Health risk behaviour attitude towards physical activity among young university students

Comportamiento de riesgo para la salud Actitud hacia la actividad física en jóvenes universitarios

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Abstract

Background: Adolescence and early adulthood represent a critical period that shapes long-term health outcomes and lays the foundation for a healthy and productive life. Understanding the influence of health risk behaviors on physical activity and dietary habits is essential for targeted public health interventions.
Objective: The primary objective of this study was to assess the impact of various dimensions of health risk behaviors on physical activity among college students and to examine the differences in physical activity and dietary patterns based on gender.
Methodology: This cross-sectional study investigated students' attitudes and behaviours related to health risks and physical activity. The analysis encompassed six dimensions of health risk behaviour: smoking, alcohol use, illicit drug use, diet, and risky sexual behaviour. A total of 95 students (30 females and 65 males), aged 20–30 years, were selected through random sampling. Data were collected using the Leah Health Risk Behaviours Inventory.
Results: Descriptive statistics revealed gender-based differences in physical activity levels, with males exhibiting higher engagement compared to females. Correlation analysis indicated that diet and smoking behaviours significantly correlated with physical activity. Furthermore, smoking, alcohol use, drug use, and risky sexual behaviour showed significant correlations with dietary patterns. Alcohol consumption was also significantly associated with both drug use and risky sexual behaviours, while risky sexual behaviour was strongly linked with illicit drug use.
Conclusion: The study highlights the interrelationships among various health risk behaviours. These findings underscore the importance of inclusive health education programs thataddress multiple dimensions of risk to promote healthier lifestyles among young adults.

Keywords

Alcohol; health risk behavior; illicit drug; physical activity; risky sexual behavior.

Resumen

Antecedentes: La adolescencia y la adultez temprana representan un período crítico que da forma a los resultados de salud a largo plazo y sienta las bases para una vida saludable y productiva. Comprender la influencia de los comportamientos de riesgo para la salud en la actividad física y los hábitos dietéticos es esencial para las intervenciones de salud pública específicas.
Objetivo: El objetivo principal de este estudio fue evaluar el impacto de varias dimensiones de las conductas de riesgo para la salud en la actividad física entre los estudiantes universitarios y examinar las diferencias en la actividad física y los patrones dietéticos según el género.
Metodología: Se trata de un estudio transversal que investigó las actitudes y comportamientos de los estudiantes en relación con los riesgos para la salud y la actividad física. El análisis abarcó seis dimensiones de las conductas de riesgo para la salud: tabaquismo, consumo de alcohol, consumo de drogas ilícitas, dieta y conductas sexuales de riesgo. Se seleccionó un total de 95 estudiantes (30 mujeres y 65 hombres), con edades comprendidas entre los 20 y los 30 años, mediante muestreo aleatorio. Los datos se recogieron utilizando el Inventario de Conductas de Riesgo para la Salud de Leah.
Resultados: La estadística descriptiva reveló diferencias de género en los niveles de actividad física, con los hombres exhibiendo una mayor participación en comparación con las mujeres. El análisis de correlación indicó que la dieta y las conductas de tabaquismo se correlacionaron significativamente con la actividad física. Además, el tabaquismo, el consumo de alcohol, el consumo de drogas y las conductas sexuales de riesgo mostraron correlaciones significativas con los patrones dietéticos. El consumo de alcohol también se asoció significativamente tanto con el consumo de drogas como con las conductas sexuales de riesgo, mientras que las conductas sexuales de riesgo se relacionaron fuertemente con el consumo de drogas ilícitas.
Conclusión: El estudio pone de manifiesto las interrelaciones entre diversas conductas de riesgo para la salud. Estos hallazgos subrayan la importancia de los programas inclusivos de educación para la salud que abordan múltiples dimensiones de riesgo para promover estilos de vida más saludables entre los adultos jóvenes.

Palabras clave

Insertar Alcohol; conducta de riesgo para la salud; droga ilícita; actividad física; conducta sexual de riesgo.

Introduction

Health is significantly influenced by individual behaviors. Engaging in healthy practices leads to better physical and mental well-being. It is considered that most young people are in good health. Young age is considered the most critical stage of life, but many people experience illnesses or behaviors that prevent them from reaching their full potential (Sunitha & Gururaj, 2014). Although young adulthood and adolescence are typically healthy, during these years, social habits and issues related to public health either start or peak. (Nanda, 2018). These behaviors often begin during this stage, making early intervention essential.

Individual health behaviors, such as tobacco use, unhealthy dietary patterns, and physical inactivity, are major contributors to premature mortality worldwide (GBD 2019 Risk Factors Collaborators, 2020). Health-risk behaviors (HRBs) continue to represent a leading cause of morbidity and mortality among adolescents and young adults, contributing significantly to the global burden of disease (WHO, 2021; Sawyer et al., 2012). These high-risk behaviors adversely impact both mental and physical health, increasing the likelihood of early death, chronic disease, and disability (Patton et al., 2016; Twenge et al., 2021). A healthy individual plays a crucial role in fostering positive social and economic development within their community.

