

Original Research Article

Association between sleep quality and quality of life among resident doctors in a tertiary hospital in Nigeria: a cross-sectional study

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ABSTRACT

Background: Sleep quality is a term in mental health that continues to attract scholarly reviews across interdisciplinary domains due to its dominant influence on human health. It is crucial to physical and mental health and directly impacts quality of life. As a result of the dearth of literature on sleep quality, this study determines the association between sleep quality and QOL among resident doctors in Nigeria.

Methods: This cross-sectional analytic study was part of a larger study among resident doctors at the University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria, between August 2015 and February 2016. Chi-square test and logistic regression were done where appropriate.

Results: A total of 208 participants were recruited, of which 96 (46.2%) were found to have poor sleep quality. The prevalence of poor sleep quality varied across medical specialties and cadres of seniority. Although it was more common among female participants than males, no statistically significant association was found between sleep quality and demographic factors such as age, sex, marital status or ethnicity ($p > 0.05$). However, there was a statistically significant relationship between sleep quality and certain work-related factors, including being in a specific specialty, holding the position of senior registrar, and having spent 12-24 months in residency (χ^2 :10.962; $p=0.004$, χ^2 :5.283; $p=0.022$, χ^2 :15.137; $p=0.002$ respectively).

Conclusions: The findings of this study indicate a high prevalence of poor sleep quality among resident doctors, suggesting that the rigorous residency training may negatively impact their sleep quality.

Keywords: Sleep, Sleep quality, Quality of life

INTRODUCTION

Sleep quality is a term in mental health that continues to attract scholarly reviews across interdisciplinary domains due to its dominant influence on human health globally. It

refers to how well an individual sleeps and is often considered essential to general human health.¹ The impact of sleep deprivation cannot be overstated, as poor sleep quality has been linked to increased mortality rates and various health conditions, including neurological

problems, cardiovascular diseases, weakened immune function etc.²⁻⁴ Globally, the prevalence of poor sleep quality (PSQ) is estimated at 20 percent in developed countries, compared to approximately 17 percent in the developing world.⁵ Moreover, maintaining good sleep quality is crucial, as it is nearly impossible to perform daily tasks effectively without adequate rest.

On the other hand, quality of life (QOL) is complex to measure. Nevertheless, the World Health Organization (WHO) attempts to define it broadly as an embodied phenomenon that includes a person's physical health, psychological state, level of independence, social relationships, personal beliefs and relationship to salient features in the environment.⁶ While objectively assessing sleep quality through methods like polysomnography can be costly, especially in low income countries, several sleep questionnaires have made it possible to explore the relationship between sleep quality and quality of life in contexts like Nigeria.⁷

Several studies have explored sleep; quality and sleep disorders among medical students and practitioners in hospital in Nigeria and globally. However, many of the studies exclusive focused on general socioeconomic and health factors among the populace with existing comorbidities like HIV, pregnant women, chronic renal diseases etc, as well as on healthy populations at the community level.⁸⁻¹⁰ Despite this growing body of research, there is a significant gap in the literature regarding the impact of sleep quality on QOL of resident doctors, particularly in Nigeria. For instance, in New Zealand, a study was carried out to determine the correlation between medical students' sleep quality and clinical performance and this revealed a poor relationship between sleep duration and lower assessment scores.¹¹

In addition, another study was conducted to examine the underlying factors affecting sleep quality among Saudi physicians and nurses in a tertiary health care centre. Some of the factors identified align strongly with this study, including burnout levels, workload (work conditions), medical specialities, family issues, and diet. Perhaps there are more similarities between Saudi Arabia and Nigeria because they promote family ties and multicultural and religious communities. Nonetheless, it was noted that poor sleep quality is a subjective intercultural global phenomenon consistent with medical practice, even among Saudi medical students.¹²

The strengths of our study are that the data is more targeted towards Nigerian resident doctors across different specialities, with the potential to unearth areas to improve their academic performance during the training programme. Also, it determines the causal relationship between sleep hygiene and sleep quality and complex and long-term factors underlying poor sleeping quality in a multicultural setting like Nigeria. This study aimed to assess the relationship between sleep quality and QOL

among resident doctors in a tertiary hospital located in southwestern Nigeria.

