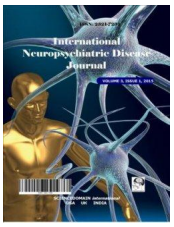

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Prevalence, Pattern, and Correlates of Use of Benzodiazepines and other Sedating Over the Counter Medications among Elderly Persons in a Nigerian Community

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: To determine the prevalence, pattern and correlates of use of benzodiazepines and other sedating over the counter medications in older persons in Abeokuta, an urban community in Nigeria.
Methodology: The design was cross-sectional. It was carried out among 212 retired state civil servants who attended the monthly meetings of the Nigeria Union of Pensioners (Ogun state chapter, Abeokuta zone) between September and November 2016. Respondents were at least 60 years as at last birthday and provided information regarding benzodiazepine use (lifetime, previous 12 months and previous 30 days) and use of sedating (antihistamine) over the counter (OTC) medications (previous 12 months and 30 days).
Results: The mean age of respondents was 70.1 ± 7.1 years and the majority were males (81.6%). The rates of benzodiazepine use were: lifetime (41.5%); previous 12 months (34.9%); previous 30

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days (23.1%). The most commonly used benzodiazepines in the last 30 days were diazepam (18.9%), bromazepam (16.5%), nitrazepam (9.9%) and lorazepam (3.3%). The rates of sedating OTC medication were: previous 12 months (49.5%); previous 30 days (36.8%). The most significant predictor variables of benzodiazepine use in the previous 30 days were: current alcohol use, current use of sedating OTC medications and daily use of medications to treat chronic medical conditions. Respondents in the ≥ 70 years category were less likely to have used a benzodiazepine in the past 30 days.

Conclusions: The rate of the use of benzodiazepines and sedating (antihistamine) OTC medications in the elderly is high. It is hoped that these findings will inform stakeholders of the extent and factors influencing hypnotic/sedative drug use in the elderly and lead to the formulation and implementation of policies and practices aimed at maintaining the health, independence, and function of older persons in Nigeria.

Keywords: Benzodiazepine; sedating OTC medication; elderly; Nigeria.

1. INTRODUCTION

Benzodiazepines are psychoactive substances that are prescribed for sleep and anxiety problems [1]. Although clinical guidelines recommend short-term use of these medications, they are frequently used for a longer period of time [2,3]. Long-term use of benzodiazepines has contributed to an increase in associated adverse health outcomes and mortality. These adverse effects include frequent headaches, memory lapses, cognitive impairments, mood lability, personality changes, and social and occupational decline [4,5]. In addition, a physical dependence syndrome can develop after weeks to months of use [5].

Although drug use disorders are mostly associated with youth, the elderly are not immune to the abuse of psychoactive substances. Psychoactive substances with abuse potential are used by at least 1 in 4 older adults [6]. Following alcohol, benzodiazepines have been described as the commonest substance abused by the elderly [7]. Compared with younger adults, older adults consume a disproportionate percentage of sedatives, anxiolytics and hypnotics medications [8]. As high as 10 % to 40% of community-dwelling elderly people chronically consume benzodiazepines [4,8,9]. In some cases, these medications are available without an appropriate prescription and may be obtained over the counter [10,11]. The number of elderly who abuse benzodiazepines is substantial and has continued to rise [12]. The female gender and a history of alcohol misuse have been identified as risk factors for the abuse of benzodiazepines and other non-benzodiazepine sedatives [4,5]. Some other factors that increases this risk in the elderly include, chronic headaches, a history of mental health disorder, social isolation and medical exposure to prescription drugs with abuse potential [4,5].

The problems related to the use and misuse of benzodiazepines may seriously affect many of the health concerns common among the elderly, including chronic physical illnesses and depression [3]. Older adults have an increased sensitivity to the clinical effects and toxicity of benzodiazepines. These effects are influenced by the physical, developmental, and psychosocial changes that occur with aging, and the age-related changes in benzodiazepine pharmacokinetics or pharmacodynamics [13]. They are thus more likely to suffer from medication side effects such as impairments in cognition, memory, coordination and balance. They are also more likely to progress to long term continuous use and dependence. Benzodiazepine withdrawal delirium occurs most frequently in older patients [14].