According to reports, university students comprise a sizable portion of the youthful population and have a high prevalence rate of risky behaviors (Pengpid et al., 2014; Anischenko et al., 2016). Basic health risk behaviours (HRB) include excessive eating, drinking alcohol, smoking cigarettes, and not exercising are major reasons for the worldwide burden of disease and young people's deaths. (Murray and Lopez, 1997; Blum & Nelson, 2004). These actions not only increase the risk of some of the world's most common causes of death, but they also cost society money in terms of violence, damage to property, detention, decreased lifespans, and medical expenses (Kolek, 2006). morbidity they are typically developed throughout adolescence, have an impact on adulthood, and significantly raise mortality and morbidity. (Eaton et al., 2006). Therefore, informing and developing the most effective prevention methods is vital to better understanding the factors influencing HRB. Furthermore, many risky behaviors seen over the years are probably connected. Some studies have shown independent relationships between high-risk alcohol consumption, inadequate stress management, and weight-related behaviors in this population, including dietary intake, P.A., and unhealthy weight control behaviors (Nelson et al., 2008, 2009). Still, not much information is available. to completely comprehend the complicated relationships between health behaviors and lifestyle patterns, particularly at this high-risk age, despite the probable mechanisms for these links having been presented. Self-esteem, in particular, can significantly impact HRB (Jessor, 2014). This study links various elements, including P.A., Diet, Smoking, alcohol use, and risky sexual conduct, to help college-age adolescents with their HRB.

The world's largest public health burden at the moment is chronic disease. The most pivotal of these chronic diseases are cancer and cardiovascular disease. We will see throughout this work how they connected to physical exercise or a lack of it. Additionally, the prevalence of chronic diseases is rising quickly globally. According to estimates, chronic diseases were responsible for around 60% of the 59 million reported deaths worldwide (WHO, 2009). Cardiovascular diseases account for over half of all deaths from chronic illnesses. According to specialists in public health from the WHO, to lead healthy and fulfilling lives, children and adolescents must need to maintain greater levels of PA and begin to act more actively throughout adulthood. Young people who participate in physical activity have improved bone mineral density, cardiovascular fitness, and muscular strength, among other health benefits, dropped risk factors for cardiovascular disease and improved mental health (Janssen & LeBlanc, 2010)

(Hallal et al., 2012) also demonstrated that Physical inactivity has been rising quickly; it is estimated that 31% of people worldwide are inactive. It has been established through decades of research that cancer, metabolic, and cardiovascular disorders are curable. and that P.A. protects against them. Exercise also contributes to psychological well-being by raising self-esteem and facilitating the management of anxiety and sadness. (Nelson et al.,2009; Warburton et al.,2006). American College of Sports Medicine (ACSM) and American Hospital Association (AHA) guideline also recommends and encourages participation in multidimensional P.A. program focusing on moderate-to-intense combined exercise for strengthening, flexibility, and balance in kids and senior citizens. The ACSM additionally indicates that

no less than a minimum of 30 minutes of PA to be needed every day, minimum thrice every week, great health benefits and suggests 10,000 steps each day to improve fitness (WHO, 2009).

Children need to have a balanced diet because this is an important period for their growth and development. (Shiu et al., 2012). Adults, as well as young people, are becoming increasingly overweight and obese, which has an impact on the likelihood of increasing type 2 diabetes mellitus (D.M.), hypertension, cardiac disease, and overall mortality (Shields, 2006). diet and health are highly complicated. For instance, a diet rich in fat (fried meals, junk food, and high-fat animal products) may be detrimental to cardiovascular health by raising LDL cholesterol levels as well as increasing the possibility of obesity, its lead to a risk factor for some medical conditions (Fung et al., 2001; Must et al., 1999; Stampfer & Willett, 2000). Adolescent Overweight is associated with unfavorable psychological and social outcomes, hyperlipidemia, hypertension, impaired glucose tolerance, and other health problems. Childhood or adolescent weight gain can last into adulthood and raises the chance of developing diabetes, gallbladder disease, coronary heart disease, and a diet heavy in fat and several other kind of cancer. Food insecurity's nutritional consequences, such as iron, vitamin A, iodine, and protein-energy malnutrition, impact students' ability to learn and participate in school (Whitman, 2001).

The leading global causes of death is tobacco usage (WHO, 2023). Adults who use tobacco, are physically inactive, engage in high-risk sexual behavior, cause damage and violence, and have other risky behaviors are two-thirds more likely to die prematurely than they should and have a third of the burden of all diseases (WHO, 2011). Usage of tobacco causes around 4 million deaths annually; by 2020, that number is anticipated to cover 8.4 million Studies in advanced countries reveal that majority of individuals start smoking before they turn 18 years old. Recent statistics show that there is an increase in the number of cases of smoking among children and adolescents, and smoking begins earlier in life. Now the days two hundred fifty million peoples who are currently children and adolescents will die usage of tobacco many of them in establishing nations (Jamal et al., 2016).

According to research that showed children in India tobacco products are mostly use children at younger age, there could be an increase in tobacco use in developing nations. The outcome demonstrates that students from sixth- grade in Chennai and Delhi (Liz Bryan, 2006). Early tobacco use is connected with a higher risk of addiction, a more extended lifetime usage, and a higher chance of lung cancer. (Perry, 2002) examined above 11,600 students between the sixth and eighth grades from 32 schools in Delhi and Chennai, India, who were polled regarding their use of beedis, cigarettes, and chewing tobacco. Additionally, discovered that young people who attended public schools smoked more than those who attended private schools and that male students that use tobacco products are comparatively more than female students.

Almost 60 health issues are associated with youth drinking, a growing concern in many nations. It promotes dangerous behavior connected to injuries and violent crimes that result in an early demise (WHO, 2023). A national study on the negative consequences of alcohol found that drinking was becoming more socially acceptable, that consumption was rising in rural and transitional areas, that drinking started earlier in life, and that drinking had a phenomenal socioeconomic and health impact, particularly on young people (Gururaj et al., 2011). According to result from the National Household Survey (NHS) by the UN Office on Drugs and Crime (UNODC), Men 12 to 18 years old used alcohol at a rate of 21.4% in 2002, according to research conducted in 24 states of India, including urban and rural areas. According to World Health Survey-India, among people ages 18 to 24, 3.9% drank heavily just occasionally, whereas 0.6% did so frequently (WHS, 2003).

