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Sociodemographic factors and addictive behaviors as predictors of mental well-being among students of tertiary institutions in Kwara State, Nigeria

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Abstract

Background Addiction is a chronic medical condition shaped by complex neurological, genetic, environmental, and experiential factors. Behavioral addictions, including gambling, internet use, and video gaming, often emerge during adolescence and can impair psychological functioning if untreated. In Nigeria, the prevalence and impact of behavioral addictions, particularly among higher institution students, remain underexplored. This study investigates the pathogenic influence of addictive behaviors on mental well-being among students in Kwara State, Nigeria.

Methods A descriptive cross-sectional survey was conducted across six higher institutions, recruiting 629 participants through a multistage sampling technique. A structured and revalidated questionnaire assessed internet use, drug consumption, gambling, sexual behavior, and mental well-being. The instrument achieved a Cronbach's alpha of 0.8. Data were analyzed using STATA 18, employing chi-square and multiple linear regression. Ethical approval was obtained from the Ethics Research Committee of the Kwara State Ministry of Health.

Results The findings revealed that sexual habits ($\beta = -0.148$, $p < 0.001$) and internet usage ($\beta = -0.101$, $p = 0.015$) are both linked to poor mental well-being, with sexual habits having a slightly stronger negative impact. Positive mental well-being was reported by 73.7% of students. Significant associations were identified between age, religion, and social media habits ($p < 0.05$). Gender showed a strong association with drug use, with males exhibiting higher moderate usage (15.9%) compared to females (5.4%).

Conclusion Behavioral addictions were found but relatively low among higher institution students in Kwara State, with notable socio-demographic variations. These findings highlight the need for targeted interventions to mitigate addiction risks and promote mental well-being, especially among university students.

Keywords Addiction, Behavioral addictions, Mental health, Students, Nigeria

1 Background

Behavioral addiction, defined as compulsive, repeated, and persistent behaviors causing functional impairment or distress, includes issues of gambling, internet, and video-gaming addictions [1, 2]. To qualify as an addiction, these behaviors must not stem from an underlying illness, be voluntary, or function solely as coping mechanisms, and must lead to significant functional impairment [3]. These behaviors, often impulsive and irresistibly compelling, frequently emerge during adolescence and, if untreated, evolve into compulsive, problematic patterns [1]. Behavioral addictions (e.g., gambling disorder, internet addiction, video-gaming addiction) are so-called because they exhibit many addictive qualities. However, this does not prove that these behaviors are addictive; rather, it points to problematic use. The first characteristic of behavioral addictions is their impulsiveness and irresistibility, which ultimately leads to functional impairment [1]. Second, most behavioral addictions begin early (in late adolescence). Additionally, they are voluntary and initially under control, but in later phases, they may develop into compulsive behaviors [1, 4].

Mental health, which includes psychological, behavioral, and emotional well-being, is a priority in healthcare systems globally [5]. Young people encounter significant barriers to maintaining psychological health, including stigma, social isolation, and shame, which impair individual productivity and increase social withdrawal. These barriers are linked to a range of mental health conditions, including anxiety, depression, eating disorders, and risky behaviors such as self-harm and suicide [6]. Notably, 16% of global diseases and injuries among individuals aged 10–19 have mental health components, with eight key neurological conditions accounting for 75% of the global burden of mental illness and addiction [7].

According to Peake and Mullings [5], mental health is the psychological, behavioral, and emotional well-being of an individual. The priority in the healthcare system is mental health [8]. The mental well-being of young people regularly runs into formidable barriers, including stigma, shame, and separation, which can have an impact on both individual output and social avoidance [7]. These interfere with day-to-day activities and can cause post-traumatic stress disorder, anxiety, depression, eating disorders, increased risk-taking behavior, including suicide and self-harm [9, 10] or eating disorders. According to the WHO 2022 report on mental disorders, 280 million people were living with depression, including 23 million children and adolescents [9]. Depression, suicide, and substance misuse are only a few of the eight neurological components that account for 75% of the global burden of mental illness and addiction.

Numerous studies have concentrated on the prevalence of different addictive behaviors. According to Tsitsika et al. [11], the prevalence of internet addiction in European countries ranges from 1.0% to 18.3%, as well as 13.7% to 18.4% in Asian nations. Another recent study indicated that while the rate of dangerous Internet users rose from 13.3% to 17.6%, the proportion of pathological Internet users increased from 4.0% to 6.9% in Europe (Estonia, Romania, Germany, Italy, and Spain) [12]. Furthermore, between 0.1% and 5.8% of adults engage in "problem gambling," which serves as a proxy measure for the prevalence of gambling disorders [7]. Approximately 35 million people are thought to be affected by drug use disorders, which encompass harmful patterns of drug use or drug dependency [13]. These disorders are believed to affect roughly 270 million people, representing approximately 5.5% of the global population aged 15 to 64 [13]. Tragically,

an estimated 0.5 million deaths per year are attributed to drug usage, with 350,000 of which are men and 150,000 are women. Notably, there is currently a dearth of research on sexual addiction in nonclinical samples [14]. This is compounded by the lack of both a generally accepted diagnostic definition and valid and reliable methods of measurement, leading to substantial variations in estimates of the incidence and prevalence of sexual addiction disorder.

