up should be performed to assess whether the acute depression and anxiety caused by hospitalization might improve after discharge, when patients return to their routine environments and families.

The questionnaire was typically administered between days 3 and 7 of the hospital stay (after patients became clinically stable). However, the psychological effects of admission might have changed within the first few days of the hospital stay. Although we excluded patients with a previous diagnosis of depression, patients with undiagnosed depression could have been missed, thus potentially influencing the final results. Our sample size, although adequate according to our sample size calculations, was small, thus potentially explaining the lack of correlation between anxiety and depression and the various risk factors. The lack of a control group comprising patients admitted for another illness or for an elective procedure was another limitation; the use of a control group might have revealed the effects of MI or CHF more clearly.

Our findings have clear implications for the management of patients in the study with CVD. Physicians and caregivers must critically spend time with patients admitted with CVD to assess their psychological status. Studies have demonstrated that adequate cardiac rehabilitation after admission mitigates the adverse psychological effects of hospitalization in these patients to some extent. Our study also lays groundwork for further larger studies in Oman regarding the psychological effects of hospitalization, and the determination of factors that might help decrease anxiety and depression in these patients. Larger prospective studies are also required to assess the beneficial effects of specific targeted interventions aimed at decreasing anxiety and depression in these patients, and assessing the effects on long term prognosis.

Conclusion

Substantial anxiety and depression were present in almost one-third of patients during their first hospital admission for CHF or ACS. Anxiety and depression in these patients are associated with poorer quality of life and prognosis. Assessment of the psychological needs of these patients must be prioritized and, when possible, support should be offered.

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Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

This study was approved by the ethics committee of the Sultan Qaboos University Hospital, Muscat, Oman (Ref:

1284, June 1, 2016). All patients provided informed consent before being enrolled in the study. The study was performed in accordance with the Declaration of Helsinki.

Authors contributions

The authors confirm that all people designated as authors qualify for authorship and have checked the article for plagiarism. If plagiarism is detected, all authors will be held equally responsible and will bear the resulting sanctions imposed by the journal thereafter. All authors met all of the following criteria: * Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work AND * Drafting the work or revising it critically for important intellectual content AND * Final approval of the version to be published AND * Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. AA, GA, HA, and MA- conceived and designed the study, conducted research, provided research materials, and collected and organized data. SN analyzed and interpreted data. AA and SN wrote the initial and final drafts of the article, and provided logistic support. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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