The NFHS survey result showed that 1 percent of women and 11 percent of men age between 15- 19 yrs. and 1.4 percent of women and 28.8 percent of men aged 20-24 yr addicted in alcohol (Parasuraman et al., 2005). Chronic heavy drinking is associated with many severe health problems, such as liver disease, cardiovascular disease, and neurological disorders (Cargiulo, 2007). A recent meta-analysis study suggested a relationship between heavy drinking and specific types of cancer, including liver, oral cavity, stomach, and colon cancer. High drinking and substance use disorders are also associated with mood, anxiety, and other psychological disorders (Cargiulo, 2007; JaneLlopis & Matytsina, 2006). Alcohol usage generally begins in childhood and increases throughout adolescence. The results of the study conducted by (Soldera et al., 2004) demonstrated that men started drinking alcohol at a very young age (12 years of age). It is concerning because the likelihood of dependence on alcohol increases the sooner

alcohol use begins, regarding the many schools studied (private and central and peripheral public schools).

Premarital sexual behavior is increasingly observed among Indian youth aged 15–24 years. According to data from the National Family Health Survey-5 (NFHS-5), 13.46% of unmarried men and 2.83% of unmarried women reported having engaged in premarital sex (Kumar et al., 2023). Among these, 60.84% of males indicated using a condom during their first sexual encounter. Educational attainment, urban residence, and access to media were significant predictors of such behavior. Digital media usage has been associated with higher chances of premarital sexual initiation and condom use. Youth exposed to mobile phones and the internet were more likely to report premarital sex and to use condoms during their first experience (Rai et al., 2023). However, consistent condom use remains a concern, especially among adolescents who lack comprehensive sexual education and awareness of sexually transmitted infections (STIs). Sexually risky behavior in youth is a critical determinant of long-term health risks, including the transmission of HIV. Although adolescents and young adults (15–24 years) represent a significant portion of new HIV infections in India, awareness and voluntary testing are still limited. Studies show that a considerable proportion of youth, particularly males, have never been tested for HIV, often due to perceived invulnerability (Mohan et al., 2024). Despite the progress made by national campaigns like those from the National AIDS Control Organisation (NACO), awareness gaps persist. Only 36.9% of youth aged 15–24 were aware of HIV prevention methods according to recent NACO reports. The persistent belief that HIV affects only specific populations remains a barrier to testing and prevention (UNAIDS, 2023).

For that, the present study aimed to identify students' health risk behavior and attitudes toward physical activity and the impact of HRB dimensions on P.A. differences among males and females in P.A. and Diet. And assess the difference due to the demographic dimensions between P.A. and Diet. The study's results will help to understand the present status of both genders in dietary behavior, Smoking, drug use, alcohol P.A., HRB, and HSRB-related knowledge and attitude towards physical activity in students. The results and patterns will help the teachers, parents, and their neighborhood to understand the way of thinking of the present and next generation. Results obtained regarding HRB and attitude towards P.A. will help to know the status of important issues regarding Physical Education programs in students' curriculum. The results can also be used to coordinate better policies concerning Physical Education, sport, health, recreation, and health education. Enhanced policies pertaining to health education, sports, physical education, and leisure. It will enrich Physical Education teachers, the students themselves, parents, schools, sports clubs, etc.., about their several and Collective responsibility in maintaining a reasonable standard of physical fitness among those committed to their change. To study the attitude toward physical activity among youth students in the Pondicherry.

Method

Material and Methods

Purpose of the Study

The present study aimed to evaluate the effects of health risk behaviors (HRBs) and physical activity (PA) among students of Pondicherry University. The research addressed a broad spectrum of HRB domains including alcohol use, cigarette smoking, dietary behavior, physical inactivity, substance abuse, and risky sexual behavior. These behaviors are of increasing relevance in university settings, where students face heightened exposure to lifestyle changes and psychosocial stressors that may influence health decisions (World Health Organization (WHO, 2021).

Study Design

A quantitative, cross-sectional research design was adopted to gather data efficiently across a large student sample, allowing for the examination of behavioral trends and group comparisons. A standardized and validated tool, the Leah Health Risk Behaviors Inventory, was employed to ensure the reliability and validity of the data collected. This instrument is suitable for assessing multidimensional health-related behaviors among young adults and has been used in similar university-based settings (Leah et al., 2019).

Participants

Participants were selected using a simple random sampling technique to reduce selection bias and ensure equal representation. A total of 109 students from Pondicherry University voluntarily participated in the study, comprising 65 males and 44 females between the ages of 19 and 30 years. Data collection was conducted through a structured Google Form, which included an informed consent statement and a brief description of the study's purpose, objectives, and significance. Participants were given the autonomy to complete the questionnaire at their convenience, without a fixed time limit, to minimize response fatigue and increase data quality. Consistent instructions were provided to ensure uniformity in responses. Ethical considerations, including confidentiality and voluntary participation, were maintained throughout the data collection process. This methodological approach was chosen to enhance accessibility, reduce logistical constraints, and facilitate accurate and timely data collection. The use of an online platform also ensured ease of participation during academic schedules and promoted honest self-reporting in a private setting.