Addictive behaviors are more likely to lead to serious consequences because they have the potential to become lifelong habits and have a severe impact on one's physical health [15], social relationships [16], and financial situation. According to Ryff and Singer [17] and Sagone and De Caroli [18], the psychological characteristics of well-being, which include interpersonal connections and a lack of distress, are essential for optimal human functioning but are also extremely prone to addictive behaviors. The fact that addictions and addictive behaviors can take many different forms makes it more difficult to assist young people's well-being. Although substance abuse is frequently linked to addiction, many other activities and substances can lead to addiction [19].

With the advent of the internet, gaming and gambling have increasingly merged in recent years, which has resulted in a frequent switch from one to the other and associated health issues. Other health issues, such as inadequate physical activity, an unhealthy diet, issues with vision or hearing, musculoskeletal issues, sleep deprivation, and associated medical conditions like depression and venous thromboembolism disorders, are also included in the list of health issues associated with gambling behavior [7]. In addition, untreated drug use disorders increase the risk of morbidity and mortality, cause significant suffering, and affect functioning in key domains such as personal, family, social, educational, and occupational functioning. Drug use disorders are associated with significant costs to society due to loss of productivity, premature mortality, increased healthcare expenditure, and costs related to criminal justice, social welfare, and other social consequences [7].

Also, sociodemographic factors, including age, sex, education, parental educational status, religion, and others, play significant roles in impacting addictive behavior and mental health [20]. In a survey conducted by the Australian Institute of Health and Welfare in 2024 [21], factors such as age, location, gender, parental education, income, and indigenous background predict mental health status and psychological distress in youth [22, 23]. Also, children and adolescents in low-income households face heightened mental health risks [24], with family structure significantly influencing their well-being [25]. Parental separation, indicative of non-intact families, is associated with increased mental health challenges [26–28].

Despite the global focus on behavioral addictions and their effects, limited research exists on their prevalence and impact in Nigeria. The intersection of behavioral addictions and mental health, including the roles of socio-economic factors, particularly among higher institution students, remains underexplored. Given the increasing rates of addiction and mental health challenges worldwide, understanding these dynamics in the Nigerian context is essential. This study examined sociodemographic factors and addictive behavior as predictors of mental well-being among higher institution students in Kwara State, Nigeria.

2 Methods

2.1 Study design, setting, and population

A descriptive cross-sectional design was adopted for this study. This study was particularly conducted in higher institutions within the Kwara Central Senatorial District, comprising Asa, Ilorin-East, Ilorin-West, and Ilorin-South, in Kwara State. The study population consisted of young people currently enrolled in any category of higher institutions in Kwara Central Senatorial District, Kwara State. Data were collected between April and May 2024.

2.2 Sample size determination

The sample size was calculated using the formula for applied research [29–31], with a 95% confidence level, 5% margin of error, and an estimated prevalence of 50% (to maximize sample size). The p-value threshold for significance was set at 0.05.

The estimated value is obtained as shown below:

$n = \frac{Z^2 pq}{d^2}$

Where:

n = sample size

z = the standard score (critical value) corresponding to a 95% confidence interval, which is equal to 1.96

d = the proportion of random sampling error between the sample and the population, which is chosen to be 5%

p = prevalence

$1.96^2 \times 0.5 \times (1\text{-}0.5) / 0.05^2$

= 384.

Calculating for a 10% non-response rate

384 / (1-0.10)

= 426

2.3 Inclusion and exclusion criteria

This study included students of the selected higher institutions in Kwara State who were registered, full-time students and were currently on campus during data collection. However, eligible students who declined to participate, those below the age of 18 years, and those who were unavailable at the time of data collection due to illness or other reasons that could affect their effective responses were excluded from the study.

2.4 Sampling technique

A multistage sampling technique was adopted in this study. First, purposive sampling was used to select Kwara Central Senatorial District out of the three senatorial districts that make up the State. This is because Kwara Central Senatorial district has the highest number of higher institutions in the state that cut across universities, polytechnics, and Colleges of Education. In all, there are 29 higher institutions in the state as generated through Kwara State Ministry of Education, out of which more than 10 are located within Kwara Central Senatorial District and six were purposively selected among the 10 higher institutions located in the Kwara Central Senatorial District. The institutions were clustered into three: University, Polytechnic, and College of Education. First, three universities were purposively selected for the study, representing federal, state, and

private ownership: the University of Ilorin, Kwara State University, and Al-Hikmah University, respectively. Unfortunately, only one polytechnic was located within the selected district, namely Kwara State Polytechnic, which was also chosen for the study. Lastly, there were six colleges of education in the metropolis, out of which two were randomly selected (Kwara State College of Education and Nana Aisha College of Education, Ilorin).

