

Biopsychosocial Factors Associated with Chronic Low Back Pain in Burundi

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Abstract

Background and purpose: Chronic low back pain (CLBP) is an increasing burden worldwide. The biopsychosocial factors associated with CLBP have not yet been investigated in Burundi. The aim of this study was to investigate the biopsychosocial factors that influence the CLBP-related outcomes of self-reported pain intensity, limitations in activities of daily living (ADLs), and social participation (SP) restrictions in a Burundian sample population.

Methods: We carried out a cross-sectional study of 58 adults with non-specific CLBP from Bujumbura city. Measures of pain intensity, ADL limitations, SP restrictions, and biopsychosocial factors were analyzed with descriptive, inferential, and correlational statistics.

Results: The biopsychosocial factors found to be associated with CLBP outcomes were body mass index (BMI), education level, gender, healthcare coverage, depression, trunk muscles endurance, and perceived exertion. Self-reported pain intensity was found to be significantly associated with a sub-university education level, depressiveness, high perceived exertion, low spine extensor muscles endurance, and low abdominal muscles endurance (p range, <0.001 to <0.05). Greater disability, in terms of ADL limitations and SP restrictions, was associated with sub-university education level, female gender, lack of healthcare coverage, high BMI, depressiveness, low spine extensor muscles endurance, and low abdominal muscles endurance, and high perceived exertion (p range, <0.001 to <0.05).

Conclusions: This study provides evidence of biopsychosocial factor associations with CLBP-related pain, ADL limitations, and SP restrictions in Burundi. Significantly associated factors were consistent with factors that have been associated with CLBP outcomes in high-income countries, with the addition of lack of healthcare coverage as a significant factor in Burundi. Evidence-based management of CLBP in Burundi should incorporate a biopsychosocial model.

Background

Low back pain (LBP) is the leading cause of disability¹ and accounts for the most years lived with disability² worldwide. According to linear-fit estimates based on data from the last 20 years, the incidence, prevalence, and disability-adjusted life years of LBP are expected to increase by ~1.4-fold by the year 2050.³ Population ageing and population growth are contributing to the increasing global burden of LBP, particularly in low- and middle-income countries that have overburdened health and social systems and that are less equipped to support disabled citizens.^{4,5} The lifetime, annual, and point prevalence rates of LBP in Africa are higher than average global LBP prevalence rates.⁶

In a 2015 systematic review examining the worldwide prevalence of chronic LBP (CLBP) in particular, Meucci et al.⁵ found that 4.2% of adults 24–39 years of age and 19.6% of adults 20–59 years of age suffer from CLBP. Etiologically, CLBP has been associated with psychosocial and biophysical factors, comorbidities, and pain-processing mechanisms.^{4,7} Biopsychosocial modeling, which considers biological, psychological, and social factors and their interactions, is valuable for providing information that can be used to promote good health and prevent illness.⁸ Several studies^{9–15}, mostly from high- and middle-income countries, have investigated the biopsychosocial factors associated with the development of CLBP. Variance in the findings among these studies may reflect study sample differences in culture and beliefs, as well as national differences in social and health systems.¹⁶ Individual factors that have been associated with CLBP risk include age, being female, a low level of education, a high body mass index (BMI), a sedentary lifestyle, smoking, anxiety, depression, fear avoidance beliefs, maladaptive perceptions of illness, lack of social support, and work-related dimensions.^{9–15,17,18}

Very few studies^{10,17,18} have investigated CLBP-associated biopsychosocial factors in Africa. No such studies have been carried out in Burundi specifically. The aim of this study was to investigate the biopsychosocial factors that influence self-reported pain intensity, limitations on activities in daily life (ADLs), and social participation (SP) restrictions related to CLBP in a Burundian population sample with the long term goal of contributing to the improvement of CLBP management in Burundi.

Methods

Study design and ethical consideration

We conducted a cross-sectional study in Bujumbura, the largest city and economic capital of Burundi. We collected data from patients diagnosed with CLBP at a single point in time. The study protocol was approved by the National Ethics Committee (CNE/20/2019).

Patients affirmed their agreement to participate by signing a consent form.

Setting

Recruitment started in September of 2019. The enrollment and assessment procedures took place at the Centre National de Référence en Kinésithérapie et Réadaptation médicale (CNRKR), Bujumbura, in Burundi. Data collection started in November 2019 and was completed in February 2020.