Instruments and Data Analysis

To ensure methodological accuracy and the relevance of the constructs measured, the researcher consulted multiple peer-reviewed academic sources in selecting appropriate tools for data collection. The study employed the Health Risk Behavior Inventory (HRBI), a standardized and validated self-report instrument designed to assess six primary domains of health risk behaviors are physical activity (PA), dietary habits (DT), smoking (SM), alcohol use (AL), drug use (DU), and sedentary behavior (SB).
Each of the six subscales comprises nine to ten items, developed at a sixth grade reading level to ensure comprehensibility among university students. The items were written as self-referential behavioral statements (e.g., “My work involved sitting for long periods”). Participants were instructed to reflect on their behavior over the previous month and respond using a 5-point Likert scale, where:1 = Never True, 2 = Rarely True, 3 = Sometimes True, 4 = Often True, 5 = Always True. This Likert-type format is widely used in psychological and behavioral health research, as it captures variability in the frequency of behaviors beyond dichotomous (yes/no) responses. To compute the scores, the mean of the items in each HRBI subscale was calculated, yielding subscale scores ranging from 1 to 5. These six subscale means were then summed to generate a total HRBI score, ranging from 6 to 30, with higher scores indicating a higher prevalence of health risk behaviors.

Data analysis

Data analysis was conducted using IBM SPSS Statistics. The following statistical techniques were applied for the analysis to examine gender based differences in health risk behaviors and physical activity levels to determine significant differences in dietary and physical activity behaviors across demographic groups Onaway analysis of variance (ANOVA) was applied. Pearson’s correlation coefficient (r) to explore associations among HRB components.

Results

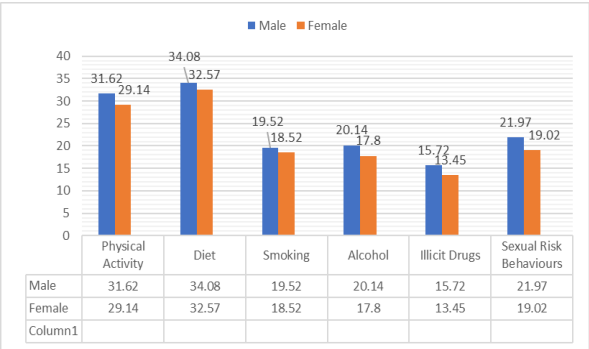
The findings of the study indicate a mean difference in physical activity levels between male and female students, suggesting that gender influences physical activity among young students. The correlation analysis reveals that both diet and smoking are significantly associated with physical activity. Furthermore, the study highlights significant correlations between diet and other health risk behaviors such as smoking, alcohol consumption, illicit drug use, and risky sexual behavior. In addition, smoking demonstrates strong associations with alcohol use, illicit drug use, and risky sexual behavior. Alcohol consumption is also significantly correlated with both illicit drug use and risky sexual behavior, while illicit drug use is clearly associated with risky sexual behavior. The study explores six dimensions of health risk behaviors (HRBs): physical activity, diet, smoking, alcohol use, illicit drug use, and risky sexual behavior. While several behavioral factors are interrelated, gender emerged as the only demographic factor with a significant impact on physical activity, indicating that other demographic factors do not substantially influence the physical activity or dietary behavior of young university students.

Table 1 illustrates the gender-wise mean scores and standard deviations across six dimensions of health risk behaviors among students. The results show that male students have higher levels of physical activity compared to females, with a mean score of 31.62 (SD = 5.567), while female students have a mean score of 29.14 (SD = 5.111). In terms of diet, male students also reported higher engagement, with a mean of 34.08 (SD = 5.636), compared to female students, whose mean was 32.57 (SD = 7.033). Regarding smoking behavior, male students had a mean score of 19.52 (SD = 4.893), slightly higher than female students, who reported a mean of 18.52 (SD = 4.123). For alcohol consumption, the mean for male students was 20.14 (SD = 6.930), while female students scored lower with a mean of 17.80 (SD = 5.403). When evaluating illicit drug use, male students again showed higher engagement, with a mean of 15.72 (SD = 6.726), compared to female students' mean of 13.45 (SD = 5.441). Finally, for risky sexual behavior, male students reported a mean score of 21.97 (SD = 8.698), whereas female students had a mean of 19.02 (SD = 1.723).

Table 1. Descriptive statistics gender with Physical Activity and Diet, Smoking, alcohol, illicit drugs, sexual risk behavior

	Gender	Mean	St. Deviation
Sum of physical activity	Male	31.62	5.567
	Female	29.14	5.111
Sum of diet	Male	34.08	5.636
	Female	32.57	7.033
Sum of smoking	Male	19.52	4.893
	Female	18.52	4.123
Sum of alcohol	Male	20.14	6.930
	Female	17.80	5.403
Sum of illicit drugs	Male	15.72	6.726
	Female	13.45	5.441
Sum of sexual risk behaviour	Male	21.97	8.698
	Female	19.02	7.723

Figure 1. Mean Chart of Gender



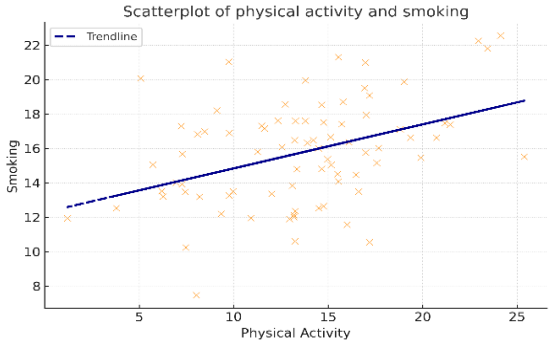
A Pearson product-moment correlation was conducted to examine the relationships between physical activity, diet, smoking, alcohol use, illicit drug use, and sexual risk behavior among students. The results revealed several statistically significant associations, indicating patterns of both health-promoting and risk-related behaviors. Table 2 presents the results of the correlation analysis examining the relationships among various dimensions of health risk behaviours (HRBs) among youth.

