



## DRUG ABUSE AMONG UNDERGRADUATE STUDENTS USING WARNER'S RANDOMIZED RESPONSE TECHNIQUE



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**Abstract:** Drug abuse is one of the health issues affecting Nigerian youth and has raised concerns among those involved in education. The associated social effects of drug abuse on undergraduate students are overwhelming. This study is therefore designed to investigate the effects of drug abuse among the undergraduate students at the Federal University of Technology, Akure thereby leading to the determination of the proportion of undergraduate students who abused drugs using the randomized response technique proposed by Warner in survey sampling. The data for the study is primary data acquired from the administration of well-structured survey questionnaires to the undergraduate students of the University. Furthermore, the proportions of undergraduate students who indulged in various sensitive attributes that can enhance drug abuse and their associated standard errors were estimated for a preassigned probability ' $p$ ' respectively. The outcomes as presented in the summary table 17 show that alcohol use was the most abused drug among the undergraduate students while peer group was the prime factor that contributed significantly to the abuse of drugs.

**Keywords:** Drug abuse, Proportion, Randomized response technique, Sensitive attributes

### Introduction

Drugs are commonly used by everybody whether young or old. Drugs are not only useful for human beings; they are also useful for animals for good health. Human beings give drugs to their animals when they discover that they are not healthy. Drug is an effective substance in the life of any living thing to cure sickness and to make life healthy. However, despite the therapeutic effects of drugs, they are being abused by people. They unlawfully use them and thus become hazardous to the users. According to the statistics provided by the World Health Organization (WHO, 2018), drugs including alcohol and tobacco have caused a lot of road accidents claiming more lives than other sicknesses suffered by mankind. The Nigerian National Drug Law Enforcement Agency has stated that drug abuse is a major problem in colleges and universities in Nigeria (NDLEA, 2020). Oshikoya and Alli, (2016) in their studies on the perception of drug abuse among Nigerian undergraduates identified addiction as one of the major consequences of drug abuse which often resulted in compulsive drug craving-seeking behaviours. Newcomb and Bentler (1989) in their study lamented the unabated substance use and abuse among children and teenagers. They emphasised that although teenage drug use was an individual behaviour, it is inherent in a sociocultural context that strongly determined its character and manifestations. Adegboro (2014) reported that despite global education about psychoactive substances, many adolescents have insufficient awareness of the hostile effects of drugs. Shibalika and Chileshe (2022) in their study investigated the causes and effects of drug abuse among primary school learners in Shibuyunji. They stated that the causes of drug abuse in Shibuyunji district were peer pressure, lack of recreational activities, curiosity and amusement, lack of parental supervision, the prevalence of drugs in the locality and poverty respectively. Udo and Okoro (2022) carried out an extensive survey study on alcohol consumption at selected bars in Keffi, Nigeria. The study found that while all consumers expressed different reasons for consuming alcohol, all the interviewed respondents were unaware of the quantity that may be harmful to the consumers. Ikoh *et al.* (2019)

investigated factors that influenced the use of drugs by youths and the extent to which this involvement has affected the security of the state and how it can be controlled. The results revealed that drug abuse was significantly practised in the metropolis due to a lack of parental control, easy access to drugs and a prominent street culture of gangsterism. Henky *et al.* (2022) in their study described the involvement of children in drug abuse as well as explained the victimization of child victims of drug abuse. The findings of the study show that the involvement of children in drug abuse cases often positions children as drug users thus leading to victimization by their friends. Christiana and Runturambi (2023) opined that the problem of drug abuse and trafficking in prisons is a phenomenon that often occurs in prisons in Indonesia. The study used the literature study method by tracing journals, mass media coverage and other related literature. The results of the study on drug abuse and trafficking in prisons were reported accordingly. This study was carried out to investigate the effects of drug abuse among undergraduate students at the Federal University of Technology, Akure as well as determine the proportions of undergraduate students who abused drugs using the randomized response technique introduced by Warner in survey sampling.

### Materials and Methods

This study is designed to investigate the effects of drug abuse among undergraduate students in the University. This is achieved by determining the proportions of undergraduate students who abused drugs through the application of the randomized response technique proposed by Warner and their associated standard errors. The investigation of the effects of drug abuse encompasses the type of substances they use; factors that contribute to the use of drugs as well as the occasions that warrant the use of drugs among the undergraduate students of the University. The real data used for the study were obtained through the administration of well-designed survey questionnaires. Furthermore, a comparison of the gender, individual factors, occasions, and type of substance in terms of drug

usage was carried out using their proportions and their associated standard errors. The following terms are clearly defined since they are very germane to the study as they are related to the adopted Warner's randomized response technique in the study. Let  $n$  = the number of sampled respondents;  $x$  = the number of respondents who answered 'yes' to the sensitive attribute in the sample size;  $p$  = preassigned probability of answering the sensitive questions;  $\hat{\lambda} = \frac{x}{n}$  is the observed proportion of "yes" responses;  $\hat{\pi} = \frac{(\hat{\lambda} + p - 1)}{(2p - 1)}$  is the estimated proportion of "yes" responses;  $V(\hat{\pi}) = \frac{\pi(1-\pi)}{n} + \frac{p(1-p)}{n(2p-1)^2}$  is the resulting variance such that  $p \neq 0.5$ . The standard error (se ( $\hat{\pi}$ )) is the square root of the variance,  $V(\hat{\pi})$ . To guarantee the confidentiality of respondents, there is a need to select the preassigned probability  $p$  very close to one in agreement with Warner's randomized response technique. Similarly, the confidentiality of the respondents was further guaranteed with respect to the sensitive attribute "drug usage" by designing the administered survey instrument (questionnaire) such that the identities of the respondents were fully protected. All they needed to do was just to provide an answer option "Yes" or "No" to the sensitive attribute asked in the study. The suitable sample size  $n$  for the study was determined using the formula proposed by Cochran (1977) which is given as  $n = \frac{N}{1 + N(e)^2}$  where  $n$  is the required sample size (total number of administered questionnaires)  $N$  is the assumed population size of the University from which sampling is carried out and  $e$  is the desired level of precision. In this case,  $N = 20,000$  and  $e = 0.05$  respectively. Therefore,

