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Research Article

Energy Drinks Consumption Among Undergraduate Students at a Sri Lankan State University

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Abstract

Background: The expanding global market for energy drinks is increasingly directed towards the youth and young adult demographic, prompting healthcare professionals to express concerns about potential health risks associated with their consumption. Currently, there is an observed trend suggesting a link between the consumption of energy drinks among young adults and subsequent substance use; however, this association remains insufficiently examined within university undergraduates in Sri Lanka. The current study aimed to assess the prevalence of energy drink consumption, associations, awareness of health-related risks, and potential relationship with substance use among residential undergraduates at the University of Colombo.

Methods: This research employed a descriptive design and enrolled 361 undergraduate participants residing in the university hostels. A self-developed online questionnaire, pre-validated for accuracy, was administered to collect socio-demographic data, frequency, reasons for energy drink consumption, perceived associations, awareness of adverse effects, and potential association between energy drink consumption and subsequent substance use. Data analysis involved computing percentages, frequencies, and assessing relationships. The threshold of significance was considered less than 0.05.

Results: Of the participants, 38.8% were male, with the majority (52.9%) falling within the age range of 23 to 25 years. The prevalence of energy drink consumption was 31%, with 47.3% of users reporting infrequent usage. The flavor was the main driver of consumption, and 89.8% of individuals were unaware of the potential health risks. There was a strong association found between the usage of alcohol, cigarettes, cannabis, marijuana, and tobacco and the consumption of energy drinks ($p<0.05$).

Conclusions: This study showed a significant prevalence of energy drink consumption among undergraduate hostellers and identified several reasons for consumption, including flavor, social influence, and participating in sports. The majority of the hostellers had poor awareness regarding health-related risks linked with energy drink consumption. Findings of this study demonstrate that consuming energy drinks is a potential risk factor for subsequent substance abuse.

Keywords: *Energy Drinks, Undergraduate, hostellers, Substance use, Sri Lanka*

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Introduction

Energy drinks (ED) are categorized under non-alcoholic beverages (Lebacq et al.,2020), containing a high concentration of caffeine (80 – 50 mg per single serving) (Galimov et al., 2020) added sugar, and other energy-stimulating agents such as herbal extractions, vitamin-Bs, amino acids, bioactive substances (L-carnitine, phenylalanine), and taurine (Heckman et al., 2010). As commercially advertised, EDs can provide different benefits to their consumers, including physical energy, enhancement of sports performances, reduction of mental and physical stress, and boosting concentration, alertness, responsiveness, and body metabolism (Reissig et al., 2009). Because of the mentioned benefits, the ED market is more often oriented toward youth (Harris & Munsell, 2015) and more prevalent among young adults in Western and Asian countries (Heckman et al., 2010). In addition to this, youth and adolescents are particularly intrigued by ED due to aggressive marketing, peer pressure, and lack of knowledge of their potentially harmful effects (De Sanctis et al., 2017).

According to a recent study carried out in Canada by using adolescents and young adults (age 12- 24), 73.6% of the surveyed had experience with ED, and the male percentage of consumption was higher than females, while young adults who are between aged 20-24, showed the highest consumption prevalence. Out of them, 10.7% consume four or more cans of ED per day, while 48% consume at least one can per day (McCrory et al., 2017). On the other hand, Asia shares one of the biggest ED markets, but as far as know, a minimal number of research studies have been carried out recently to evaluate the prevalence of ED consumption throughout Asian countries. Among these surveys, Kushwaha et al. (2019) reported the prevalence of ED consumption patterns in Dharan, Nepal, by using health science undergraduate students. As reported by their results, 58.3% of participants were ED consumers; among them male proportion (75%) was higher than that of females.

The rapid growth in ED sales among adolescents and young adults has in turn, triggered the potential adverse effects on their health (Galimov et al., 2019), including cardiac symptoms (palpitation, tachycardia), neurological problems (Ali et al., 2015), respiratory tract diseases, sleep disorders, and gastrointestinal symptoms (Lebacq et al., 2020). These adverse effects are more serious in adolescents and young adults since they are at a critical stage of physical and cognitive development (Yasuma et al., 2021).

Even though the prevalence is high and known health-related effects are considerable, most of the previous studies did not take into account how awareness regarding ED-linked health events supports minimizing the consumption rate. However, a cross-sectional study focused on young adults (12-17 age) in the U.S. evaluated the perceptions about EDs and revealed that 19% of participants believe that EDs are safe for youths (Kumar et al., 2015). According to these data, many young people may be uninformed of or misinformed about the possible health consequences and nutritional value of EDs by their vendors (De Sanctis et al., 2017).