Despite the wealth of information on the epidemiology of benzodiazepine use in older adults in high income countries, there is little or no information concerning benzodiazepine use among the elderly in low income countries such as Nigeria. As a result, health care professionals may fail to recognize and address the misuse of benzodiazepines in the older age group. A public health goal for elderly is to maintain health, independence, and function [15]. But this goal may not be feasible in our environment if the extent of hypnotics/sedatives use in this age-group is not known. The aim of this study is to determine the prevalence, pattern and correlates of benzodiazepine use and use of sedating over the counter medications in older persons in Abeokuta, an urban community in Nigeria.

2. METHODS

This study was conducted in Abeokuta, the largest city and capital of Ogun state, south-west Nigeria. The state occupies 16,980.6 area square km and has a projected population of over 4.5 million [16]. We adopted a cross sectional design which was descriptive in nature. The study's population was the 416 retired state civil servants who attended the monthly meetings of the Nigeria Union of Pensioners (Ogun state chapter, Abeokuta zone) during a 3-month period (September – November 2016). A civil servant retires on attainment of 60 years of age or after spending 35 years in public service.

A desired sample size of 288 was calculated using the Leslie Kish's formulae [17]. The inclusion criteria were: at least 60 years at last birthday and the ability to communicate in English, the language of the study. Our exclusion criteria were: pensioners were severe physical challenges such as severe visual and hearing impairments and a self-reported history (current or past) of mental disorder. The respondents were selected through a simple random sampling method.

The socio-demographic variables collected included gender, age at last birthday, marital status, religion and ethnicity. The clinical data identified were the presence or absence of chronic physical illnesses and the daily use or non-use of medications to manage the identified physical morbidities. With regards to the use of sleep medications – benzodiazepines and sedating (antihistamines) over the counter medications – the following data were obtained: life-time use, use without an appropriate physician's prescription, use in the previous 12 months and use in the previous 30 days (i.e. current use). Participants who self-reported using a sleep medication in the previous 30 days but couldn't recall brand or generic names were shown the various types of oral benzodiazepines (diazepam, bromazepam, nitrazepam, flunitrazepam, and lorazepam) and sedating OTC drugs available locally and asked to identify the ones they have consumed. Respondents were also asked about recent alcohol use (i.e. use in the previous 30 days)

The average duration of night sleep was categorized into 3: short sleepers (<6 hours), normal sleepers (6–8 hours) and long sleepers (>8 hours). Sleep quality and adequacy was assessed using the Insomnia Severity Index (ISI), a 7-item questionnaire assessing the nature, severity, and impact of insomnia [18]. The dimensions of sleep evaluated were: severity of sleep onset, sleep maintenance, early morning awakening, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by the sleep difficulties. The recall period was the "last month" and a 5-point likert scale was used to rate each item (e.g., 0 = no problem; 4 = very severe problem), yielding a total score ranging from 0 to 28. This was interpreted as follows: absence of insomnia (0–7); sub-threshold insomnia (8–14); moderate insomnia (15–21); and severe insomnia (22–28). The instrument has been validated for use in primary care and older adults [18]. The shorter version of the Geriatric Depression Scale (GDS) was used to screen for the depressive symptoms in the respondents. This self-report instrument is a 15-item questionnaire in which participants were asked to respond by answering yes or no in reference to how they felt over the past 2 weeks. Scores of 0 –4 were considered normal ('not depressed) and 5–15 were categorized as 'depressed'[19].

Respondents spent an average of 15–20 minutes in filling the questionnaires. The investigators assisted in reading the questions to respondents who had mild visual impairments.

2.1 Data Analysis

Data was analyzed using the statistical package for social sciences (SPSS version 21) computer software. Respondents who self-reported 'not knowing' if they had used sleep medications or could neither recall nor identify the medication used were not included in the analysis. The socio-demographic, illness-related, depression scores, alcohol use and sleep variables of respondents were presented using descriptive statistics frequencies and percentages. The means and standard deviations were calculated as applicable. The rate and pattern of benzodiazepine use and use of sedating OTC medications were presented categorically, using frequency distribution tables and percentages. The associations between benzodiazepine use in the previous 30 days and sedating OTC medication use, alcohol use, depression scores, sleep variables and socio-demographic characteristics were analyzed using the Pearson's Chi Square test. The level of significance was set at <0.05. Multiple logistic regression was done to determine the extent of

the relationship between multiple variables and benzodiazepine use in the previous 30 days.