In all, six institutions were selected, comprising three Universities, one Polytechnic, and two Colleges of Education. Five faculties were randomly selected from each institution, and five departments were also randomly selected to ensure adequate coverage. Respondents were selected using a systematic sampling technique; a methodical approach that guarantees representative samples are unbiasedly selected. The proportion of students selected from each department was determined by the total number of students in the selected departments using the proportionate sampling method. A systematic sampling interval (kth) was calculated by dividing the total number of students in each department by the desired sample size. This interval was used to select every kth student from the list of students in each department. Starting from a randomly selected point on the list, every kth student was selected for the sample. This process was repeated for each department, ensuring that the proportion of students selected from each department was representative of the total number of students in that department.

2.5 Data collection tool

The data for this study were collected using a structured questionnaire comprising sections on sociodemographic characteristics and five validated scales measuring addictive behaviors and mental well-being. The questionnaire was written in English, and since all the respondents were in school and communicated clearly in English, the instrument was not translated into any other language. All scales were adapted from established instruments but re-validated before use, and generated a Cronbach alpha coefficient of 0.8, which is considered strong enough for use. The application in this study is described in detail below.

2.5.1 Internet addiction assessment (IAA)

Internet addiction was assessed using an 18-item scale adapted from Cash et al. [32]. This tool differentiates problematic use from mere use by evaluating patterns of behavior, loss of control, and functional impairment. Each item is dichotomous (Yes = 1, No = 0). The total score is the sum of all items, yielding a continuous severity spectrum from 0 to 18, where a higher score indicates a greater severity of internet addiction.

2.5.2 Gambling symptom assessment scale (G-SAS)

Gambling symptom severity was measured using the 12-item G-SAS [33, 34]. This scale assesses urges, thoughts, and the behavioral and psychosocial consequences of gambling over the past 7 days. Each item is rated on a 5-point Likert scale (0–4). The total score (range: 0–48) was categorized using established clinical cut-offs to classify severity: Mild (8–20), Moderate (21–30), Severe (31–40), and Extreme (41–48).

2.5.3 Sexual addiction screening test (SAST)

Sexual compulsivity was evaluated using 17 items adapted from the full 45-item Sexual Addiction Screening Test [35]. The selected items were deemed most suitable for the

study population, and the tool was revalidated prior to deployment. The scale identifies behaviors indicative of sexual addiction, focusing on loss of control and negative consequences. For this adapted version, a total score of 3 or above was used as the cut-off point to indicate a potential problem with sexual addiction.

2.5.4 Drug abuse screening test (DAST-20)

Problematic drug use was screened using a 15-item version adapted from the Drug Abuse Screening Test (DAST-20) [36]. The adaptation involved removing 5 items that were not valid during the revalidation process for our specific context. The tool assesses non-medical use of drugs and its negative repercussions over the past 12 months. Responses are dichotomous (Yes/No). A total score of 6 or more was used to indicate a drug-related problem, consistent with the interpretation of the standard scale.

2.5.5 Warwick-Edinburgh mental well-being scale (WEMWBS)

Mental well-being was measured using the full 14-item Warwick-Edinburgh Mental Well-being Scale (WEMWBS) [37]. Items are positively worded and rated on a 5-point frequency scale. The total score is the sum of all items, providing a continuous measure ranging from 14 to 70, where a higher score indicates greater positive mental well-being.

2.6 Validity and reliability

Despite using existing scales, several additional measures were taken to ensure that the instrument met the necessary psychometric requirements. Validity of the questionnaire contents was achieved through consultation of relevant literature and adherence to the study objectives. The draft was subjected to expert review, where the content and structure of the instrument were critically examined. Necessary corrections were made to ensure structure and content validity. The instrument was pretested in one of the higher institutions in Asa local government area (LGA), which was not selected for the main study. The analysis showed that the tool had a reliability coefficient above 0.8. Findings from the pre-test were also used to make necessary corrections to ensure the relevance, context-friendly appropriateness, and adequacy of the items in the instrument.

2.7 Data management and analysis procedure

The study team checked the questionnaires for errors and numbered them serially for easy identification and recall. Completed questionnaires were sorted, edited, and coded with the use of a coding guide. The data obtained from the questionnaires were entered into the computer using STATA version 18. Descriptive statistics, such as frequencies and means, were used to summarize participants' sociodemographic characteristics and responses. Bivariate analyses, including chi-square tests, were conducted to examine initial associations. For inferential analysis, multiple linear regression was employed to identify independent variables associated with mental well-being. Covariates were chosen based on established literature linking addictive behaviors (gambling, sexual habits, internet use, drug habits) to mental well-being. Demographic factors (age, sex, religion) were considered in descriptive and bivariate analyses, while addictive behaviors were modeled as predictors in the regression. The results are presented as regression coefficients with significance levels and overall model fit ($R^2 = 0.056$, $p < 0.001$).