METHODS

Study setting

This study was conducted across various departments offering residency training at the University of Ilorin Teaching Hospital (UTH) in Ilorin, Kwara State, Nigeria. The departments involved in the residency programme include anesthesia, behavioural sciences (psychiatry), ENT (otorhinolaryngology), epidemiology and community health, family medicine, laboratory medicine (chemical pathology, hematology, microbiology, pathology), internal medicine, obstetrics & gynecology, ophthalmology, pediatrics, radiology and surgery.¹³

Study design

This hospital based cross-sectional analytic study was conducted between August 2015 and February 2016.

Study population

The study population were residents in all departments of UTH offering residency training within the study period and who met the inclusion criteria.

Inclusion criterion

All residents who consented to participate in the study.

Exclusion criteria

Exclusion criteria for this study include residents on external rotation at during the study, those with histories of sleep disorders, those unwell and those who were less than 3 months into the residency programme.

Sample size determination

The sample size was estimated using Fisher's formula for populations <10, 000, with an estimated sample size of at least one hundred and fifty-five (155) participants.¹⁴ However, all consenting resident doctors who met the criteria for the study were included.

Study instruments

Sociodemographic data were collected from participants using a structured questionnaire. Variables collected included age, sex, marital status, clinical variables like previous history of sleep disorders and work-related variables. The Pittsburgh sleep quality index (PSI), a standardized self-rated questionnaire developed by Buysse et al was used to measure sleep quality.¹⁵ This PSQI consists of 24 items that generate seven components: sleep disturbances, use of sleep medication,

sleep duration, habitual sleep efficiency, sleep latency, and daytime dysfunction. These components are summed to produce a global sleep quality score ranging from 0 to 21, with higher scores indicating poor sleep quality. A cutoff score 5, validated for use in Nigeria, was used to distinguish between good and poor sleep quality.¹⁶

The WHO quality of life screening instrument (WHOQOL-BREF) questionnaire was used to assess the quality of life. This 26-item instrument uses a 5-point Likert scale to capture respondents perceived quality of life across four domains: physical health, psychological health, social relationship and environment factors. Before the main study, a pilot study involving 20 consenting junior intern doctors at UITH to validate the research instrument was carried out.

Sampling technique

A comprehensive list of all resident doctors in each department was obtained from the Association of Resident Doctors (ARD) and confirmed with the chief resident doctor in each department. Participants were allotted a unique numerical code, recorded on the complete questionnaire to maintain confidentiality. Data collection involved administering the Pittsburgh sleep quality index (PSQI) and the WHO quality of life-BREF (WHOQOL-BREF). Trained research assistants were able to administer the tools. During the data collection, residents with poor sleep quality were advised to seek further evaluation and support from relevant specialist consultants.

Data analysis

All data collected were analyzed using the Statistical Package for Social Sciences (SPSS) version 18. Frequency distribution of the variable was carried out and statistical weighting was done to validate the true prevalence of sleep disorders. Where appropriate, binary logistic regression analysis examined the associations between sleep quality and quality of life. A statistically significant level of less than 0.05 ($p < 0.05$) was used to identify meaningful relationship between variables.

Ethical considerations

Permission to undertake the study with reference number: UITH/CAT/189/21B/659 was obtained from the ethical and research committee of UITH. Also, written approval was sought and obtained from the head of the department of each of the specialty. Informed consent was obtained before participating in the study.

RESULTS

Social- demographic variables of participants

Table 1 shows that the age of participants was 34.14 ± 3.54 . The majority (65.4%) were in the age group

31-35 years, there were more males (70.7%) than females (29.3%), 56.3% were Christians, and 43.8% were Muslims. About nine out of ten (89.9%) were married, with most participants having 1-2 children and 161 (77.4%) were Yoruba, 10.1% Hausa, 4.3% Igbo, while the remaining 8.2% were of the other tribes.

Table 1: Socio-demographic variables of participants.