2.2 Ethical Considerations

Ethical approval was duly obtained from the Research and Ethical Committee of the Neuropsychiatry Hospital, Aro, Abeokuta Ogun State, and permission was obtained from the executives of the Nigeria Union of Pensioners, Ogun state chapter, Abeokuta zone. The purpose of the study was explained to the respondents and they were assured of confidentiality. During the study, respondents got a free blood pressure check and had the opportunity to consult on health-related matters. Participants signed an informed consent form.

3. RESULTS

Of the 288 persons invited, 212 met the study's inclusion criteria, gave informed consent and fully participated in the study. This gave a response rate of 73.6%. The mean ± SD age of the respondents was 70.1 ± 7.1 years; their ages ranged from 60 – 91 years. The majority were males (173; 81.6%), were married (161; 75.9%) and practiced Christianity (159; 75.0%). All the participants were from the Yoruba ethnic group (a major ethnic group in Nigeria). One hundred and thirty three (62.7%) reported having a medical morbidity. The commonest illnesses were hypertension (66; 31.1%), diabetes mellitus (13; 6.1%) and chronic pain (12; 5.7%). One hundred and eleven (52.3%) respondents used medications daily to manage their chronic medical problems. With regards to the duration of night sleep, most participants (139; 65.6%) reported sleeping between 6 and 8 hours nightly, while 34 (16.0%) slept for less than 6 hours nightly. An analysis of geriatric depression scores revealed that 60 (29.8%) respondents had a score of ≥ 5, and were categorized as 'depressed'. The insomnia severity index (ISI) showed that 113 (53.3%) persons had 'insomnia' (i.e. ISI ≥ 8). Eighty six (40.6%) respondents consumed alcohol in the previous 30 days.

Eighty eight (41.5%) reported a lifetime use of benzodiazepines; 74 (34.9%) had used a benzodiazepine in the previous 12 months, while 49 (23.1%) had used them in the previous 30 days. Forty one (19.3%) had used benzodiazepines without an appropriate physician's prescription. In the last 30 days, the most commonly used benzodiazepines were diazepam (40; 18.9%), bromazepam (35; 16.5%), nitrazepam (21; 9.9%) and lorazepam (7; 3.3%). Almost half (105; 49.5%) reported using sedating over the counter (OTC) medications in the previous 12 months; 78 (36.8%) used in the previous 30 days.

Table 3 showed a univariate analysis between respondent socio-demographic, illness related, sleep variables and benzodiazepine use in the previous 30 days. The analysis showed that respondents' age (χ^2 = 4.723, p = .030), the presence of a medical morbidity (χ^2 = 5.983, p =. 014), daily use of medications to manage chronic medical problems (χ^2 = 7.409, p =. 006) and alcohol use in the previous 30 days (χ^2 = 5.585, p =.018) were significantly correlated with use of benzodiazepine in the previous 30 days. Similarly respondent's duration of night sleep (χ^2 = 6.752, p =.034), ISI scores (χ^2 = 10.946, p =.004) and using sedating OTC medications (χ^2 =13.740, p < .0001) were significantly associated with use of benzodiazepines in the last 30 days.

The predictor variables derived from the univariate analysis were entered into a binary logistic regression model as shown in Table 4. A test of the full model against a constant only model was statistically significant indicating that the predictors as a set reliably distinguished use and non-use of benzodiazepines in the last 30 days (χ^2 = 37.240, p < .0001). Nagelkerke's R^2 of 0.244 indicated a moderate relationship between predictions and groupings. Prediction success overall was 78.8%. The Wald test statistics demonstrated that respondents' age, alcohol use in previous 30 days, daily use of medications to treat chronic medical conditions and use of sedating OTC medications in the previous 30 days made the most significant contributions to prediction. Exp (B) value indicated that respondents who have used alcohol in the previous 30 days, used medications daily to treat chronic medical conditions and used sedating OTC medications in the last 30 days were 2 to 3 times more likely to use a benzodiazepine in the previous 30 days. Respondents in the ≥ 70 years category were less likely to have used a benzodiazepine in the past 30 days. Respondents ISI scores, sleep duration and the presence of medical morbidity did not predict the use of benzodiazepine in the previous 30 days.