2.8 Ethical and cultural considerations

This study was conducted in Kwara State and received ethical approval from the Ethics Research Committee of the Kwara State Ministry of Health, which is licensed by the National Health Research Ethics Committee (NHREC) of Nigeria. The reference number for this approval is ERC/MOH/2024/02/185. The study strictly adhered to the ethical guidelines outlined in the Helsinki Declaration for research involving human subjects. Before the research commenced, the participants were informed about the purpose and process of the study. Furthermore, time was spent to properly educate respondents about the purpose of the study, the procedure, the risks, the benefits, and their rights. Written informed consents were obtained from all participants, and their confidentiality was assured with the agreement that their identities would remain undisclosed. To further safeguard their confidentiality, no personal identifiers were collected from the respondents. In addition, the study did not involve any invasive procedures, so the respondents were not subjected to any physical harm. The participants were allowed to answer the questions in a comfortable environment without any public interference. The participants were also informed that they had the right to withdraw from the study at any time without any prejudice.

3 Results

Table 1 shows the prevalence of addictive behaviors among undergraduates in Kwara State. While 67.9% of students exhibited moderate social media habits, they generally showed low levels of engagement in risky behaviors, with 87.8% reporting low drug use and 85.4% reporting low gambling habits. Additionally, 95.4% of students reported low levels of risky sexual behavior. On a positive note, the survey found that 73.7% of students possessed high self-esteem, indicating strong positive mental well-being.

Table 2 presents the association between socio-demographic variables and social media habits. Significant associations were found for age and institution type. Younger students (20 years and below) exhibited higher rates of moderate social media usage (74%), while older students (> 25 years) exhibited a wider range of usage patterns, with the highest proportion of both low (72.7%) and high (25.0%) usage, which is the highest among the different age categories. A significant association was also found with institution type ($p = 0.005$), with university students reporting the highest percentage of moderate use (72.9%), followed by college of education and polytechnic students, who reported moderate usage rates of 64.9% and 56%, respectively. No significant associations were found with gender ($p = 0.773$) or religion ($p = 0.294$).

Table 3 examines the relationship between drug use patterns and socio-demographic characteristics. Notably, gender emerged as a significant predictor ($p < 0.001$), showing that males had a higher proportion of moderate drug use (15.9%) compared to females (5.4%). Institution type (public/private) was also significant ($p = 0.034$), with students

Table 1 Prevalence of addictive behaviors among undergraduates in Kwara state

Habits	Low (*n*%)	Moderate (*n*%)	High (*n*%)
Social media	115 (18.2%)	429 (67.9%)	88 (13.9%)
Drug	555 (87.8%)	71 (11.2%)	6 (0.9%)
Sexual	603 (95.4%)	23 (3.6%)	6 (0.9%)
Gambling	540 (85.4%)	83 (13.1%)	9 (1.4%)
Self esteem-mental	53 (8.4%)	113 (17.9%)	466 (73.7%)

Table 2 Association between sociodemographic variables and social media habits

Variables	Social media habits			Total *n* (%)	Chi-square analysis
	Low *n* (%)	Moderate *n* (%)	High *n* (%)		
Age categories					
≤ 20 years	44 (14.9%)	219 (74.0%)	33 (11.1%)	296 (100.0%)	$X^2 = 118.252$, df = 4, $p < 0.001$
21–25 years	57 (19.5%)	191 (65.4%)	44 (15.1%)	292 (100.0%)	
> 25 years	32 (72.7%)	1 (2.3%)	11 (25.0%)	44 (100.0%)	
Gender					
Male	55 (16.8%)	227 (69.2%)	46 (14.0%)	328 (100.0%)	$X^2 = 1.761$ df = 4 $p = 0.773$
Female	59 (20.0%)	196 (66.4%)	40 (13.6%)	295 (100.0%)	
Prefer not to say	1 (11.1%)	6 (66.7%)	2 (22.2%)	9 (100.0%)	
Religion					
Islam	71 (17.4%)	273 (67.1%)	63 (15.5%)	407 (100.0%)	$X^2 = 2.449$, df = 2, $p = 0.294$
*Others	44 (19.6%)	156 (69.3%)	25 (11.1%)	225 (100.0%)	
Public/private institution					
Private	29 (17.8%)	120 (73.6%)	14 (8.6%)	163 (100.0%)	$X^2 = 5.576$ df = 2 $p = 0.062$
Public	86 (18.3%)	309 (65.9%)	74 (15.8%)	469 (100.0%)	
Institution type					
University	62 (16.6%)	272 (72.9%)	39 (10.5%)	373 (100.0%)	$X^2 = 15.016$ df = 4 $p = 0.005$
Polytechnic	28 (22.4%)	70 (56.0%)	27 (21.6%)	125 (100.0%)	
College of education	25 (18.7%)	87 (64.9%)	22 (16.4%)	134 (100.0%)	