Further, several pieces of literature pointed out that there is a potential risk of ED consumption which can lead to influence on substance use including alcohol, tobacco, and marijuana (Yasuma et al., 2021). Components in EDs are more likely to release pleasure-compensating neurotransmitters (e.g., Dopamine and norepinephrine), which can directly act on the mesolimbic reward pathways of the brain, resulting in potential substance use and addiction (Kushwaha et al., 2019). A Nepal study that focused on undergraduate students reported that alcohol, cigarette, and marijuana consumption were higher among students who drink ED more frequently compared to those who do not (Kushwaha et al., 2019). The same study revealed that among undergraduates who practice alcohol mixed with EDs, 73.3% use tobacco, and 42.1% use marijuana (Kushwaha et al., 2019). Alcohol mixed with EDs was also found to be positively correlated with substance use (Kushwaha et al., 2019).

Despite the existence of such statistics, the prevalence, associations, awareness of its negative health effects, and subsequent substance usage related to ED consumption are not well studied locally. Anecdotally, there will be a considerable prevalence of ED in our society as well. Studies mentioned that adolescents and young adults are a vulnerable group with a high prevalence of ED consumption in Asian countries. Therefore, this study was conducted to assess the prevalence of ED consumption, awareness of health risks, and its potential relationship with subsequent substance use among residential undergraduate students at the University of Colombo.

Methodology

Study design, participants, and recruitment

A descriptive study was conducted among undergraduate residential hostellers at the University of Colombo from March 2022 to January 2023. A total of 422 university hostellers were invited to participate in this study, and a simple random sampling technique was used for enrollment. All undergraduate residential students at the University of Colombo were eligible to be included in the study, except undergraduate monks at Bikku Hostel, due to ethical issues. The sample size was calculated according to Daniel's sample size formula (Daniel, 1999). According to the formula, 384 subjects were needed to perform an analysis with a significant level of $\alpha = 0.05$, considering dropouts (10%), 422 subjects were recruited for this study.

Study instrument

An online, pre-validated and pre-tested, self-administered questionnaire constructed on Google Forms was utilized to collect the data. The questionnaire was designed to meet the study's objectives and consisted of closed-ended questions.

Section one of the questionnaire was focused on the participants' socio-demographic information, such as age, sex, race, ethnicity, family details, faculty, and academic year. Section two was comprised of questions regarding ED consumption, frequency, and reasons for consumption. Section three focused on the participants' awareness regarding composition and potential adverse health-related risks. The last section was

comprised of questions to assess substance use behaviors, which substances they used, and the frequencies.

Data collection

The consent form and information sheet of the study were distributed to study participants via WhatsApp/email through their wardens. After obtaining written consent, the questionnaire was distributed in the same manner. Participants were asked to complete the online questionnaire to gather information. To maintain anonymity and confidentiality, names and email addresses were not featured on the Google form questionnaire. The participants received two reminder emails two weeks apart from the initial request to participate. Participants had access to the questionnaire for one month.

Data analysis

The gathered data was screened to detect and eliminate incorrect and inappropriate data, and completeness and consistency were checked and entered into the Statistical Package of Social Sciences (SPSS) analysis software version 25 for the analysis. Through descriptive analysis, data have been gathered to determine the prevalence of ED use as well as the reasons, patterns, and frequency of consumption. Chi-square analysis and Fisher's Exact tests were utilized to examine the association between ED use and undergraduates' knowledge of the potential adverse effects associated with consumption and subsequent substance use among undergraduates. To facilitate interpretation, results have been presented in the form of tables, graphs, and pie charts. The threshold of significance was set at less than 0.05.

Ethical considerations

Ethical approval was obtained from the ethical committee established at the University of Colombo, Institute of Indigenous Medicine. Permission for data collection was obtained from the Registrar, University of Colombo, and then from the Assistant Registrar at the Student and Staff Affairs branch, University of Colombo. Hostellers were approached via the respective wardens and sub-wardens.

The study's participants were fully informed about the study and that they had the right to withdraw at any time. confidentiality and anonymity were maintained. Only the investigators and supervisors have access to the collected data, and they were only utilized for research purposes. Electronic data was saved as password-protected.

Results

Socio-demographic characteristics

The questionnaire was distributed among 422 participants; 361 undergraduates (85.55%) responded. Table 1 displays the socio-demographic characteristics of the participants. Of the total participants, 221 (61.2%) were females. The minimum age of the participants was 20 years, and the maximum age was 28 years, while the mean age was 23.07±1.43 years. Sinhala and Buddhists were dominant among the participants, accounting for 90% and 87.5% of the total participants, respectively. The majority (97.2%) of the respondents were unmarried. Nearly half of the responders were first-year undergraduates (n=154, 42.7%).