Physical Activity and Smoking

Physical activity was significantly related to diet ($r = .43$, $p < .01$) and smoking ($r = .21$, $p < .01$), revealing significant relationships between students' amounts of physical activity and other health-related behaviors. The positive relation with diet implies that higher rates of physical activity among students also correlate with healthier dietary practices, demonstrating a clustering of health-enhancing behaviors. This is in line with current literature indicating that those who value physical fitness tend to carry that concern over into other aspects of personal health, including nutrition. Interestingly, a weaker but statistically significant correlation between physical activity and smoking was also noted. Although the association ($r = .21$) itself is fairly modest in strength, it indicates that physical activity does not exclude participation in health-risk behaviors such as smoking. This might indicate the coexistence of conflicting behaviors in the same subjecta phenomenon that is frequently encountered among adolescents and

young adults whose choices in lifestyle are more often dictated by social, cultural, or psychological considerations. The occurrence of both health-fostering and risk behavior demonstrates the multifaceted nature of student behavior patterns. The implications are to take a holistic approach to promoting health by supporting physical activity and healthy diet alongside other more established risk behaviors like smoking. These correlations are shown in Figure 2, with scatterplots showing the positive linear correlations between smoking, diet, and physical activity.

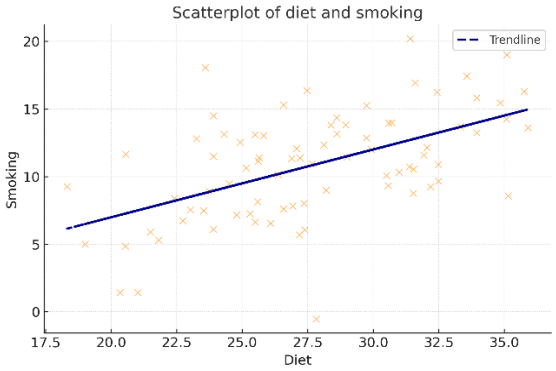
Figure 2. Scatter Plot Indicating Positive Correlation Between Physical Activity and Smoking



Diet and Smoking

Diet was also significantly and positively related to a number of other health-related behaviors, such as smoking (r =.51, p <.01), alcohol consumption (r =.42, p <.01), drug use (r =.31, p <.01), and sexual risk behavior (r =.34, p <.01). These results suggest that those reported healthier or more conscientious eating habits also tended to report greater levels of participation in risk-related behaviors. Although this would seem counter intuitive on the basis that diet is normally thought of as a health-promoting behaviour, it is reflective of the complex and frequently non-linear nature of health behaviour patterns within student groups. It could be that students who are health conscious in one area (for example, diet) are not always applying the same level of care or vigilance in other areas, such as substance use or sexual activity. Alternatively, such associations might be shaped by underlying psychosocial or lifestyle determinants such as stress, peer culture, or personality disorders that underlie the simultaneous engagement in both healthy and risky behaviors. This co-occurrence pattern indicates that eating behaviors are not solitary, and health interventions need to take into account the wider behavioral context within which these habits are established and perpetuated. Interventions designed to encourage healthier eating among students can be advantaged by being incorporated with education and support of other behaviors such as smoking, alcohol, and sexual health.

Figure 3. Scatter Plot Indicating Positive Correlation Between Diet and Smoking

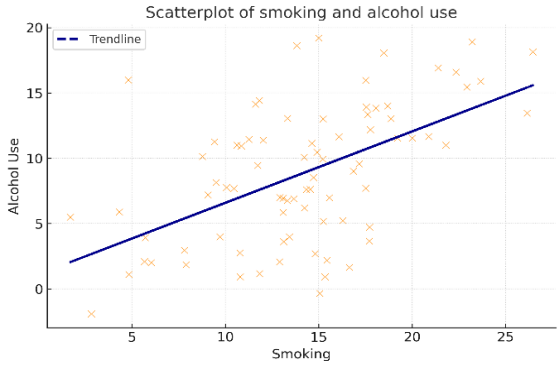


Smoking and Alcohol Use

Smoking was also positively and significantly correlated with several health-risk behaviors, such as alcohol use (r =.56, p <.01), illegal drug use (r =.61, p <.01), and sexual risk behavior (r =.46, p <.01). These

correlations indicate a strong clustering of risky behaviors among smokers. That is, students reporting more frequent smoking also reported more frequent use of alcohol and illegal drugs, as well as increased participation in sexual activities that could be risky. This clustering of behavior is in line with research in health psychology and public health literature, which indicates that health damaging behaviors cluster together, especially among young adults and adolescents. Common risk factors like sensation-seeking, peer pressure, stress, or lower self-regulation could be responsible for this clustering, rendering individuals susceptible to the adoption of multiple risky behaviors at the same time. The high degree of these correlations, especially between smoking and drug use (r =.61) and alcohol use (r =.56), reflects the necessity of multimodal intervention strategies. Instead of treating each behavior separately, prevention programs among youth and young adults could prove to be more effective if they simultaneously address the interrelated aspect of substance use and associated risk-taking behaviors. These are graphically depicted in the scatterplot presented in Figure 4, which reveals the positive linear relationships between smoking and these other behaviors.