Variables	Frequency (n=208)	Percentage
Age group (years)		
<30	19	9.1
31-35	136	65.4
36-40	46	22.1
>40	7	3.4
Mean±SD	34.14±3.54	
Range	25-52	
Sex		
Male	147	70.7
Female	61	29.3
Religion		
Christianity	117	56.3
Islam	91	43.8
Marital status		
Married	187	89.9
Single	21	10.1
Number of children		
None	50	24.0
1-2	107	51.4
3-4	46	22.1
>4	5	2.4
Ethnicity		
Yoruba	161	77.4
Hausa	21	10.1
Igbo	9	4.3
Others	17	8.2

Sociodemographic variables of participants (work-related)

Table 2 shows that more than half (62.5%) of the participants were senior registrars, 36.5% of participants have 25-36 months duration of residency; 12-24 months (27.9%), 37-48 months (25.5%), while the remaining 10.1% had a duration of more than 48 months. Participants in the surgical-related departments constituted 46.2% with the departments of surgery and obstetrics and gynecology having the highest percentage of 13.0% respectively. The medical-related departments had 45.7% of the participants with department of community health having the highest percentage of 12.0%.

In contrast, the laboratory-related departments constituted 8.2% of the participants with department of morbid anatomy and hematology having the highest percentage of 2.4%.

Table 2: Socio-demographic variables of participants (work-related).

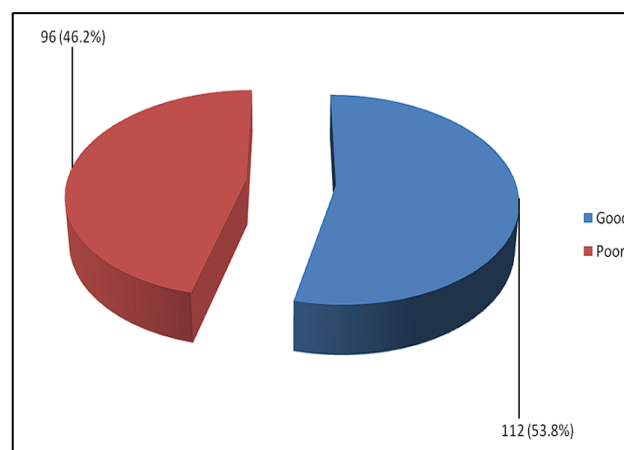
Department	Frequency	Percentage
Rank		
Registrar	78	37.5
Senior registrar	130	62.5
Duration of residency		
12-24 months	58	27.9
25-36 months	76	36.5
37-48 months	53	25.5
>48 months	21	10.1
Department		
Surgical	96	46.2
Surgery	27	13.0
Obstetrics and gynecology	27	13.0
Ophthalmology	15	7.2
Anesthesia	11	5.3
Otorhinolaryngology (ENT)	5	2.4
Radiology	11	5.3
Medical	95	45.7
Pediatrics	20	9.6
Family medicine	21	10.1
Internal medicine	22	10.6
Community health	25	12.0
Psychiatry	7	3.4
Laboratory medicine	17	8.2
Microbiology	3	1.4
Chemical pathology	4	1.9
Hematology	5	2.4
Morbid anatomy	5	2.4

Table 3 shows that nearly all (97.1%) of the participants had an interest in their job, of which 88.5% reported that the workload was high, 52.9% working for 51-80 hours per week, 62.0% working on the average of 160-200 hours on call duty per month. More than half (57.7%) attempted part one exam once, 30.0% twice and 12.3% thrice or more before passing. 52.4% of the participants said they rarely/sometimes had financial difficulties. About half (49.5%) of the participants never had time for recreation.

Figure 1 shows that more than half (53.8%) of the participants had good sleep quality while the remaining 46.2 percent had poor quality of sleep. This categorization was based on their global performance on PSQI with a cut-off point 5.

Quality of life of resident doctors

Table 4 shows that participants with poor quality of life had the following scores on all the domains: environment domain (23.6%), physical health (22.6%), social relationship (22.1%), and 17.3% of the participants on the psychological health domain.

**Figure 1: Quality of sleep among resident doctors.**

Individual's overall perception of quality of life and perception of their health

Table 5 shows that only 2.4% of the participants perceived that they had a poor quality of life, and 4.3% of the participants were dissatisfied with their health.

Table 3: Work-related factors of participants.