Participants

Volunteer participants were recruited through advertisements about the study and by consulting admission records of hospitals and rehabilitation centers in Bujumbura. The principal investigator screened potential participants by phone. Those who were eligible and interested made appointments to come to the CNRKR, where they signed a written consent form before undertaking the study assessments. The inclusion criteria were: having a diagnosis of non-specific CLBP; being 18–65 years old; Burundi residence; and mobility sufficient to enable walking and sit-to-stand transition without assistance. LBP was defined as chronic when the pain had been persistent for at least 12 weeks¹⁹ and nonspecific when the pain was not attributable to a recognizable pathology (e.g., infection, tumor, osteoporosis, rheumatoid arthritis, fracture, inflammation).²⁰ The exclusion criteria were: pregnancy; any sign of serious spinal pathology (e.g., cancer, cauda equina lesion); radicular pain indicative of nerve root compression; severe spinal stenosis; spondylolisthesis; and fibromyalgia. The final study cohort included 58 adult patients with CLBP.

Data collection and variables descriptions

The principal investigator (I.N.) and two clinician co-authors conducted the evaluations. Before data collection, the evaluators were trained to standardize instrument administration. Because some participants lacked reading fluency, the assessments were interviewer-administered and the measures were adapted to Kirundi via evidence-based guidelines.²¹ Individual and psychosocial outcome data were collected. CLBP related data were collected according to the International Classification of Functioning, Disability, and Health.

Biopsychosocial factors

Individual characteristics

The sociodemographic variables analyzed were age, gender, weight, height, BMI, marital status, profession, education level, healthcare coverage, and previous treatments (e.g., medications, physical therapy).

Depression

CLBP-associated depression was measured with Beck Depression Inventory (BDI)-II, a 21-item questionnaire designed to measure severity of depressiveness. Each item references a symptom in four statements worth 0, 1, 2, and 3 points, respectively; the respondent chooses the statement that best describes the severity of his/her symptoms over the past 2 weeks.^{22,23} BDI-II scores (range, 0–63) were obtained by summing the number of each marked statement and interpreted as follows: <10, no/minimal depression; 10–18, mild to moderate depression; 19–29, moderate to severe depression; and 30–63, severe depression.²⁴

Fear avoidance beliefs

The Fear-Avoidance Beliefs Questionnaire (FABQ)²⁵ was used to measure how participants' fear avoidance beliefs about physical activity and work may affect their LBP. The FABQ consists of 16 items in which agreement with the statement in each item is rated on a 7-point Likert scale (0 = completely disagree, 6 = completely agree). The FABQ consists of a four-item physical activity subscale

(FABQ-PA; maximum score 24), a seven-item work subscale (FABQ-Work; maximum score 42), and five additional informational/categorical items.

Physical fitness

- Muscle endurance

The Shirado test²⁶ of static endurance of the abdominal muscles was applied. The participants lay in a supine position with their hips and knees bent at 90°, calves resting on a stool or chair, and arms crossed over the chest with their hands resting on their shoulders. They were asked to lift their scapulas off the ground and maintain this crunch position as long as possible. We noted the held time in seconds without encouraging the subject or specifying the time during the test. The test ended for each participant when his or her scapulas went down due to fatigue or discomfort, or after a maximum duration of 240 s.

The Sorensen test was applied to assess endurance of the trunk extensor muscles. The participants lay on the examining table in the prone position with the upper edge of the iliac crests aligned with the edge of the table. Their lower bodies were fixed to the table with their arms folded across their chest, and they were asked to maintain their upper bodies in a horizontal position isometrically.^{27,28} The time during which each participant held his/her upper body straight and horizontal was recorded. The test was stopped if the trunk went down due to fatigue or discomfort, or after a maximum duration of 240 s.

- Perceived exertion

To assess perceived exertion, we applied Borg's category ratio-scale (Borg CR10)²⁹, a common scale used to assess sensory perceptions, subjective symptoms, and feelings. The Borg CR10 was completed at the end of each stage of a step test by asking the participants to rate their perception of physical effort or exertion after 2 min of stepping up and down. The step test³⁰ was organized according to submaximal, gradational, and discontinuous principles. We used four wooden platforms of different heights (0.07, 0.12, 0.19, and 0.24 m). Patients were instructed to step up and down for 2 min at a frequency of 84 steps/min (given by a metronome). Patients were allowed to rest seated on a chair for 2 min after each stage. They were encouraged to perform as many stages as they could.