Table 1: Socio-Demographic Characteristics of the undergraduate residential hostelers at the University of Colombo (n=361)

Characteristics	Frequency (n)	Percentage (%)
Age (mean ±SD)	23.07± 1.43	
Sex		
Male	140	38.80
Female	221	61.20
Ethnicity		
Sinhalese	325	90.00
Tamil	15	4.20
Burgher	05	1.40
Moors	16	4.40
Religion		
Buddhist	316	87.5
Hindu	14	3.90
Christian	15	4.20
Islam	16	4.40
Marital state		
Married	10	2.80
Unmarried	351	97.20
Hostel premises		
Kithyakara Men's Hostel	33	9.10
Havelock Women's Hostel	23	6.40
Bullers Women's Hostel	11	3.30
De Saram Women's Hostel	87	24.00
Blomfontein Men's Hostel	45	12.50
Thelawala Hostels	54	15.00
Nursing Faculty Hostel	71	19.70
Technology Faculty Hostel	36	10.00
Study Year		
1st year	154	42.70
2nd year	72	19.90
3rd year	92	25.50
4th year	38	10.50
5th year	05	1.40

Prevalence of Energy Drink Consumption

Compared to the total number of responders, ED consumers accounted for 112. This denoted that the prevalence of current ED consumption among residential hostellers in the University of Colombo was 31% (Figure 1).

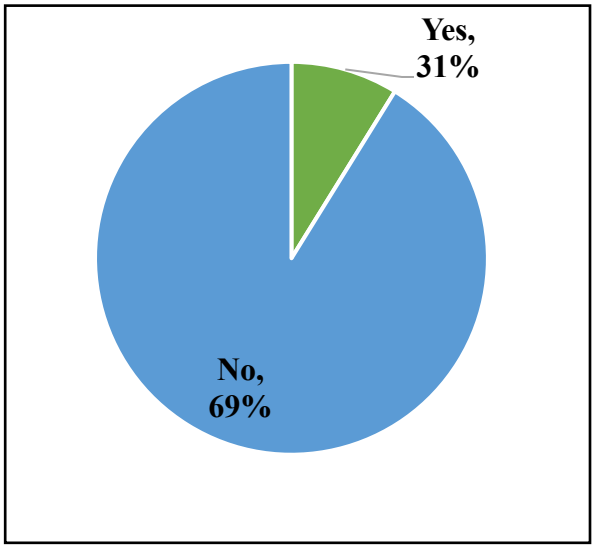

Figure 1. The status of the ED consumption

Frequency of EDs consumption

During the study period, 2.70% consumed ED daily. From the remaining responders, 12(10.7%) consumed ED 1-2 times a week, 4 (3.6%) consumed 3-4 times a week, 40 (35.7%) consumed 1-2 times a month, and the majority of responders reported as Infrequent (<1 time for at least 3 months) (47.3%) consumers.

Reasons for consuming EDs

The study's findings indicated that hostellers take EDs for various reasons. The majority of hostellers (78.8%) used EDs because of their taste. In addition, giving energy when tired (20.9%), helping with studying (10.2%), and making them feel better (10.7%) were reported as the main reasons.

The initial introduction to EDs

The initial strategy of introduction to EDs among university hostellers is presented in Figure 2. Accordingly, recommendations from friends (40.2%) were the most common strategy, while 25.9% indicated that they were introduced to ED by advertisement. The minimum number of responders (13.4%) was initially introduced at the selling stores.

ED consumption and relevant events

As shown in Figure 3, most of the responders (33.3%) did not need any special occasion to consume EDs. 27% of them consumed EDs while doing sports, and 23.4% of responders consumed them while studying.

Associations of ED consumption among undergraduate hostelers

As shown in Table 2. Several associations for ED consumption were identified by the study. Age, gender, living with family members, academic year, doing a part-time job, sexual activity, and level of awareness regarding the health risks of ED were identified as the significant associations with ED consumption. Higher consumption rates were observed among males (59.8%) compared to females (40.2%)($p<0.001$) and students aged 23–25 years (57.1%)($p=0.001$). Students from single-parent families (11.6%)($p=0.001$) reported higher ED consumption. Additionally, engagement in part-time jobs (25%) and being sexually active (24.1%) were associated with increased ED consumption