Variables	Frequency (n=208)	Percentage
Interest in job		
Yes	202	97.1
No	6	2.9
Perception of workload		
High	184	88.5
Low	24	11.5
Number of hours on duty per week		
40-50 hours	61	29.3
51-80 hours	110	52.9
More than 80 hours	37	17.8
Average number of hours on call duty per month		
160-200 hours	129	62.0
201-320 hours	74	35.6
More than 320 hours	5	2.4
Number of attempts before passing part 1 (n=130)		
One	75	57.7
Two	39	30.0
Three or more	16	12.3
Financial difficulties		
Never	11	5.3
Rarely/sometimes	109	52.4
Often	85	40.9
Always	3	1.4
Time for recreation		
Never	103	49.5
Rarely/sometimes	84	40.4
Often	16	7.7
Always	5	2.4

Table 4: Graded quality of life of resident doctors.

	Poor	Good
Domain	N (%)	N (%)
Physical health	47 (22.6)	161 (77.4)
Psychological health	36 (17.3)	172 (82.7)
Social relationship	46 (22.1)	162 (77.9)
Environment	49 (23.6)	159 (76.4)

Table 5: Individual's overall perception of quality of life and perception of their health.

Perception	Frequency (n=208)	Percentage
Quality of life		
Poor	5	2.4
Good	203	97.6
Health		
Poor	9	4.3
Good	199	95.7

Relationship between sleep quality and socio-demographic variables (work-related)

Table 6 shows that most participants with poor quality of sleep were in the surgical-related departments (58.3%),

senior registrars (54.2%), and participants who had 12-24 months duration of residency (35.4%). The work-related factors of the participants showed significant relationship with sleep quality ($p < 0.05$).

Table 6: Relationship between sleep quality and socio-demographic variables (work-related).

Variables	Sleep quality			χ^2	P value
	Good	Poor	Total		
	N (%)	N (%)	N (%)		
Department					
Surgical	40 (35.7)	56 (58.3)	96 (46.2)	10.962	0.004*
Medical	60 (53.6)	35 (36.5)	95 (45.7)		
Laboratory medicine	12 (10.7)	5 (5.2)	17 (8.2)		
Rank					
Registrar	34 (30.4)	44 (45.8)	78 (37.5)	5.283	0.022*
Senior registrar	78 (69.6)	52 (54.2)	130 (62.5)		
Duration of residency					
12-24 months	24 (21.4)	34 (35.4)	58 (27.9)	15.137	0.002*
25-36 months	46 (41.1)	30 (31.3)	76 (36.5)		
37-48 months	24 (21.4)	29 (30.2)	53 (25.5)		
>48 months	18 (16.1)	3 (3.1)	21 (10.1)		

χ^2 : Chi square; Y: Yates corrected chi square; *: p value <0.05.

Table 7: Relationship between sleep quality and family-related factors.

Variables	Sleep quality			χ^2	P value
	Good	Poor	Total		
	N (%)	N (%)	N (%)		
Who do you live with					
Alone	16 (14.3)	6 (6.3)	22 (10.6)	5.275	0.153
Nuclear family	79 (70.5)	78 (81.3)	157 (75.5)		
Extended family	8 (7.1)	8 (8.3)	16 (7.7)		
Partner	9 (8.0)	4 (4.2)	13 (6.3)		
Relationship with spouse (n=187)					
Cordial	98 (98.0)	87 (100.0)	185 (98.9)	0.376Y	0.539
Not cordial	2 (2.0)	0 (0.0)	2 (1.1)		
Relationship with children (n=158)					
Cordial	80 (97.6)	76 (100.0)	156 (98.7)	0.433Y	0.510
Not cordial	2 (2.4)	0 (0.0)	2 (1.3)		
Relationship with family members					
Cordial	110 (98.2)	96 (100.0)	206 (99.0)	0.364Y	0.546
Not cordial	2 (1.8)	0 (0.0)	2 (1.0)		
Family size (extended)					
≤2	24 (21.4)	11 (11.5)	35 (16.8)	8.971	0.030*
3-4	44 (39.3)	29 (30.2)	73 (35.1)		
5-6	32 (28.6)	45 (46.9)	77 (37.0)		
>6	12 (10.7)	11 (11.4)	23 (11.1)		
Type of residence					
One room apartment	7 (6.3)	1 (1.0)	8 (3.8)	11.101Y	0.025*
One bedroom flat	12 (10.7)	2 (2.1)	14 (6.7)		
Two-bedroom flat	29 (25.9)	40 (41.7)	69 (33.2)		
Three-bedroom flat	64 (57.1)	51 (53.1)	115 (55.3)		
Others	0 (0.0)	2 (2.1)	2 (1.0)		
Do you sleep alone?					
Yes	16 (14.3)	12 (12.5)	28 (13.5)	0.141	0.707
No	96 (85.7)	84 (87.5)	180 (86.5)		

χ^2 : Chi square; Y: Yates corrected chi square; *: p value <0.05.