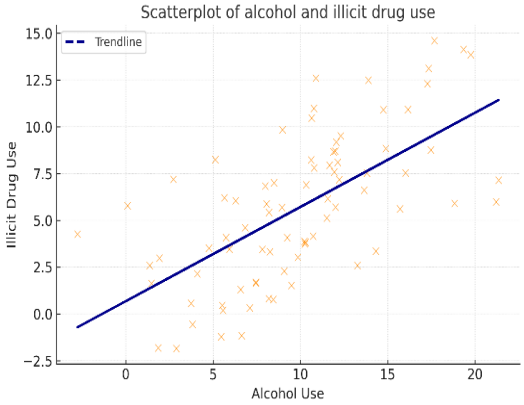
Figure 4. Scatter Plot Indicating Positive Correlation Smoking and Alcohol Use



Alcohol Use and Illicit Drug Use

Alcohol consumption was also found to be significantly and strongly related to both illegal drug use (r =.65, p <.01) and sexual risk behavior (r =.47, p <.01). These findings are further evidence of interrelated patterns of health-risk behaviors among the student population. Most particularly, the size of the relationship between alcohol and illegal drug use is striking, as it reflects that students who drink at increasing levels are also much more likely to use drugs. The strong correlation with sexual risk behavior also points to the larger public health issue that drug use may enhance the probability of having unprotected or otherwise unsafe sex. This might be explained by the disinhibiting effect of alcohol, which can decrease judgment and enhance impulsivity and thus lead to risky decision-making in social or sexual situations. These results are consistent with well-established behavioral models, including the problem behavior theory, which posits that some risk behaviors tend to cluster together because they share common underlying psychological or social causes. The observed associations are consistent with the necessity of addressing substance use and sexual health simultaneously in both research and intervention. The association of alcohol consumption and these risk behaviors is presented in Figure 5, which displays the positive linear trends among the variables and further supports the interpretation of a strong behavioral clustering effect.

Figure 5. Scatter Plot Indicating Positive Correlation Alcohol Use and Illicit Drug Use



Diet and Sexual Risk Behaviour

Diet also showed a very strong positive correlation with sexual risk behavior ($r = .34$, $p < .01$), which means that those who report healthier diet might also have a greater sexual risk-taking behavior. Although diet is generally considered to be a health enhancing behavior, its positive correlation with a health risking behavior like sexual risk taking implies a more complex and multilogical behavior pattern among some individuals. Such a co-occurrence can probably represent the theory that participation in risky and healthy behaviors is often not mutually exclusive, especially within emerging adults as well as in student populations. For instance, people who lead active social lifestyles and are beauty conscious might more likely eat well and at the same time exhibit socially motivated behaviors like unsafe sex. Also, dispositional personality bases like extroversion or sensation-seeking can possibly be sources of health directed habits as well as risk exposing behaviors. The discovery supports the need to go beyond dualistic classification of individuals as "healthy" or "unhealthy" and recognize the multiple ways in which behaviors may interact. The findings are especially valuable when developing focused health interventions, since they may be compelled to work on both protective and risk behaviors at the same time, instead of assuming that those who adopt one beneficial behavior (e.g., good diet) are unlikely to take up others that are risky. This relationship is graphically showed in Figure 6, where the scatterplot depicts the positive linear trend between sexual risk behavior and diet and substantiates the interpretation of a weak but significant association.

Figure 6. Scatter Plot Indicating Positive Correlation Diet and Sexual Risk Behavior

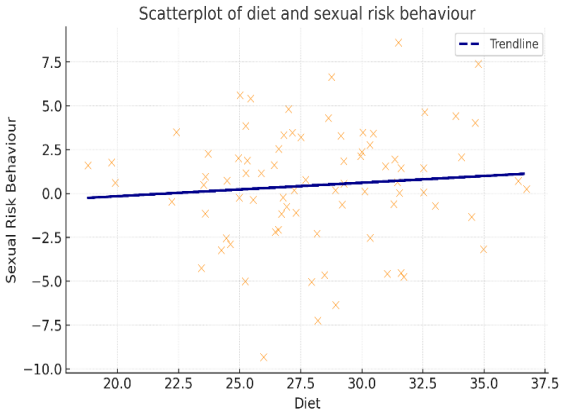


Table 2. The correlation results in Physical Activity and Diet, Smoking, alcohol, illicit drugs, sexual risk behavior

Variable	Physical Activity	Diet	Smoking	Alcohol	Illicit Drugs	Sexual Risk Behaviour
1. Physical Activity	—	.43**	.21*			
2. Diet	.43**	—	.51**	.42**	.31**	.34**
3. Smoking	.22*	.51**	—	.56**	.61**	.46**
4. Alcohol		.42**	.56**	—	.65**	.47**
5. Illicit Drugs		.31**	.61**	.65**	—	.47**
6. Sexual Risk Behaviour		.34**	.46**	.47**	.47**	—

Note: All correlations are Pearson's r. *p < .05, **p < .01.