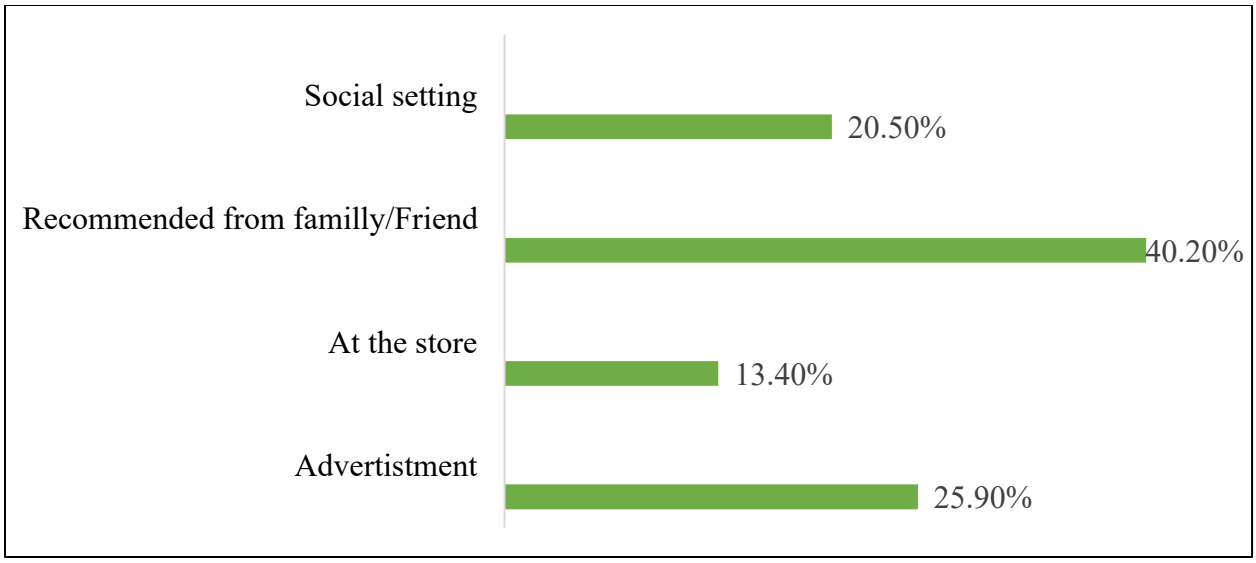

Figure 2. Strategy for the initial introduction of EDs

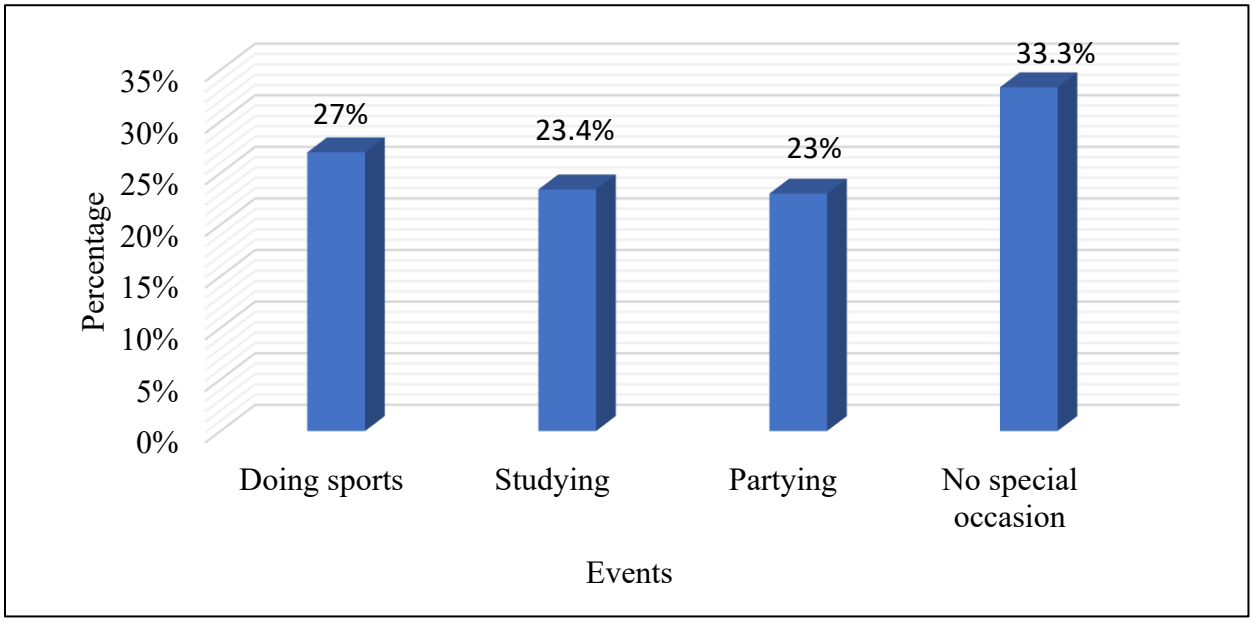

Figure 3. Events in which ED is consumed.

Table 2: The key associations of ED consumption among undergraduate hostelers

ED Consumption	Yes n (%)	No n (%)	*p-v*alue
Age			
20-22	32 (28.6%)	110 (44.2%)	**0.001**
23-25	64 (57.1%)	127 (51%)	
26-28	16 (14.3%)	12 (4.8%)	
Gender			
Male	67 (59.8%)	73 (29.3%)	**<0.001**
Female	45 (40.2%)	176 (70.7%)	
Family members who live with			**0.001***
Both parents	93 (83%)	233 (93.6%)	
Single parents	13 (11.6%)	13 (5.2%)	
Grandparent/s	5 (4.5%)	0 (0%)	
Husband/wife	1 (0.9%)	3 (1.2%)	
Monthly income of household			
<10,000	16 (14.4%)	62 (25%)	0.097
10,000 – 29,999	37 (33.3%)	83 (33.5%)	
30,000 – 50,000	40 (36%)	74 (29.8%)	
>50,000	18 (16.2%)	29 (11.7%)	
Academic year			
1st	35 (31.3%)	119 (47.8%)	**<0.001***
2nd	31 (27.7%)	41 (16.5%)	
3rd	23 (20.5%)	69 (27.7%)	
4th	19 (17%)	19 (7.6%)	
5th	4 (3.6%)	1 (0.4%)	
Self-study hours			
<2 hours	33 (29.5%)	59 (23.7%)	0.354*
2-4 hours	59 (52.7%)	127 (68.3%)	
5-8 hours	18 (16.1%)	59 (23.7%)	
>8 hours	2 (1.8%)	4 (1.6%)	
Engage in physical activities (sports, exercises etc.)			0.076
Yes	48 (42.9%)	82 (32.9%)	
No	64 (57.1%)	167 (67.1%)	