Table 3 Association between drug habits and socio-demographic characteristics

Variables	Drug habits			Total *n* (%)	Chi-square analysis
	Low *n* (%)	Moderate *n* (%)	High *n* (%)		
Age categories					
≤ 20 years	268 (90.5%)	24 (8.1%)	4 (1.4%)	296 (100.0%)	$X^2 = 6.461$, df = 4, $p = 0.167$
21–25 years	249 (85.3%)	41 (14.0%)	2 (0.7%)	292 (100.0%)	
> 25 years	38 (86.4%)	6 (13.6%)	0 (0.0%)	44 (100.0%)	
Gender					
Male	273 (83.2%)	52 (15.9%)	3 (0.9%)	328 (100.0%)	$X^2 = 21.464$ df = 4 $p < 0.001$
Female	276 (93.6%)	16 (5.4%)	3 (1.0%)	295 (100.0%)	
Prefer not to say	6 (66.7%)	3 (33.3%)	0 (0.0%)	9 (100.0%)	
Religion					
Islam	358 (88.0%)	43 (10.6%)	6 (1.5%)	407 (100.0%)	$X^2 = 3.775$, df = 2, $p = 0.151$
*Others	197 (87.6%)	28 (12.4%)	0 (0.0%)	225 (0.0%)	
Public/private institution					
Private	152 (93.3%)	11 (6.7%)	0 (0.0%)	163 (100.0%)	$X^2 = 6.758$ df = 2 $p = 0.034$
Public	403 (85.9%)	60 (12.8%)	6 (1.3%)	469 (100.0%)	
Institution type					
University	332 (89.0%)	41 (11.0%)	0 (0.0%)	373 (100.0%)	$X^2 = 16.442$ df = 4 $p = 0.002$
Polytechnic	106 (84.8%)	18 (14.4%)	1 (0.8%)	125 (100.0%)	
College of education	117 (87.3%)	12 (9.0%)	5 (3.7%)	134 (100.0%)	

from private institutions reporting lower rates of drug use. Furthermore, the type of educational institution (university, polytechnic, college) showed a significant association with drug habits ($p = 0.002$), with university students showing the highest rate of low drug use (89.0%).

Table 4 explores the association between sociodemographic variables and sexual habits. The findings reveal that sexual habits were predominantly low across all demographic groups. A significant association was found with religion ($p = 0.048$), with a slightly higher percentage of non-Islamic students reporting moderate sexual activity (5.3%) compared to Muslim students (2.7%). Age categories ($p = 0.622$) and gender ($p = 0.227$) do not show significant associations with sexual practices. In addition, the type of public or private institution ($p = 0.876$) and the type of institution ($p = 0.078$) also show no significant relationships. Notably, university students reported slightly higher rates of low sexual activity (96.2%), although the differences were not statistically significant.

Table 5 presents the association between gambling habits and various sociodemographic variables, including age categories, gender, religion, type of institution, and institution classification. Gambling habits were significantly associated with several factors. Age was a significant factor ($p < 0.001$), with the oldest group (> 25 years) showing the highest rate of moderate gambling (36.4%). Gender differences play a notable role in gambling habits. Gender was highly significant ($p < 0.001$), with females predominantly reporting low gambling habits (96.6%), whereas males demonstrated higher levels of moderate (21.6%) and high gambling habits (2.7%). Interestingly, no significant association was observed between gambling habits and religious beliefs. However, private institution respondents reported higher proportions of low gambling habits (91.4%) compared to those in public institutions (83.4%) ($p = 0.038$). Furthermore, gambling habits also varied significantly by institution type. Respondents from colleges of education exhibited the highest percentage of low gambling habits (92.5%) ($p = 0.041$), whereas those from universities and polytechnics showed relatively higher rates of moderate gambling habits (14.7% and 15.2%, respectively).

Table 6 examines the association between sociodemographic variables and self-esteem and mental habits. The analysis reveals that self-esteem was high across the sample. The

Table 4 Association between sociodemographic variables and sexual habits

Variables	Sexual habits			Total *n* (%)	Chi-square analysis
	Low *n* (%)	Moderate *n* (%)	High *n* (%)		
Age categories					
≤ 20 years	282 (95.3%)	11 (3.7%)	3 (1.0%)	296 (100.0%)	$X^2 = 2.630$, df = 4, $p = 0.622$
21–25 years	281 (96.2%)	9 (3.1%)	2 (0.7%)	292 (100.0%)	
> 25 years	40 (90.9%)	3 (6.8%)	1 (2.3%)	44 (100.0%)	
Gender					
Male	308 (93.9%)	16 (4.9%)	4 (1.2%)	328 (100.0%)	$X^2 = 5.647$ df = 4 $p = 0.227$
Female	287 (97.3%)	6 (2.0%)	2 (0.7%)	295 (100.0%)	
Prefer not to say	8 (88.9%)	1 (11.1%)	0 (0.0%)	9 (100.0%)	
Religion					
Islam	390 (95.8%)	11 (2.7%)	6 (1.5%)	407 (100.0%)	$X^2 = 6.093$, df = 2, $p = 0.048$
*Others	213 (94.7%)	12 (5.3%)	0 (0.0%)	225 (100.0%)	
Public/private institution					
Private	156 (95.7%)	6 (3.7%)	1 (0.6%)	163 (100.0%)	$X^2 = 0.264$ df = 2 $p = 0.876$
Public	447 (95.3%)	17 (3.6%)	5 (1.1%)	469 (100.0%)	
Institution type					
University	359 (96.2%)	13 (3.5%)	1 (0.3%)	373 (100.0%)	$X^2 = 8.414$ df = 4 $p = 0.078$
Polytechnic	118 (94.4%)	6 (4.8%)	1 (0.8%)	125 (100.0%)	
College of education	126 (94.0%)	4 (3.0%)	4 (3.0%)	134 (100.0%)	