CLBP related outcomes

Pain

Participants were asked to report the intensity of their pain on an 11-point numerical rating scale (NRS) ranging from 0 to 10, wherein 0 represented the absence of pain and 10 represented the worst pain imaginable.^{31,32} In accordance with Jansen et al.'s recommendations, we adopted the following NRS interpretation rubric: 1–4, mild pain; 5–6, moderate pain; and 7–10, severe pain.³³

Activity limitations

ADL limitations were measured with the Roland Morris Disability Questionnaire (RMDQ) and the Canadian Occupational Performance Measure (COPM). The RMDQ³⁴ consists of 24 items that refer to different ways that LBP may affect activities. Participants ticked the limitation items that applied to themselves. The RMDQ scores were the number of ticked items, such that higher RMDQ scores indicate greater ADL limitations, and thus greater disability. The COPM³⁵ is a patient-specific measure intended to determine what problems are having the greatest impact on occupational performance in the areas of self-care, productivity, and leisure. During a semi-structured interview, the patient identified important activities that are difficult to perform, and then rated the importance of each activity on a 1–10-point scale. Next, they rated their performance in the five activities rated as most important on a 1–10-point scale, with higher scores reflecting better performance in ADLs (i.e., less limitations).

Restrictions in participation

Restrictions in SP were assessed with a 5-Item Pain Disability Index (5-IPDI)³⁶ which consists of the first five items (family/home responsibilities, recreation, social activity, occupation, and sexual behavior) of the 7-Item Pain Disability Index³⁷. The index items were rated on a 0–10 numeric scale from 0 (no participation) to 10 (maximum participation), with possible total scores ranging from 0 to 50 such that higher scores reflect greater restrictions in SP participation, and thus greater disability.

Data analysis

The data were analyzed in SPSS, version 27 software. For each study variable, the normality of data was verified by means of histograms and Q-Q plots. Descriptive statistics were used to present the study sample's biopsychosocial and CLBP outcomes. Outcomes are reported as means with standard deviations for continuous and normally distributed variables, medians with interquartile ranges for ordinal and non-normally distributed variables, and numbers of cases with percentages for nominal variables. We used Mann-Whitney and Kruskall-Wallis tests to investigate the impact of nominal biopsychosocial factors on CLBP outcomes, and used Spearman correlation test to explore associations of quantitative biopsychosocial factors with CLBP outcomes. Correlation coefficient values were reported with *p*-values and interpreted as follows³⁸: 0.0–0.10, negligible; 0.10–0.39, weak; 0.40–0.69, moderate; 0.70–0.89, strong; and 0.90–1.0, very strong.

Results

Characteristics of the study participants

The characteristics of the 58 study participants with CLBP in terms of biopsychosocial factors are presented in Table 1. Notably, the majority of the sample were female, married, employed, and with a university level education. The majority of the participants had minimal depressiveness (median BDI-II score = 6) without a gender difference. The perceived exertion (median Borg CR10 score), abdominal endurance (mean Shirado test score), and trunk extensor endurance (mean Sorensen test score) data are also reported in Table 1. The study participants' CLBP outcomes, including self-reported pain intensity (NRS), ADL limitations (RMDQ and COPM), and SP restrictions (5-IPDI) are summarized in Table 2.

Table 1

Biopsychosocial factors, N=58

Biospsychosocial factors	N (%)	Biospsychosocial factors	Mean ± SD / Median [25; 75]
Sex		Age (years)	41.3±10.20
Female	34 (58.6)	Weight (kg)	72.4±13.15
Male	24 (41.4)	Height (cm)	1.65±0.08
Marital status		Body mass index (Kg.m ⁻²)	26.5±4.44
Married	43 (74.1)	Pain duration	4.0(2.00 ; 7.25)
Single	12 (20.7)	Shirado test	25.0±25.72
Divorced	1 (1.7)	Sorensen test	42.3±45.47
Widowed	2 (3.4)	Borg CR10 ⁺	4.0[2.00; 6.75]
Profession		BDI	6.0[3.00; 11.25]
Employee	39 (67.2)	FABQ-PA	7.0[0.00 ; 15.00]
Self-employed	9 (15.5)	FABQ-Work	12.5[4.00 ; 22.00]
Unemployed	10 (17.2)		
Education level			
Under university	21 (36.2)		
University	37 (63.8)		
Healthcare coverage	42(72.4)		
Previous medication	51(87.9)		
Previous physiotherapy	18(31.0)		