Table 1. Socio-demographic, Illness related and Sleep variables of respondents (N = 212)

Variable	n	%
Age group		
60 – 69	114	53.8
≥ 70	98	46.2
Mean ± sd	70.14 ± 7.10	
Gender		
Male	173	81.6
Female	39	18.4
Marital status		
Married	161	75.9
Separated/Divorced/Widowed	51	24.1
Religion		
Christianity	159	75.0
Islam	53	25.0
Presence of medical morbidity		
No	79	37.3
Yes	133	62.7
Hypertension	75	35.3
Diabetes Mellitus	20	9.4
Chronic Pain	13	6.1
Peptic Ulcer	12	5.7
Others*	12	5.7
> 1 morbidity	37	17.5
Used medications daily to treat medical morbidity		
No	101	47.7
Yes	111	52.3
Night sleep hours		
< 6	34	16.0
6 – 8	139	65.6
> 8	39	18.4
Geriatric depressive scores (GDS)		
0 – 4	152	71.2
≥ 5	60	29.8
Insomnia severity index (ISI)		
Absent	99	46.7
Sub-threshold	80	37.7
Moderate-Severe	33	15.6
Alcohol use in the previous 30 days		
No	126	59.4
Yes	86	40.6

Others (e.g. rheumatoid arthritis and asthma)*

Table 2. Use of benzodiazepine and sedating over the counter medication (N = 212)

	n	%
Life time use (BZD)	88	41.5
BZD use without Prescription	41	19.3
BZD use in last 12 months	74	33.9
BZD use in precious 30 days	49	23.1
Diazepam	40	18.9
Bromazepam	35	16.5
Nitrazepam	21	9.9
Lorazepam	7	3.3
Flunitrazepam	4	1.9
Sedating OTC Medication (in last 12 months)	105	49.5
Sedating OTC Medication (in last 30 days)	78	36.8

Table 3. Association between benzodiazepine use in previous 30 days and socio-demographic, illness, sleep related variables

Variable	BZD use (%)	BZD non-use (%)	X^2	df	P
Age					
60 – 69	33 (28.0)	81 (71.1)	4.723	1	0.030*
≥ 70	16 (16.3)	82 (83.7)			
Gender					
Male	36 (20.8)	137 (79.2)	2.809	1	0.094
Female	13 (33.3)	26 (66.7)			
Marital status					
Married	39 (24.2)	122 (75.8)	0.462	1	0.462
Separated/Divorced/Widowed	10 (19.6)	41 (80.4)			
Religion					
Christian	41 (25.8)	118 (74.2)	2.557	1	0.110
Islam	8 (15.1)	45 (84.9)			
Presence of medical morbidity					
Yes	38 (28.6)	95 (71.4)	5.983	1	0.014*
No	11 (13.9)	68 (86.1)			
Use medication daily					
Yes	34 (30.6)	77 (69.4)	7.409	1	0.006*
No	15 (14.9)	86 (85.1)			
Duration of night sleep (hours)					
< 6	13 (38.2)	21 (61.8)	6.752	2	0.034*
6 – 8	31 (22.3)	108 (77.7)			
> 8	5 (12.8)	34 (87.2)			
Geriatric depressive scores (GDS)					
0 – 4 ('not depressed')	32 (21.1)	120 (78.9)	1.283	1	0.257
≥ 5 ('depressed')	17 (28.3)	43 (71.7)			
Insomnia severity index (ISI)					
Absent	13 (13.1)	86 (86.9)	10.946	1	0.004*
Sub-threshold	24 (30.0)	56 (70.0)			
Moderate-severe	12 (36.4)	21 (63.6)			
Alcohol use in last 30 days					
Yes	27 (31.4)	59 (68.6)	5.582	1	0.018*
No	22 (17.5)	104 (82.5)			
Sedative OTC Medication use in last 30 days					
Yes	29 (37.2)	49 (62.8)	13.740	1	<0.001*
No	20 (14.9)	114 (85.1)			