Table 8: Relationship between sleep quality and quality of life.

Quality of life	Sleep quality			χ^2	P value
	Good	Poor	Total		
	N (%)	N (%)	N (%)		
Overall quality of life					
Poor	10 (8.9)	26 (27.1)	36 (17.3)	11.904	0.001*
Good	102 (91.1)	70 (72.9)	172 (82.7)		
Overall health					
Poor	8 (7.1)	24 (25.0)	32 (15.4)	12.662	<0.001*
Good	104 (92.9)	72 (75.0)	176 (84.6)		
Physical health					
Poor	12 (10.7)	35 (36.5)	47 (22.6)	19.588	<0.001*
Good	100 (89.3)	61 (63.5)	161 (77.4)		
Psychological health					
Poor	10 (8.9)	26 (27.1)	36 (17.3)	11.904	0.001*
Good	102 (91.1)	70 (72.9)	172 (82.7)		
Social relationship					
Poor	16 (14.3)	30 (31.3)	46 (22.1)	8.637	0.003*
Good	96 (85.7)	66 (68.8)	162 (77.9)		
Environment					
Poor	14 (12.5)	35 (36.5)	49 (23.6)	16.477	<0.001*
Good	98 (87.5)	61 (63.5)	159 (76.4)		

χ^2 : Chi square; *: p value <0.05.

Table 9: Associations of poor sleep quality.

Independent variables	B	P value	Odds ratio	95% CI	
				Lower	Upper
Related departmental group (surgery/ others)	1.155	0.002*	3.175	1.521	6.627
Rank (senior registrar)	0.567	0.213	1.764	0.722	4.311
Duration of residency(months)	0.073	<0.001*	1.075	1.036	1.116
Family size	-0.145	0.257	0.865	0.673	1.112
Type of residence (3 bedroom/others)	0.524	0.001*	1.690	1.849	3.362
Physical health (poor)	0.467	0.425	1.596	0.506	5.037
Psychological health(poor)	-0.368	0.591	0.692	0.181	2.652
Social relationship(poor)	-0.212	0.688	0.809	0.288	2.272
Environment domain(poor)	0.105	0.839	1.110	0.404	3.055
Overall quality of life(poor)	1.015	0.074	2.759	0.906	8.401
Overall health(poor)	2.035	0.006*	7.649	1.801	12.490
Psychiatric morbidity	2.110	<0.001*	8.246	2.784	14.428

B: Coefficient of logistic regression; OR: Odds ratio; 95% CI: 95% confidence interval. *: p value <0.05; R²: 0.455; Predictive value: 76.9%; χ^2 : 86.627; p value: <0.001*

Relationship between sleep quality and family-related factors

Table 7 shows the relationship between quality of sleep and family factors of the participants with poor quality of sleep were those that lived with nuclear family (81.3%), while majority of those who had cordial relationship with spouse (98.0%), children (97.6%), family (98.2%) had better sleep quality. An extended family size of 5-6 (46.9%), those who do not sleep alone (87.5%) had poorer sleep quality. Only the family size and type of

residence where participants lived had statistical significance among family factors (p<0.05).

Relationship between sleep quality and quality of life

Table 8 shows that poor sleep quality was more in those who had poor perception of their overall quality of life and health (27.1% and 25.0% respectively), poor physical health (36.5%), poor psychological health (27.1%), poor social relationship (31.3%) and poor environment domain scores (36.5%). There was a significant relationship

between sleep quality and all domains of the quality of life ($p < 0.05$).

Table 9 shows that significant associations of poor sleep are being in a surgical-related departmental group, living in a three-bedroom apartment, duration of residency, perceived overall poor health and presence of psychiatric morbidity. Residents in surgical related departments have 3.2 times the odds of poor sleep, monthly increase in duration of residency training increases the odds of having poor sleep by about 1.1 times, living in a 3-bedroom apartment increases the odds of having poor sleep about 7.7 times while the presence of psychiatric morbidity increases the odds of having poor sleep quality by 8.3 times.