Outcomes are presented as Median [25; 75]

N⁺=53; N= Number of subjects

Borg CR10-2= Borg Category Ratio scale at the end of step test-stage 2; BDI= Beck Depression Inventory; FABQ-PA= Fear Avoidance Beliefs Questionnaire-Physical Activity

Table 2

Chronic low back pain outcomes

Outcomes, N= 58	Median [25; 75]	Minimum; Maximum
NRS	7.0 [5.38; 8.00]	0; 10
RMDQ	9.0 [7.00; 13.25]	4; 21
COPM	3.0 [2.20; 3.60]	0; 5.6
5-IPDI	28.0 [17.00; 33.00]	5; 50

N= Number of subjects

NRS= Numerical Rating Scale; COPM=Canadian Occupational Performance Measure; RMDQ=Roland and Morris Disability Questionnaire; 5-IPDI=5-Item Pain Disability Index

Association of biopsychosocial factors and CLBP outcomes

The results of our analyses of the relationships of categorical biopsychosocial factors with CLBP outcomes are reported in Table 3. Pain intensity ratings were not influenced significantly by gender or healthcare coverage. Compared to participants who had a university education, participants with less than a university level of education had higher pain intensity ratings and ADL limitations (higher RMDQ and lower COPM scores) but less SP restrictions (lower 5-IPDI scores) (all $p < 0.001$). On average, women had more ADL limitations (higher RMDQ and lower COPM scores) and more SP restrictions (higher 5-IPDI scores) than men. Participants without healthcare coverage had more ADL limitations and more SP restrictions than participants with healthcare coverage.

The results of our analyses of the relationships of quantitative biopsychosocial factors with CLBP outcomes are reported in Table 4. CLBP outcomes were found to have weak to moderate correlations with BMI, depressiveness, muscle endurance, and exertion perception. CLBP symptom severity was found to be positively correlated with BMI and depressiveness, and inversely related to physical fitness. That is, participants with high pain intensity on NRS ratings tended to have higher perceived exertion scores and lower muscle endurance scores. Meanwhile RMDQ scores (higher scores indicate greater CLBP-related disability) correlated directly with BMI ($\rho = 0.27$; $p < 0.05$), depressiveness ($\rho = 0.48$; $p < 0.01$), and exertion perception ($\rho = 0.47$; $p < 0.01$), while correlating inversely with muscle endurance measures (Shirado test, $\rho = -0.52$; $p < 0.001$; Sorensen test $\rho = -0.57$; $p < 0.001$). Similarly, SP restrictions (represented by 5-IPDI scores) correlated directly with BMI ($\rho = 0.27$; $p < 0.05$), depressiveness ($\rho = 0.45$; $p < 0.01$), and perceived exertion ($\rho = 0.44$; $p < 0.01$), while correlating inversely with muscle endurance measures (Shirado test $\rho = -0.33$, $p < 0.05$; Sorensen test, $\rho = -0.47$, $p < 0.01$).

Table 3

Chronic low back pain outcomes distribution according to study level, gender and healthcare coverage

Outcomes	Study level		Gender		Healthcare coverage				
	Under university (N=21)	University (N=37)	P value	Males (N=24)	Females (N=34)	P value	Healthcare coverage (N=42)	No healthcare coverage (N=16)	P value
NRS	8.0[7.00; 9.00]	6.0[5.00; 7.00]	<0.001	6.4[5.00; 8.00]	6.8[5.00; 8.00]	>0.05	6.25[5.75; 8.00]	7.0[5.12; 9.00]	>0.05
RMDQ	13.0[9.00; 17.00]	8.0[6.00; 11.50]	<0.001	8.0[6.00; 11.00]	11.4[8.00; 14.00]	<0.01	9.0[6.75; 12.00]	14.0[8.25; 17.50]	<0.05
COPM	2.2[5.40; 7.20]	3.4[3.00; 4.10]	<0.001	3.5[2.80; 4.40]	2.8[1.90; 3.30]	0.001	3.15[2.15; 3.80]	3.0[2.35; 3.35]	>0.05
5-IPDI	11.0[8.50; 14.50]	24.0[13.00; 29.50]	<0.001	22.3[15.00; 27.00]	30.0[24.00; 34.00]	<0.01	26.0[15.50; 31.25]	30.5[24.25; 30.50]	<0.05