Table 5 Association between gambling habits and socio-demographic variables

Variables	Gambling habits			Total *n* (%)	Chi-square analysis
	Low *n* (%)	Moderate *n* (%)	High *n* (%)		
Age categories					
≤ 20 years	267 (90.2%)	26 (8.8%)	3 (1.0%)	296 (100.0%)	$X^2 = 27.635$, df = 4, $p < 0.001$
21–25 years	245 (83.9%)	41 (14.0%)	6 (2.1%)	292 (100.0%)	
> 25 years	28 (63.6%)	16 (36.4%)	0 (0.0%)	44 (100.0%)	
Gender					
Male	248 (75.6%)	71 (21.6%)	9 (2.7%)	328 (100.0%)	$X^2 = 56.412$ df = 4 $p = < 0.001$
Female	285 (96.6%)	10 (3.4%)	0 (0.0%)	295 (100.0%)	
Prefer not to say	7 (77.8%)	2 (22.2%)	0 (0.0%)	9 (100.0%)	
Religion					
Islam	354 (87.0%)	47 (11.5%)	6 (1.5%)	407 (100.0%)	$X^2 = 2.522$, df = 2, $p = 0.283$
*Others	186 (82.7%)	36 (16.0%)	3 (1.3%)	225 (100.0%)	
Public/private institution					
Private	149 (91.4%)	12 (7.4%)	2 (1.2%)	163 (100.0%)	$X^2 = 6.546$ df = 2 $p = 0.038$
Public	391 (83.4%)	71 (15.1%)	7 (1.5%)	469 (100.0%)	
Institution type					
University	310 (83.1%)	55 (14.7%)	8 (2.1%)	373 (100.0%)	$X^2 = 9.952$ df = 4 $p = 0.041$
Polytechnic	106 (84.8%)	19 (15.2%)	0 (0.0%)	125 (100.0%)	
College of education	124 (92.5%)	9 (6.7%)	1 (0.7%)	134 (100.0%)	

Table 6 Association between sociodemographic variables and self-esteem/mental habits

Variables	Self esteem-mental habits			Total *n* (%)	Chi-square analysis
	Low *n* (%)	Moderate *n* (%)	High *n* (%)		
Age categories					
≤ 20 years	27 (9.1%)	51 (17.2%)	218 (73.6%)	296 (100.0%)	$X^2 = 2.244$, df = 4, $p = 0.691$
21–25 years	22 (7.5%)	51 (17.5%)	219 (75.0%)	292 (100.0%)	
> 25 years	4 (9.1%)	11 (25.0%)	29 (65.9%)	44 (100.0%)	
Gender					
Male	30 (9.1%)	65 (19.8%)	233 (71.0%)	328 (100.0%)	$X^2 = 4.195$ df = 4 $p = 0.380$
Female	22 (7.5%)	48 (16.3%)	225 (76.3%)	295 (100.0%)	
Prefer not to say	1 (11.1%)	0 (0.0%)	8 (88.9%)	9 (100.0%)	
Religion					
Islam	34 (8.4%)	70 (17.2%)	303 (74.4%)	407 (100.0%)	$X^2 = 0.377$, df = 2, $p = 0.828$
*Others	19 (8.4%)	43 (19.1%)	163 (72.4%)	225 (100.0%)	
Public/private institution					
Private	7 (4.3%)	19 (11.7%)	137 (84.0%)	163 (100.0%)	$X^2 = 12.312$ df = 2 $p = 0.002$
Public	46 (9.8%)	94 (20.0%)	329 (70.1%)	469 (100.0%)	
Institution type					
University	27 (7.2%)	73 (19.6%)	273 (73.2%)	373 (100.0%)	$X^2 = 26.285$ df = 4 $p < 0.001$
Polytechnic	3 (2.4%)	28 (22.4%)	94 (75.2%)	125 (100.0%)	
College of education	23 (17.2%)	12 (9.0%)	99 (73.9%)	134 (100.0%)	

institution type revealed significant findings, with students from private institutions exhibiting notably higher levels of self-esteem (84.0%) compared to those in public institutions (70.1%) ($p = 0.002$). Self-esteem varied significantly by institution type ($p < 0.001$), with polytechnic students reporting the highest proportion of high self-esteem (75.2%), followed closely by college of education students (73.9%) and university students (73.2%).