Doing a part-time job			
Yes	28 (25%)	15 (6%)	**<0.001**
No	84 (75%)	234 (94%)	
Sexually active			
Yes	27 (24.1%)	18 (7.2%)	**<0.001**
No	85 (75.9%)	231 (92.8%)	
Level of awareness			
Poor	77 (68.8%)	247 (99.2%)	**<0.001***
Good	29 (25.9%)	2 (0.8%)	
Excellent	6 (5.4%)	00(0%)	

*Fisher's Exact Test

(p<0.001). Poor awareness of ED's risks was associated with higher consumption (68.8%), while good (25.9%) and excellent awareness (5.4%) showed lower rates (p < 0.001).

Awareness of the health risks of ED consumption

According to Figure 4, those who obtained a percentage mark (for the level of awareness) exceeding 80% were categorized as having excellent awareness, while 60% to 79% and less than 60% were denoted as having good and poor awareness, respectively. Over 85% of responders had poor awareness levels, while 8.6% and 1.7% of responders had good and excellent awareness, respectively.

Table 3 presents the association between socio-demographic factors and the level of awareness. Age, gender, academic year, and ED consumption were significantly associated with the awareness. Awareness levels varied significantly by age, with students aged 23–25 years showing the highest percentage of good (48.4%) and excellent (50%) awareness compared to other age groups (p = 0.012). Gender also showed a significant association, with males demonstrating higher, good (67.7%) and excellent (50%) awareness compared to females (p = 0.002). Academic year played a critical role, as second-year students had the highest percentage of good awareness (48.4%), while first-year and fifth-year students were more likely to exhibit excellent awareness (42.7% and 33.3%, respectively) (p < 0.001). ED consumption was strongly linked to awareness levels, with all participants with excellent awareness (100%) and the majority with good awareness (93.5%) being ED consumers (p < 0.001).

Relationship between ED consumption and subsequent substance use among undergraduate hostel residents.

Consumption of particular substances of the total sample and their frequencies are shown in Figure 5. The majority of responders consumed alcohol (13.6%), and only a few consumers (1.1%) used non-prescribed drugs. According to the study findings, ED