Discussion

Physical Activity and Smoking

The current study revealed significant correlations between physical activity and two key health-related behaviors: diet (r = .43, p < .01) and smoking (r = .21, p < .01), highlighting the interconnected nature of health promoting and health risk behaviors among university students. The positive and moderately strong relationship between physical activity and diet aligns with prior research, which has consistently found that individuals who engage in regular physical activity tend to exhibit healthier dietary patterns (González et al., 2017; Kaewthummanukul & Brown, 2006). This behavioral clustering supports the notion of a lifestyle synergy, wherein engaging in one positive health behavior can reinforce engagement in others (Plotnikoff et al., 2004). The study also observed a weaker but statistically significant positive association between physical activity and smoking. Although this correlation (r = .21) is modest in strength, it is consistent with previous research indicating that health-enhancing and health-risk behaviors can co-occur, particularly during young adulthood (Lisha & Sussman, 2010). For instance, athletes and physically active individuals are not entirely insulated from substance use and may engage in behaviors such as smoking due to social pressures, coping mechanisms, or cultural norms (Peretti-Watel et al., 2003). This duality underscores the complexity of youth behavior, where engagement in physical activity may coexist with detrimental health behaviors, reflecting ambivalence or transitional lifestyle choices. The findings reinforce the need for a holistic approach to health promotion, recognizing that behavior change should not be siloed. Programs aimed at increasing physical activity should also integrate dietary education and smoking cessation strategies, fostering an integrated health framework (Prochaska et al., 2008). Additionally, the modest correlation between physical activity and smoking emphasizes that the promotion of one health behavior does not automatically result in the reduction of risk behaviors, necessitating targeted interventions that address both dimensions simultaneously. These results align with the theory of Health Behavior Clustering, suggesting that interventions addressing multiple behaviors concurrently may yield greater public health impact than isolated strategies (van Nieuwenhuijzen et al., 2009). The coexistence of beneficial and harmful behaviors further suggests the influence of underlying psychosocial factors such as stress, peer influence, or identity exploration common in this developmental stage (Sawyer et al., 2012). Ultimately, the study sheds light on the multifaceted nature of health behaviors among young adults and calls for integrated campus-based wellness programs that address both the promotion of physical activity and the mitigation of risk behaviors like smoking. Future studies may benefit from examining mediating psychological constructs (e.g., health beliefs, self-efficacy, and social norms) that influence these behavioral patterns.

Diet and Smoking

The results of the study revealed that diet was significantly and positively correlated with several health-related behaviors including smoking (r = .51, p < .01), alcohol consumption (r = .42, p < .01), illicit drug use (r = .31, p < .01), and sexual risk behavior (r = .34, p < .01). While it may appear paradoxical that healthier eating habits co-occur with risk behaviors, such findings are not uncommon in behavioral health literature. Rather than assuming unidirectional or linear associations, these results highlight the complex and sometimes contradictory nature of health behavior patterns in emerging adulthood. Previous studies have suggested that individuals, particularly college students, may adopt positive health behaviors such as maintaining a healthy diet for reasons that are aesthetic, performance-oriented, or socially driven, rather than being rooted in holistic well-being (Laska et al., 2010; Larson et al., 2008). Consequently, these individuals may still engage in risk behaviors such as smoking or alcohol use, not out of ignorance but due to psychosocial influences such as stress, peer norms, or identity exploration (Arnett, 2000; Park, 2004). This behavioral duality reinforces the notion that health behaviors do not

operate in silos but are often influenced by broader psychological, social, and cultural determinants. The positive correlation between diet and smoking (r = .51) is particularly noteworthy. It suggests a co-existence of conflicting behaviors, indicating that adopting one health-promoting behavior does not automatically preclude engagement in harmful ones. This co-occurrence is echoed in prior research, where individuals might compensate for their smoking behavior with healthier dietary practices, or vice versa, in an effort to maintain a perceived balance (Spring et al., 2012; Schuit et al., 2002). Similarly, the associations with alcohol, drug use, and sexual risk behavior point to a clustering of behaviors that may serve social or coping functions during this transitional life stage (Lisha & Sussman, 2010). These findings have several important implications for health interventions. First, they underscore the necessity of multi-behavioral intervention models, where diet-related interventions are not implemented in isolation but are integrated with education on smoking cessation, substance use prevention, and sexual health. Second, the results call for a deeper psychosocial assessment of student health behavior motivations, which can help tailor interventions to address the underlying causes rather than surface level behaviors. These patterns reinforce the application of behavioral theories such as the Theory of Planned Behavior (Ajzen, 1991) and Problem Behavior Theory (Jessor, 1991), both of which propose that behaviors are interlinked through shared psychosocial pathways.

Smoking and Alcohol Use

The findings revealed strong positive correlations between smoking and several other health-risk behaviors, including alcohol use ($r = .56$, $p < .01$), illegal drug use ($r = .61$, $p < .01$), and sexual risk behavior ($r = .46$, $p < .01$). These results underscore the well-documented phenomenon of behavioral clustering, where multiple risk behaviors co-occur within individuals, particularly among adolescents and young adults. This clustering effect is consistent with prior empirical research indicating that engagement in one risky behavior significantly increases the likelihood of engaging in others (Jessor, 1991; Biglan et al., 2004). The high correlation between smoking and drug use (r = .61), and between smoking and alcohol use (r = .56), points to shared underlying psychosocial determinants. Factors such as sensation-seeking tendencies, exposure to permissive peer norms, high levels of perceived stress, and deficits in impulse control or self-regulation have all been identified as potential contributors to such co-occurrence (Kuntsche et al., 2005; Patrick et al., 2011). These risk factors often operate concurrently, creating a behavioral environment where adopting one risk habit facilitates or normalizes the adoption of others. This pattern reflects the Problem Behavior Theory (Jessor, 1991), which conceptualizes risky behaviors not as isolated incidents, but as part of a broader syndrome of deviance influenced by personality, environmental, and social variables. In this context, smoking may serve as both a gateway and a marker for broader behavioral dysregulation. The findings support the notion that interventions targeting youth and young adults must be comprehensive and multimodal. Rather than addressing smoking, alcohol, or drug use in isolation, prevention programs would benefit from integrating strategies that simultaneously address these behaviors and their underlying causes. For instance, enhancing emotional regulation, resisting peer pressure, and promoting alternative coping strategies could have cascading positive effects across multiple risk domains (Prochaska et al., 2008). In light of these results, university-based health promotion initiatives should move toward syndemic frameworks approaches that consider the synergistic nature of co-occurring behaviors and vulnerabilities (Singer et al., 2017). This is especially relevant in student populations, where identity formation, experimentation, and stress coexist and influence lifestyle patterns.