Table 7 Multiple linear regression analysis predicting mental well-being ($N = 632$)

Predictor	Unstandardized coefficients (B)	Std. Error	Standardized coefficients (β)	t-value	*p*-value
(Constant)	42.802	1.355		31.578	< 0.001
Gambling habit	-0.116	0.070	-0.067	-1.655	0.098
Sexual habits	-0.350	0.099	-0.148	-3.548	< 0.001
Internet habit score	-0.170	0.070	-0.101	-2.443	0.015
Drug habits	-0.114	0.174	-0.027	-0.651	0.515
Model summary					
R^2	0.056				
Adjusted R^2	0.050				
F-statistic	9.267				
p-value (model)	< 0.001				

No significant association was found with age or gender, indicating that these factors do not affect self-esteem or mental well-being across the groups. Similarly, religion did not show any significant correlation with self-esteem or mental habits.

Table 7 narrates the multiple linear regression conducted to determine the impact of addictive behaviors on mental well-being, controlling for demographic factors. The model included gambling habits, sexual habits, internet habit score, and drug habits as predictors. The regression model was statistically significant, $F(4, 627) = 9.267$, $p < 0.001$, indicating that the set of predictors reliably predicted mental well-being. However, the model explained a modest portion of the variance in mental well-being scores ($R^2 = 0.056$, Adjusted $R^2 = 0.050$). Analysis of the individual predictors revealed that sexual habits ($\beta = -0.148$, $p < 0.001$) and internet habit score ($\beta = -0.101$, $p = 0.015$) were significant negative predictors of mental well-being. This indicates that higher levels of sexual compulsivity and more severe internet addiction were independently associated with lower mental well-being scores. In contrast, gambling habits ($\beta = -0.067$, $p = 0.098$) and drug habits ($\beta = -0.027$, $p = 0.515$) were not significant predictors of mental well-being in this model. A separate regression analysis confirmed that the demographic variables of age, religion, and gender were not joint significant predictors of mental well-being ($F(3, 628) = 2.286$, $p = 0.078$, $R^2 = 0.011$), although age alone showed a small but significant positive relationship ($B = 0.395$, $p = 0.036$). Our regression analysis showed that all the variables included in the model significantly explained only 5.0% of the variance observed in the Mental well-being scores of our participants. This indicates that other confounding factors that are not measured in our study may have been responsible for the remaining 95% variance observed in our participants' mental well-being scores.

Our regression analysis showed that all the variables included in the model significantly explained only 5.0% of the variance observed in the Mental well-being scores of our participants. This indicates that other confounding factors that are not measured in our study may have been responsible for the remaining 95.0% variance observed in our participants' mental well-being scores.

4 Discussion

Addictive behaviors among higher institution students in Nigeria are a growing concern, with significant implications for their psychological and mental well-being. The present study examined the prevalence of addictive behaviors among higher institution students in Kwara State, Nigeria, and explored their associations with socio-demographic

variables and mental well-being. The findings reveal important patterns in social media use, drug habits, sexual behavior, gambling, and self-esteem, providing insights into the behavioral tendencies of Nigerian university students.

4.1 Prevalence of addictive behaviors

The predominance of moderate social media engagement (67.9%) alongside low levels of drug use (87.8%), gambling (85.4%), and risky sexual practices (95.4%) suggests that undergraduates in Kwara State generally exhibit controlled behaviors outside digital platforms. This finding aligns with a broader Nigerian context where moderate, rather than pathological, levels of addictive behavior are often reported [38]. A notably positive finding was the high self-esteem levels (73.7%), which may serve as a protective factor against the development of more severe addictive behaviors [39]. The high prevalence of low-risk sexual behavior contrasts with some studies reporting higher risky sexual practices among African university students [40], possibly due to the strong cultural and religious influences prevalent in Kwara State, which may promote more conservative sexual norms [41].

4.2 Social media habits and socio-demographic factors

Age was significantly associated with social media use. Younger students (≤ 20 years) showed the highest moderate usage (74.0%), which is consistent with global trends indicating younger students' deeper immersion in digital platforms [42, 43]. The findings are not consistent with a study conducted in Ibadan that found that younger students are more vulnerable to addictive behaviors [44]. However, gender was found to predict addiction as males reported higher rates of gambling and substance use, as noted by Aguocha et al. [45], who attributed this to cultural norms encouraging risk-taking behaviors in men. Institution types also influence behaviors; students in private institutions reported higher self-esteem (84.0%) and lower gambling rates, likely due to more structured environments and better access to mental health resources [38]. Notably, gender was not significantly associated with social media habits, contradicting some studies that found gender differences in usage patterns [46]. This may reflect evolving trends where both genders engage equally in digital platforms. The lack of gender differences echoes global surveys showing similar social media patterns in male and female university populations.