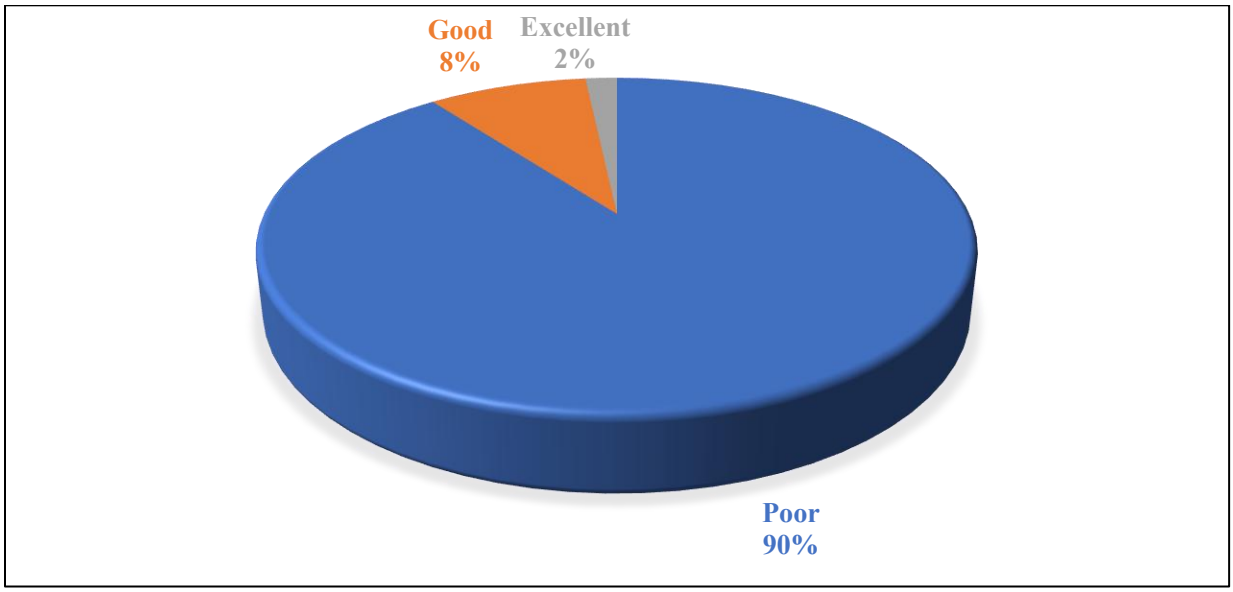

Figure 4. Responders' level awareness of the health effects of EDs

Table 3: Socio-demographic factors associated with levels of awareness

Socio-demographic characteristics	Poor aware, n(%)	Good awareness n(%)	Excellent awareness n(%)	*p*-value
Age				**0.012**
20-22	131 (40.4%)	10 (32.3%)	1 (16.7%)	
23-25	173 (53.4%)	15 (48.4%)	3 (50%)	
26-28	20 (6.2%)	6 (19.4%)	2 (33.3%)	
Gender				
Male	116 (35.8%)	21 (67.7%)	3 (50%)	**0.002**
Female	208 (64.2%)	10 (32.3%)	3 (50%)	
Marital state				0.075
Married	9 (2.8%)	0 (0%)	1(16.7%)	
Unmarried	315 (97.2%)	31 (100%)	5 (83.3%)	
Hostel premises				0.058
Kithyakara men's hostel	28 (8.6%)	5 (16.1%)	0 (0%)	
Havelock women's hostel	19 (5.9%)	3 (9.7%)	1(16.7%)	
Bullers women's hostel	9 (2.8%)	1 (3.2%)	1 (16.7%)	
De Saram women's hostel	85 (26.2%)	2(6.5%)	0 (0%)	

Blomfontein men's hostel	37 (11.4%)	5 (16.1%)	3(50%)	
Thelawala hostels	1 (0.3%)	0 (0%)	0 (0%)	
Nursing faculty hostel	51 (15.7%)	3(9.7%)	0 (0%)	
Kithyakara men's hostel	62 (19.1%)	9 (29%)	0 (0%)	
Technology faculty hostel	32 (9.9%)	3 (9.7%)	1 (16.7%)	
Academic year				**<0.001**
1st	145 (44.8%)	7 (22.6%)	2 (42.7%)	
2nd	56 (17.3%)	15 (48.4%)	1 (16.7%)	
3rd	89 (27.5%)	3 (9.7%)	0 (0%)	
4th	32 (9.9%)	5 (16.1%)	1 (16.7%)	
5th	2(0.6%)	1 (3.2%)	2 (33.3%)	
ED consumption				**<0.001**
Yes	77 (23.8%)	29 (93.5%)	6 (100%)	
No	247 (76.2%)	2 (6.5%)	0 (0%)	