**p is significant when <0.05*

4. DISCUSSION

This study has shown that the use of benzodiazepines and other sedating OTC drugs among older adults is common in the study population. About 23% of participants reported taking a benzodiazepine at some time in the previous 30 days, while a higher proportion (36.8%) reported using sedating OTC medications in the previous 30 days. We found a strong correlation between self-reported benzodiazepine use and the use of sedating OTC medications. Other studies have reported similar findings [20,21]. This finding poses serious concerns, because the primary agent in most sedating OTC medications is an antihistamine (e.g. diphenhydramine) whose potential for adverse drug reaction with benzodiazepines is especially troublesome in the elderly. These reactions often results from anticholine and antihistamine blockade activity and includes dryness of mouth, blurred vision, urinary retention, constipation, and central nervous system effects (e.g. somnolence, delayed reaction time, psychomotor retardation and cognitive impairment) [22]. The most commonly used benzodiazepines by respondents in this study were long-acting agents (diazepam, bromazepam and nitrazepam). The prolonged sedating effects of

Table 4. Binary logistic regression relating benzodiazepine use in previous 30 days to predictor variables

Variable	Exp (B)	Wald	p	95% CL	Reference
Age (≥ 70 years)	0.379	6.019	0.014*	0.017 – 0.823	
Medical morbidity (Yes)	0.724	0.510	0.475	0.298 – 1.757	
Sleep hours		2.350	0.309		**< 6**
6 – 8	2.308	1.459	0.227	0.594 – 8.969	
> 8	1.173	0.073	0.787	0.369 – 3.723	
Alcohol use (Yes)	2.199	4.342	0.037*	1.048 – 4.615	
Medication use (Yes)	2.599	5.037	0.025*	1.129 – 5.983	
Insomnia severity		1.911	0.385		**No insomnia**
Sub-threshold	0.574	1.044	0.307	0.198 – 1.666	
Moderate-Severe	1.020	0.002	0.969	0.380 – 2.759	
Sedating OTC use (Yes)	2.270	4.689	0.030*	1.081 – 4.768	
Constant	0.036	5.098	0.024*		

**p is significant when <0.05*
Exp (B) = Odds Ratio
CL = Confidence Interval

long-acting agents coupled with the concomitant use of sedating OTC drugs may further increase the risk of cognitive impairment and other CNS effects [23].

We found a correlation between the presence of a medical morbidity, the daily use of medications to manage chronic physical illnesses and current benzodiazepine use. Generally, older people suffer more from physical morbidities and use more medications than younger people [24]. Previous studies have identified chronic medical disorders where multiple medications are used as risk factors for benzodiazepine abuse in older adults [10,20]. On the other hand benzodiazepine use and misuse could lead to neuropsychiatric and medical comorbidities [3]. The symptoms of benzodiazepine intoxication and withdrawal may complicate clinical assessment in the elderly. For example, physical symptoms of withdrawal such as memory loss, headaches, tremors and delirium may be misinterpreted as consequences of normal aging or as worsening of a pre-existing medical/psychiatric morbidity [14].

We found no association between current benzodiazepine use and depressive symptomatology in this sample of older adults. This was inconsistent with previous research, where a self-reported diagnosis of anxiety or depression was strongly associated with benzodiazepine use [25,26]. The findings of this study may suggest that psychological distress is not a principal determinant of benzodiazepine use in this cohort of older persons. Besides, individuals with a current or past history of mental illness were excluded from the study. It may therefore imply that many older persons use benzodiazepines not because of overt psychological distress or impairment in daily functioning but for perceived poor quality and quantity of sleep [27]. This may also explain why sleep variables (Insomnia Severity Index and subjective duration of night sleep) were significantly associated with benzodiazepine use. However some studies have questioned the relevance and appropriateness of the sole use of rating scales measuring psychiatric symptoms to understand psychotropic drug use among older persons [20]. This is because, the rate of common mental disorders (e.g. depression, anxiety disorders) is lower among older than younger adults, and largely outpaces their use of psychotropic medications [28].