4.3 Drug use pattern and gender dynamics

Gender was a significant predictor of drug use patterns, with males exhibiting higher moderate use (15.9%) than females (5.4%). The moderate level of substance abuse reported by the students aligns with studies by Aguocha et al. [45] and Olanrewaju et al. [47], who attributed this disparity to cultural norms that often encourage risk-taking behaviors in men. The overall low prevalence of 12.8% in southwestern Nigeria and peer pressure, academic stress, and easy access to substances are key contributors [47]. Similarly, 13.1% of students engaged in gambling, with financial strain and personality traits identified as significant motivators, aligns with the study by Temitope et al. [48]. Sexual compulsivity was less common, with 95.4% of students reporting minimal engagement. Ifeanyi Brian et al. [41] noted that cultural and religious norms limit sexual compulsivity in Nigeria. In contrast, 73.7% of students reported high self-esteem, which acts as

a protective factor against mental health challenges [49]. Students from private institutions and universities reported lower substance use, suggesting that structured environments, stricter policies, and potentially better access to resources can act as protective factors [50]. University students also showed lower drug use than polytechnic and college of education students, suggesting institutional environment influences substance use patterns.

4.4 Addictive behaviors as predictors of mental well-being

Crucially, our multiple linear regression analysis provides direct evidence for the relationship between specific addictive behaviors and mental well-being. The model was statistically significant, explaining 5.6% of the variance in mental well-being scores. This indicates that higher levels of sexual compulsivity and more severe internet addiction were independently associated with poor mental well-being, supporting global literature on the detrimental psychological effects of these behaviors. However, this does not align with studies that found frequency of sexual activities, sexual quality of life, and male sexual function to be positively associated with quality of life, which is a component of mental well-being [51–53].

However, it is important to note that gambling habits and drug habits were not significant predictors in our model. This suggests that in this specific cohort, the negative impact on mental well-being was more strongly tied to behavioral addictions related to internet and sexual activity than to substance use or gambling. The modest R^2 value (0.056) indicates that a large portion of the variance in mental well-being is explained by factors not measured in this study, such as socioeconomic status, academic pressure, genetic predispositions, or other unmeasured psychological variables [20, 24]. This underscores the complex, multifactorial nature of mental well-being.

Internet habit is linked to feelings of inadequacy [54], while substance abuse exacerbates depression and cognitive impairments [55]. However, drug addiction did not predict internet use in our current study. This contradicts previous findings where a negative correlation was found between drug abuse and mental health, indicating that substance abuse has an adverse impact on mental well-being [56].

5 Limitations

A limitation of this study is the reliance on self-reported data from participants, which may be subject to biases such as recall inaccuracies or social desirability effects, potentially affecting the reliability and validity of the findings. Also, cross-sectional design limits causal interpretation, but these findings underscore the need for psychosocial interventions in tertiary institutions. Also, not all predictors of mental well-being were considered in their study. Hence, future studies should consider other possible predictors of mental well-being among tertiary institution students. Lastly, the study's generalizability is limited due to its specific location, which may not reflect broader populations or diverse settings. Furthermore, as our model explained only 5.6% of the variance, future research should incorporate a broader range of potential predictors, including socioeconomic factors, personality traits, and detailed academic stressors, to build a more comprehensive model.

6 Conclusion and recommendations

This study identified the presence of addictive behaviors related to social media, substance misuse, gambling, and sexual compulsivity among Nigerian university students. The prevalence of these behaviors was influenced by a range of sociodemographic factors, including age, gender, institution type, as well as broader cultural and environmental factors. However, based on our regression analysis, internet-related habits were significantly associated with lower mental well-being, while substance misuse and gambling were not significant predictors in this cohort. Social media addiction was the most common behavior identified. Substance misuse, though less common, appeared to be influenced by peer influence and academic pressure, while gambling is driven by financial difficulties and individual personality traits. Sexual compulsivity is less common, with cultural and religious beliefs providing some protection. To address these issues, particularly the significant association between internet use and well-being, university institutions should prioritize creating robust mental health support systems, including counseling services and peer support initiatives. Targeted awareness campaigns should educate students on the risks of excessive social media use, promote digital literacy, and healthy online habits. Furthermore, regulations should be considered to manage substance availability on campus. Finally, longitudinal studies are needed to establish causality and explore the complex interplay between a wider array of factors, including socioeconomic status, family background, and academic stress, and their collective impact on student mental well-being.

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Author contributions
OPA, BTO, and OAO prepared the initial draft of the manuscript; all authors reviewed, provided feedback, and approved this version of the manuscript.

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Data availability
The data sets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from the Ethics Research Committee of the Kwara State Ministry of Health (ERC/MOH/2024/02/185) to ensure that the study protocol conforms to international standards for conducting human subject research. The study strictly adhered to the ethical principles outlined in the Declaration of Helsinki for research involving human subjects. Written informed consent was obtained from all participants, and their confidentiality was guaranteed through the agreement that their identities would remain undisclosed.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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