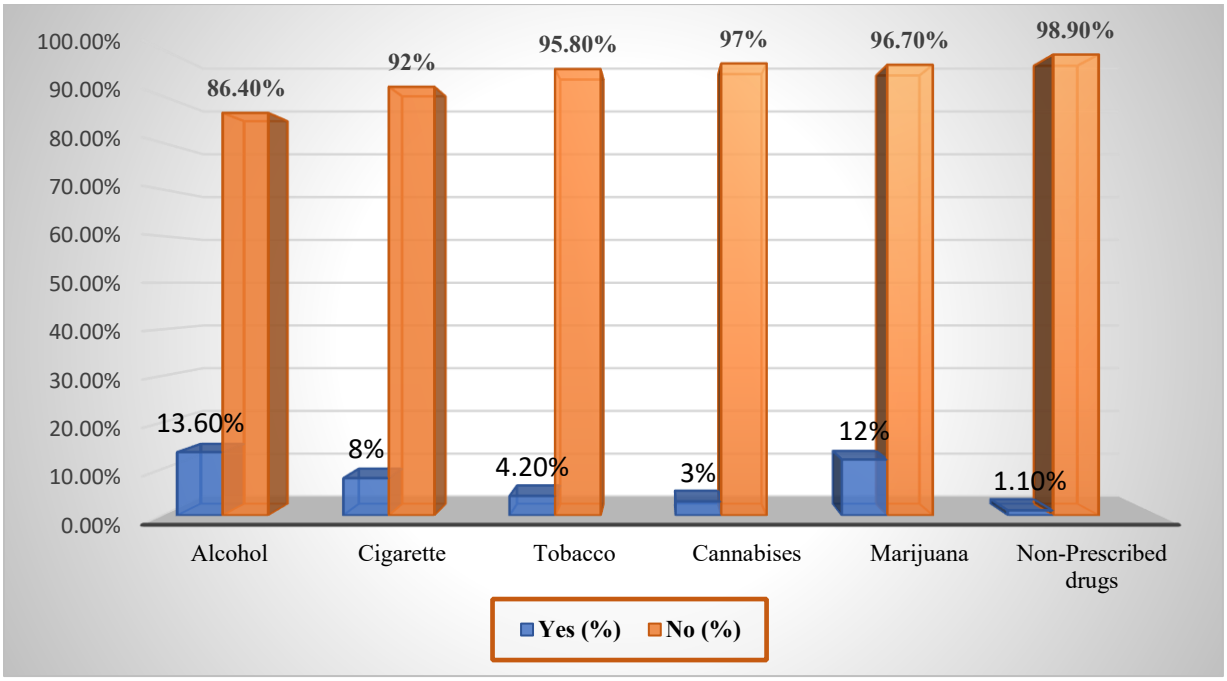

Figure 5. Substance use prevalence among undergraduate hostellers

consumption has an association with subsequent substance use among undergraduate hostellers (Table 4). Particularly, alcohol consumption was statistically significant with ED consumption ($p < 0.001$). 13.6% of consumers consume EDs and alcohol.

Similarly, cigarettes ($p < 0.001$), Tobacco ($p < 0.001$), cannabis ($p=0.001$), and marijuana ($p=0.002$) consumption showed significant association with ED consumption. ED consumers compared to the non-consumers were more likely to consume alcohol (13.6% vs. 4.8%, $p < 0.001$), cigarettes (21.4% vs. 2%, $p < 0.001$), and other forms of tobacco (11.6% vs. 0.8%, $p < 0.001$). Cannabis use was also significantly higher among ED consumers (8% vs. 0.8%, $p = 0.001$), as was marijuana use (8% vs. 0.8%, $p = 0.002$). However, the association between ED consumption and non-prescribed drug use was not statistically significant ($p = 0.090$).

Discussion

This study sought to assess the prevalence of ED intake among undergraduate hostellers at the University of Colombo. Further, their awareness of potential health risks related to this behavior, reasons and associations for consumption, and its relationship with subsequent substance use were assessed.

The findings revealed that more than one-third of the participants had never consumed EDs. Of the participants, 112 were currently consuming ED, indicating a prevalence of consumption of 31% among undergraduate hostellers at the University of Colombo. According to Ghozayel et al. (2020), University students have devised several ways to enhance their performance while studying, participating in sports, and coping with daily stressors by using EDs. This alleged benefit of EDs may account for the large number of research participants who regularly use them.

In line with our study, Ghozayel et al. (2020) denoted a considerable prevalence of ED usage in 45% of undergraduates of two private universities in Beirut, Lebanon. Nevertheless, Kushwaha et al. (2019) have shown a high prevalence of ED consumption (58.3%) among undergraduates in Nepal. Compared to other South Asian countries, the prevalence of ED consumption among undergraduate hostelers was observed to be low in the current study. However, the differences in population and sample sizes, in addition to study design, may be the reasons behind the disparity in prevalence among the various studies.

ED consumption was cited by survey participants for a variety of reasons, including enjoyment of the taste, support for academic and athletic endeavors while driving, and sex enhancement. The primary motivation given by 64 respondents was the taste. This is consistent with research by Qtait & Alarab (2020), which revealed that the majority (61%) of study participants drank EDs because of their taste. This fact was justified by the study of Heckman et al. (2010), in which it is observed that the majority of EDs contain flavorings and sweeteners like glucose, which help to improve their taste. Furthermore, it was discovered that 20.9% and 10.2% of people

Table 4: Association between ED consumption and substance use

ED consumption	Yes n (%)	No n (%)	p-Value
Alcohol consumption			
Yes	37 (13.6%)	12 (4.8%)	**<0.001**
No	75 (86.4%)	237 (95.2%)	
Cigarette consumption			
Yes	24 (21.4%)	05 (2%)	**<0.001**
No	88 (78.6%)	244 (98%)	
Tobacco consumption (Other than cigarettes)			
Yes	13 (11.6%)	02 (0.8%)	**<0.001**
No	99 (88.4%)	247 (99.2%)	
cannabis consumption			
Yes	09 (8%)	02 (0.8%)	**0.001**
No	103 (92%)	247 (99.2%)	
Marijuana consumption			
Yes	9 (8%)	103 (92%)	**0.002**
No	103 (92%)	246 (98.8%)	
Non-prescribed drug consumption			
Yes	03 (2.7%)	01 (0.4%)	0.090
No	109 (97.3%)	248 (99.6%)	

used EDs to get energy when they were tired and to help them study. This also potentially implies that the academic workload of undergraduates might increase the use of EDs.

According to the findings of this study, individuals initially encountered ED through advertisements, personal recommendations from friends or relatives, or convenience stores. The most common methods of introduction were friends or family members and advertisements. Similarly, Saku et al. (2020) revealed that the initial introduction of ED to bus drivers took place through advertisement (44.2%) and friend or family recommendation (31%). It is not unexpected that commercials for ED might lead people to start using them because they are so enticing. McCrory et al. (2017) found that 31.2% of the participants had first encountered ED via suggestions from friends and relatives. This implies that the

drinking habits of these hostellers are heavily influenced by their close friends and family.