Outcomes are presented as Median [25; 75]

N= Number of subjects

NRS= Numerical Rating Scale; COPM=Canadian Occupational Performance Measure; RMDQ=Roland and Morris Disability Questionnaire;

5-IPDI=5-Item Pain Disability Index

Table 4

Spearman correlation between low back pain outcomes and biopsychosocial predisposing factors (N=58)

Outcomes	BMI	BDI	Shirado test	Sorensen test	Borg CR10-2 ^a
NRS	0.06	0.40**	-0.29*	-0.36**	0.30*
RMDQ	0.27*	0.48**	-0.52**	-0.57**	0.47**
COPM	-0.05	-0.20	0.27*	0.25	-0.38**
5-IPDI	0.27*	0.45**	-0.33*	-0.47**	0.44**

*: correlation is significant at the 0.05 level (2-tailed)

**: correlation is significant at the 0.01 level (2-tailed)

N= Number of subjects; N^a=53

NRS= Numerical Rating Scale; RMDQ=Roland and Morris Disability Questionnaire; COPM=Canadian Occupational Performance Measure; 5-IPDI=5-Item Pain Disability Index; BMI= Body Mass Index; BDI= Beck Depression Inventory; Borg CR10-2= Borg Category Ratio scale at the end of step test-stage 2

Discussion

This study investigated biopsychosocial factors that may influence self-reported pain intensity, ADL limitations, and SP restrictions related to CLBP in a Burundian population sample. We found that these CLBP outcomes were significantly associated with BMI, gender, education level, and healthcare coverage, as well as with depressiveness, trunk muscle endurance, and perceived exertion scores. We observed more biopsychosocial factor associations with ADL limitations and SP restrictions than with pain intensity. BMI, gender, and healthcare coverage were not associated with CLBP-related pain intensity.

The present findings of participants with less than a university-level education having significantly greater pain intensity and more ADL limitations than were reported by participants with a university education are consistent with prior reports identifying lesser education as being associated with risk of LBP and associated disability.^{39, 40, 41} These associations could reflect variations in behavioral and environmental risk factors as well as variations in living and work conditions. For example, people without a university education are more likely to have jobs that are associated with lumbar spine strain, and are less likely to have adequate access to health services and to have developed adaptive stress coping strategies.^{41, 5} In contrast, highly educated persons are more likely to be in professional, managerial, or other skilled occupations that are generally less physically demanding and where there is more flexibility to eliminate pain-provoking job situations.⁴² However, the university educated group in our sample reported more SP restrictions than participants with less than a university education.

In the current study, we observed several gender effects indicating that the women in our sample had greater CLBP-related disability than men, including more ADL limitations (higher RMDQ and lower COPM scores) and more SP restrictions (higher 5-IPDI scores). However, consistent with the findings of Staikou et al. (2017)⁴³ and Girard-Tremblay et al. (2014)⁴⁴, we did not observe a gender difference in self-reported pain intensity. Greater CLBP-related disability in women might be related to their exposure to musculoskeletal loads during pregnancy and burdens associated with their domestic and professional tasks.⁵ Additionally, compared to married men in Africa, married African women tend to spend more time engaged in household work and thus generally have less leisure time for health-promoting physical activity.^{45, 46}

The present findings of greater CLBP-related disability (greater ADL limitations and SP restrictions) in participants without healthcare coverage, compared to those with healthcare coverage, may be explained by the former not receiving the healthcare services they need.^{47, 48} This finding underscores the need for less costly treatment options to fit the needs of such communities.⁴⁹

Our findings indicating that a high BMI was associated with greater CLBP-related disability (greater ADL limitations and SP restrictions) in our sample are consistent with similar associations reported in the literature.^{50–54} Correlations of BMI with CLBP-related disability and symptom severity may reflect biomechanical stress on the joints and spinal structures⁵², postural alterations⁵⁵, and higher levels of adipokines being secreted by enlarged fat cells inducing greater release of pain and proinflammatory cytokines.⁵⁶

Conversely, obesity can limit mobility and range of motion⁵⁷, which may lead to physical inactivity and functional limitations due to movement-associated discomfort and pain, as well as to mental distress. Physical activity is recommended together with limited calorie consumption for weight loss and maintenance^{58–60}, with aerobic exercise being more effective for weight reduction than resistance exercises.^{60, 61} Thus, physical inactivity may lead to further increases in BMI and worsening CLBP-related disability.