DISCUSSION

To the author's knowledge, this is the first study that reports on the association between sleep quality and QOL among doctors in Nigeria. In this study, less than half of the participants were found to have poor sleep quality, with variations observed based on medical specialties and level of seniority. This contrasts with findings from similar studies conducted in countries like Turkey and Pakistan, where poor sleep quality was lower and appeared unaffected by specialty or seniority.^{17,18} This discrepancy may be attributed to differences in the structure and rigorous residency training programme, as the Nigerian system places immense significance on academic and professional qualifications, which puts more pressure on the resident doctors' physical and mental health.

Although not statistically significant, the present study, like the one conducted in Pakistan, discovered that poor sleep quality was more prevalent among female participants.¹⁸ This finding validates existing literature that suggests sleep disturbances are generally more prevalent among women.^{19,20} In the African context, additional pressures such as family responsibilities and household obligations, when combined with the demands of medical training, may further contribute to the higher prevalence of poor sleep quality among female resident doctors.

The study also revealed that resident doctors who had attempted their first professional examination three or more times were more likely to experience poor sleep quality. This may be attributed to institutional policies that require residents to pass the examination within four attempts, beyond which they risk dismissal from the residency programme. The pressure and anxiety associated with this policy likely contribute to sleep disturbances. It is widely recommended that adults obtain at least eight hours of sleep per night, and sleep deprivation has been shown to negatively functioning negatively.^{21,22} Insufficient sleep impairs clinical judgement and increases the risk of medical errors in the medical field.²¹

Although not statistically significant, this study also observed that residents working more than 80 hours per week tended to have poor sleep quality. Similar findings have been reported in other studies, linking extended work hours with high levels of sleep deprivation, reduced job performance, and increased likelihood of errors.²² At the study site, it was common for residents to work beyond 80 hours per week, mainly due to the high workload and staffing shortages. This situation is exacerbated by the ongoing brain drain in Nigeria's healthcare sector, which has placed additional strain on the remaining workforce and negatively impacted their well-being, including sleep quality.^{23,24}

This study identified a significant association between sleep quality and several work-related factors, including departmental classification, professional rank, and duration of residency training. Residents in surgical departments had poorer sleep quality compared to their counterparts in medical and laboratory-based departments. This disparity may be attributed to the intense demands of surgical call duties, which often involve late-night operations due to limited access to essential facilities such as operating theatres and emergency services.

Furthermore, senior registrars reported poorer sleep quality, likely due to the compounded responsibilities associated with their role. These include increased clinical and administrative duties, research commitments, and the added pressure of preparing for and successfully passing the second professional examination within a set timeframe. The cumulative stress from these expectations may significantly impair their ability to rest adequately. Also, family-related factors were associated with poor sleep quality in this study. Specifically, residents with a Family size of 5-6 members and those living in 3-bedroom accommodation reported poor sleep quality. While a study conducted in Iran did not establish a significant association between family size and sleep quality, the findings in the present study may be explained by increased stress and responsibilities that often accompany larger household sizes.²⁵ Managing the needs of a larger family can contribute to psychological strain and reduced rest.

Finally, most participants with poor sleep quality also reported lower scores across physical, psychological, social relationship and environmental domains of QOL. Numerous studies have highlighted the connection between poor sleep quality and various mental health issues, as well as physical conditions such as hypertension, diabetes etc.²⁶⁻²⁸ The findings of this study further reinforce their relationship, showing a significant association between sleep quality and quality of life. This suggests that sleep deprivation among resident doctors has a detrimental impact on their overall wellbeing and QOL.

This study was conducted in a single centre in Nigeria. The study's results may not accurately represent of the experience of all doctors in Nigeria since it was conducted in one region of the country.

CONCLUSION

This study has highlighted several key associations between sleep quality and QOL among doctors, particularly, resident doctors in Nigeria. Notably, work-related factors such as being in a special speciality, holding the position of senior registrar, and having spent 12-24 months in residency influence sleep quality. The study also reveals a high prevalence of poor sleep quality among resident doctors, significantly affecting their overall quality of life during their residency training programme.

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