Persons in the 60 – 69 years category used more benzodiazepines than the over 70 years category. Similar findings has been replicated in previous studies [29, 30]. Perodeau et al. found that the oldest old are healthier, use fewer medication and face fewer stressful events compared with the young old [31]. Having left the civil service for a considerably longer time, the oldest old would more likely have adjusted better to life as a retired individual. Considering their frailer physical state and limited functioning, physicians may exercise extra caution when prescribing medications to the oldest old [31].

Alcohol use in the previous 30 days correlates with current benzodiazepine use. Jinks and Raschko found a high correlation between prescription drug abuse and previous or active alcohol dependence [32]. A study on elderly men in Sydney, Australia, reported that 5.7% and

33.7% daily used sedatives/anxiolytics and alcohol respectively and users of sedative or anxiolytic drugs were more likely to engage in daily drinking compared with non-users of sedative or anxiolytic drugs [33]. Older persons may use alcohol as a sleeping aid. Alcohol may initially initiate sleep, but tolerance rapidly develops and heavy drinking worsens insomnia. Potential benzodiazepine-alcohol interactions are commoner in the elderly [33,34]. Benzodiazepines compete with alcohol for metabolism by the liver enzymes. This leads to decreased drug metabolism, and an increased risk of toxicity and dangerous cognitive side effects such as delirium, seizures, and coma. These effects are usually more marked in regular and heavy drinkers of alcohol.

The poor regulation of the production, distribution and consumption of benzodiazepines and sedating antihistaminergic drugs in Nigeria has contributed to its increased use in the community [35]. This is worrisome because many study participants reported obtaining benzodiazepines over the counter, without an appropriate physician prescription. In cases where benzodiazepines are prescribed, the physician may be unaware of the patient's current or previous use of sedating OTC drug [6]. Poor regulation could be attributed to the poor enforcement of national and pharmaceutical laws regarding prescription drugs [35].

To prevent the adverse effects associated with the unregulated and long-term use of benzodiazepines, close monitoring is especially recommended, when benzodiazepines are used by older adults [3]. Several reviews and guidelines recommend that the use of long-acting benzodiazepines by older adults be avoided [2, 3]. Chronic use has been associated with falls, fractures, motor vehicle accidents, cognitive impairments such as delirium and dementia [5]. Even episodic use over a long duration is associated with harm [36]. One study showed that a lifetime use equivalent to twice a week for one year confers a 50% increased risk of dementia [37]. Where medication is necessary, intermittent and short-term use of short acting benzodiazepines and the non-benzodiazepine Z drugs (zopiclone, zolpidem) are preferable for the treatment of insomnia. Low doses of sedative antidepressants are also an alternative pharmacological treatment for insomnia. Cognitive behavioral therapy (CBT) techniques, such as sleep hygiene, sleep restriction, stimulus control, cognitive therapy and relaxation therapy, are effective for treating chronic insomnia and facilitating benzodiazepine withdrawal in the elderly [2,3].

5. LIMITATIONS AND STRENGTHS

The study design made it impossible to establish a temporal relationship between variables. We recommend a longitudinal study to further clarify the associations between variables and benzodiazepine use. The use of self-report questionnaires and visual identification of medications may have introduced some recall bias. Considering the stigma associated with mental illness in the community, some respondents with a history of mental illness may have chosen not to disclose. Furthermore, the study may have under-estimated the use of substances to aid sleep. It's possible some of the respondents use herbal and other non-orthodox remedies to initiate and maintain sleep. The consequences of benzodiazepine use such as falls and cognitive impairments were not studied.

Despite these limitations, we identified some noteworthy strengths. The study contributes to the growing body of psychogeriatric studies in Nigeria. It has provided some useful data on the rate, pattern and correlates of hypnotics and sedatives use among older persons in Nigeria. The prevalence of benzodiazepine use in elderly is high and compares to rates obtained from developed countries. The use of benzodiazepines decreased with increasing age but increased with use of sedating OTC medications and daily use of medications to treat chronic medical morbidities.

6. CONCLUSION

It is hoped that the findings will inform relevant stakeholders of the extent and factors influencing hypnotic/sedative drug use in the elderly and lead to the formulation and implementation of policies and plans aimed at maintaining the health, independence and function of older persons in Nigeria.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee

has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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