Alcohol Use and Illicit Drug Use

The study identified a strong positive correlation between alcohol consumption and both illicit drug use ($r = .65$, $p < .01$) and sexual risk behavior ($r = .47$, $p < .01$). These results contribute to the growing body of literature that highlights the clustering of health-risk behaviors, especially within adolescent and young adult populations. Notably, the magnitude of the association between alcohol and drug use is particularly pronounced, suggesting that as students increase their frequency or quantity of alcohol consumption, they are also substantially more likely to engage in illicit drug use. This clustering is supported by the Problem Behavior Theory (Jessor, 1991), which suggests that risk behaviors do not occur in isolation but are interconnected through shared psychological and social factors, such as low self-regulation, sensation seeking, and susceptibility to peer influence. The significant correlation with sexual risk behavior (r = .47) further underscores this theoretical perspective and highlights the synergistic nature of substance use and sexual risk-taking. One possible mechanism underlying these associations

is the disinhibitory effect of alcohol, which impairs judgment and increases impulsivity, thereby facilitating engagement in risky behaviors, including unsafe sex (Cooper, 2006; Hendershot et al., 2007). Research has shown that alcohol consumption in social settings often coincides with opportunities for sexual activity, particularly in college environments, where both behaviors are normalized and even socially reinforced (Fromme et al., 1999). The implications of these findings are substantial for public health and intervention design. The strength of these associations highlights the inadequacy of compartmentalized interventions that target substance uses or sexual health in isolation. Instead, integrated prevention programs are warranted programs that simultaneously address multiple interrelated behaviors and their underlying determinants (Prochaska et al., 2008; Spring et al., 2012). For example, university health services might offer joint workshops on substance use awareness and safe sex practices, targeting the common risk factors such as poor coping skills or high-risk social networks.

Diet and Sexual Risk Behavior

The study revealed a statistically significant and positive correlation between diet and sexual risk behavior ($r = .34$, $p < .01$). Although diet is traditionally classified as a health-enhancing behavior, its positive association with a health-risk behavior such as sexual risk-taking suggests that individual lifestyle patterns may be multidimensional and context-dependent rather than dichotomous. This finding reflects the complexity of health behavior in student populations, where health-promoting and risk-taking behaviors may not be mutually exclusive. Emerging adulthood, especially within university settings, is often marked by exploration, identity formation, and experimentation, making it a period prone to behavioral incongruence (Arnett, 2000). For instance, individuals who are socially active, physically appearance-conscious, or engaged in fitness cultures may prioritize dietary health while also engaging in high-risk sexual behaviors driven by social or sensation-seeking motives (Bryan et al., 2007; Lisha & Sussman, 2010). Personality traits such as extroversion or sensation seeking have been found to correlate both with health-directed behaviors (e.g., diet, exercise) and risk-oriented behaviors (e.g., unsafe sex, substance use) (Zuckerman, 2007). This supports a growing body of research challenging the simplistic categorization of individuals as either "healthy" or "unhealthy." Instead, dual-process behavioral models suggest that people often engage in both protective and risky behaviors, depending on situational cues, motivations, and personal values (Gerrard et al., 2008). For instance, an individual may value fitness and maintain a balanced diet, yet engage in risky sexual behaviors influenced by peer norms, alcohol use, or emotional coping. From a public health and intervention perspective, these findings emphasize the importance of integrative behavioral frameworks. Programs should avoid assuming that individuals who adhere to one set of health guidelines (such as dietary practices) are necessarily low-risk in other domains. Health promotion efforts need to holistically address lifestyle patterns, accounting for the interplay of psychosocial, behavioral, and environmental influences on both risk and protective actions (Spring et al., 2012).

Practical Implications

The findings of this study have important practical implications for health education, prevention programs, and policy development targeted at student populations. The significant clustering of substance related risk behaviors suggests the need for integrated health interventions that address multiple behaviors concurrently rather than in isolation. Schools, universities, and health service providers may benefit from designing comprehensive wellness programs that combine physical activity promotion, nutritional education, and substance use prevention.

Future Research

Future studies should explore these behavioral relationships using longitudinal designs to better understand how these patterns evolve over time and whether specific behaviors predict future risk or protective outcomes. Incorporating qualitative methods could also provide deeper insights into the motivations, beliefs, and contextual influences that drive health-related decision-making among students.

Conclusions

The present study offers meaningful insights into the patterns and interrelationships of health risk behaviors (HRBs) among university students. By examining both protective and risky health related behaviors within this population, the study revealed significant behavioral clustering. Specifically, health promoting behaviors such as regular physical activity and a balanced diet were found to be positively associated not only with each other but, in certain cases, also with health-risk behaviors, including smoking, alcohol consumption, illicit drug use, and risky sexual behavior. Notably strong associations were observed between smoking and drug use, alcohol and drug use, and smoking and alcohol use. These findings underscore the tendency for certain risk behaviors to co-occur, highlighting the complex and interrelated nature of health behavior patterns among emerging adults in a university setting.

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