The present data showing that depressiveness correlated strongly with ADL limitations and SP restrictions, as well as with pain, are consistent with several recent publications^{62–64} reporting that, compared to patients without depression, depressed patients had, on average, a higher level of pain and a poorer quality of life. The directionality of the relationship between depression and CLBP is unclear and could be complex. Pain and depression are closely correlated from the perspectives of brain region involvement and neurological function. Specifically, neuroplasticity related to chronic pain may lead to depression⁶⁵ and depression may worsen pain behaviors.⁶⁶ Structural and functional changes in the hippocampus in particular have been implicated in the relationship between chronic pain and depression.⁶⁷

Our physical fitness-related data analysis results support the notion that good physical fitness may be protective against CLBP. Specifically, we found that measures of isometric muscle endurance of the back extensors and flexors were negatively related to pain intensity, ADL limitations, and SP restrictions. Previously, Bozorgmehr et al.⁶⁸ found that muscle endurance correlated with pain severity, but not disability level. Other studies^{28, 69, 70}, however, found that people with LBP tended to have reduced muscular endurance in the lumbar extensors, consistent with the present results. Additionally, poor core endurance has been found to be associated with nonspecific CLBP in collegiate athletes.⁷¹ It is not yet clear whether this relationship is due primarily to weak core muscles contributing to the development of back injuries and LBP, or back problems leading to weakening of core muscles.⁶⁹

Exertion is a measure of aerobic fitness. The participants in our sample who reported higher levels of perceived exertion during the step test had higher pain intensity levels as well as more ADL limitations and more SP restrictions. However, Wittink et al. (2002)⁷² found that aerobic fitness, indexed with maximum rate of oxygen consumption, was not significantly associated with CLBP outcomes and they concluded that there was not an association between pain intensity and aerobic fitness.

STUDY STRENGTH AND LIMITATIONS

This work is the first cross-sectional study to demonstrate associations of biopsychosocial factors with CLBP-related outcomes in Burundi. However, some biopsychosocial factors that have been reported to be associated with CLBP in other populations and thus could be relevant in the Burundian population were not investigated in this study, including self-efficacy, illness perception, catastrophizing, coping strategies, work absenteeism, and isolation, among others.

Conclusion

CLBP outcome variables were found to be associated with biopsychosocial factors, including BMI, gender, education level, healthcare coverage, depressiveness, trunk muscle endurance, and perceived exertion in Burundian patients. Most of these biopsychosocial factors have been found to be associated with CLBP outcomes in high-income countries. However, healthcare coverage, which is lower in Burundi and other low-income countries than in most high-income countries, emerged as a significant factor affecting CLBP outcomes in our study. Notably, the CLBP-related outcomes of ADL limitations and SP restrictions were more frequently associated with biopsychosocial factors than CLBP-related pain intensity. The present findings support the incorporation of a biopsychosocial model in evidence-based management of CLBP in Burundi. Future studies of CLBP in Burundi should examine larger samples and investigate more biopsychosocial factors.

Abbreviations

5-IPDI : 5-Item Disability Index

ADL: Activity of Daily Living

BDI: Beck Depression Inventory

BMI: Body Mass Index

Borg CR10: Borg's Category Ratio-scale

CLBP: Chronic Low Back Pain

CNRKR : Centre National de Référence en Kinésithérapie et Réadaptation médicale

CNE : Comité National d'Ethique

COPM: Canadian Occupational Performance Measure

FABQ: Fear Avoidance Beliefs Questionnaire

LBP : Low Back Pain

NRS : Numerical Rating Scale

RMDQ : Roland Morris Disability Questionnaire

SP: Social Participation

STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

Declarations

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The National Ethics Committee (CNE/20/2019) approved the study protocol. All subjects gave their written informed consent before participating in study. Our study methods were carried out in accordance with strobe guidelines for cross-sectional studies.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIAL

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

COMPETING INTERESTS

The authors have no conflicts of interest to declare.

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None

AUTHORS' CONTRIBUTIONS

Conceptualization: IN, FN, AS, YB, JLT and OK.

Protocol draft: IN, YB, JLT and OK.

Data collection: IN, FN and AS.

Data analysis: IN, JLT and OK.

Writing – original draft: IN.

Writing & critical revision for important intellectual content: IN, YB, JLT and OK.

Supervision: JLT and OK.

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