As observed by Lebacq et al. (2020), engaging in physical activity increased the risk of ED consumption among the young population, and having a single parent or lower family affluence was associated with ED consumption. But surprisingly, our study revealed that there was no association between ED consumption and engagement in sport activities or having a single parent. According to the study results, Most ED consumers were living with both parents.

This may be possible because people may have different reactions to EDs. Some may find them helpful for sports performance, while others may not. Research that does not take individual differences into account might not capture the complexity of the relationship. Further, in some sports or fitness communities, EDs are popular for their potential to boost energy and performance, while in others, the focus may be on healthier and more natural ways to improve physical performance.

According to the current study, ED consumption was associated with the level of awareness regarding the negative health effects of ED consumers. In line with this study, Kumar et al. (2015) also observed that the most probable reason to use EDs was the lack of awareness of the negative health-related effects of EDs.

This study revealed that 9 out of 10 hostellers had comparatively poor awareness of the content of ED, the maximum caffeine level, and whether it is associated with health-related risks. Among the respondents, 68.8% had poor awareness regarding health risks in ED consumption, while 25.9% of them reported good awareness, and 5.4% of them had excellent awareness of ED consumption. Saku et al. (2020) also observed that 72% of the poor awareness in the Ghana population. As Gunja & Brown (2012) reported, little is known about the components, outcomes, and toxicity of EDs. When comparing other populations, this study sample also denoted a severe lack of awareness among the undergraduate hostellers.

This study found a significant association between gender and awareness of the health risks associated with ED consumption. Male participants had good awareness (67.7%) compared to females (64.2%). Previous studies have also shown an association between gender and ED consumption and knowledge of its health risks. For example, males are more likely to consume EDs and have more knowledge about their effects, contents, and side effects (Sampasa-Kanyinga et al., 2020). This is possible because peer groups and social circles can play a significant role in shaping awareness.

Further, this study found a statistical significance between awareness of the health-related risks associated with ED consumption and the academic year of university students. The results indicate that first-year students had the highest levels of poor awareness. These findings differ from previous studies that have investigated the association between awareness of health risks and academic years; according to some studies, students in later years or seniors have greater awareness. For instance, as per Cencek et al. (2016), medical and dental

students at the Medical University of Lublin had a greater awareness of the health risks associated with ED consumption in their later academic years than in their earlier academic years.

The current study also revealed that current ED users consume various substances at different rates across the sample. It shows that 49 individuals consumed alcohol. while 29, 15, 11, 12, and 04 participants consumed cigarettes, tobacco (other than cigarettes), cannabis, marijuana, and non-prescribed drugs, respectively. Additionally, it showed a strong association between eventual drug usage and ED consumption among undergraduate hostelers. According to the findings, alcohol consumption was associated with the use of EDs ($p < 0.001$).

According to a cross-sectional study conducted among undergraduates of Erciyes University, the average regular consumer of EDs consumed alcohol-mixed EDs at a rate of 37.6% (Borlu et al., 2019). This is in line with our study's findings on the percentage of alcohol consumption. Further, it was reported that the subjects' regular and attempted ED consumption situations were significantly associated with their alcohol consumption and smoking habits. This is in line with the results of this study.

According to the findings of Leal and Jackson (2019), in Nepal revealed that individuals who consume EDs are substantially more likely to desire to start using marijuana than those who don't. This shows an agreement with the findings of the current study. As Jackson et al. (2013) observed that among adolescents (13–17 years old) and young adults (18–25 years old) who visited the emergency department, young adults who use tobacco were more likely to consume EDs than young adults who did not.

Peacock et al. (2015) concluded that illicit drug users have consumed ED at any point in their lifetime. However, these findings showed that non-prescribed drug use was not significantly associated with ED consumption ($p = 0.090$).

Limitations

This study has a few limitations that should be acknowledged. First, the reliance on self-reported data through an online questionnaire may have introduced response bias, as participants might have underreported or overreported their ED consumption and substance use behaviors. Second, the cross-sectional nature of the study limits the ability to establish causal relationships between ED consumption, awareness of adverse effects, and subsequent substance use. Lastly, the study was conducted at a single university, which may restrict the applicability of the results to other institutions or cultural contexts.

Conclusions

Overall, this study showed the incidence of ED intake among the undergraduate hostellers of the University of Colombo. ED use was shown to be greater among those who were between the ages of 23 and 25. They were in their first year at the university, were doing part-time jobs, and had lower levels of awareness, as well. The majority of the hostellers had poor awareness regarding health-related risks linked with ED

consumption. Long-term, this may raise their risk of harmful side effects or negative health impacts related to using EDs

A considerable proportion of hostellers consumed substances such as alcohol, tobacco, marijuana, and cannabis. The findings unequivocally demonstrate that consuming ED can be linked with substance abuse. The association and potential risk of substance use should be further investigated using a longitudinal study. The findings highlight the necessity of educating young people about the harmful effects of using EDs.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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