$n = \frac{20,000}{1 + 20,000(0.05)^2} \approx 392$ . It is noteworthy that out of these 392 administered survey questionnaires, only 373 were returned by the respondents (students) in the University. Consequently, the sample size was later grouped into males and females for a suitable statistical conclusion.

**Results and Discussion**

In this section, the results of the analysis of the administered survey instrument (questionnaires) with the adoption of the ingenious randomized response technique introduced by Warner in the methodology above as well as a discussion of the results of the analysis at preassigned probability 'p' are presented in the following tables respectively.

**Demographic Analysis of students with sensitive response**

A descriptive analysis of responses obtained from the survey carried out using the Warner randomized response technique is given in the table below

**Table 1:** Frequency distribution of the total number of respondents (students) with sensitive responses

Gender	Total
Male	81
Female	48

Table 1 shows the frequency distribution of the total number of respondents (students) who engaged in drug abuse among the University's undergraduate students. It indicates that male students have the highest record of drug abuse more than female students.

**Table 2:** Frequency distribution of gender of respondents (students) versus Age groups of students

Gender of respondent	Age of students			Total
	18-20	21-25	26+	
Male	12	52	17	81
Female	6	39	3	48
Total	18	91	20	129

Table 2 shows the frequency distribution of gender of respondents (students) and the age groups of students. Here, the highest age group that engaged in drug abuse falls between the ages 21-25 having a total number of 91 and mostly recorded among the male students.

**Table 3:** Frequency distribution of gender of respondents versus students living with/without parents

Gender of respondents	Living with/without Parents			Total
	Living without parent	Living with one parent	Living with both parents	
Male	16	27	38	81
Female	3	11	34	48
Total	19	38	72	129

Table 3 shows the frequency distribution of gender of respondents (students) living with/without parents. The table above shows that students who live with both parents engaged most in drug abuse.

**Table 4:** Frequency distribution of drug type's usage among gender of respondents (students) of various age groups versus students living with/without parents

Drugs used	Male	Female	18-20	21-25	26+	Living without parent	Living with one parent	Living with both parents
Alcohol	79	44	18	88	17	19	35	69
Cigarette	35	13	7	36	5	9	17	22
Cocaine	0	0	0	0	0	0	0	0
Heroin	0	0	0	0	0	0	0	0
Marijuana	1	0	0	1	0	0	0	1
Aspirin/codeine	6	3	0	6	3	4	2	3
Others	3	8	0	8	3	3	3	5

Table 4 shows the frequency distribution of gender of respondents of various age groups who are involved in different usage of drugs versus students living with/without parents. The table shows that Alcohol is the most abused drug among male undergraduate students within the age bracket 21-25.

**Table 5:** Frequency distribution of respondents' reasons for using drugs versus students living with/without parents

Reasons	Male	Female	18-20	21-25	26+	Living without parent	Living with one parent	Living with both parents
Motivation	54	20	12	48	14	13	20	41
Reduce stress	20	15	4	25	6	7	15	13
Build up self-esteem	14	7	0	16	5	4	5	12
Performance	35	12	6	37	4	7	12	28
Others	6	7	1	10	2	2	1	10

Table 5 above shows the frequency distribution of respondents' reasons for engaging in drug abuse. The table reveals that among the reasons adduced, motivation has the highest record followed by performance mostly predominant among the male students in the age bracket 21-25.

**Table 6.** Frequency distribution of the factors that contributed to drug abuse among the respondents (students) versus students living with/without parents

Factors	Male	Female	18-20	21-25	26+	Living without parent	Living with one parent	Living with both parents
Peer group	72	35	17	74	16	16	32	59
Depression	13	7	2	15	3	5	6	9
Self-esteem	13	7	0	17	3	4	7	9

**Table 7:** Frequency distribution of the occasions that contributed to drug abuse among the respondents (students) versus students living with/without parents respondents

Occasions	Male	Female	18-20	21-25	26+	Living without parent	Living with one parent	Living with both parents
Before exams	6	3	0	6	3	3	3	3
Before sport	2	1	1	1	1	1	0	2
On-street	13	0	3	6	4	3	6	4
At parties	63	28	14	63	14	17	26	48
At home	44	32	8	59	9	9	25	42

Tables 6 and 7 show the frequency distributions of both the factors and the occasions that contributed to drug abuse among University undergraduate students. It is obvious from the tables that peer group is the primary factor that contributed mostly to drug abuse among students while parties are the occasions where respondents (students) commonly abused drugs.

**Proportional Analysis of Respondents Involving in Drug Abuse**

This section of the paper presents the results of a proportional analysis of undergraduate students involved in drug abuse using Warner's randomized response technique in the methodology above as well as the discussion of the results of the proportional

analysis (proportion  $\hat{\pi}$  and the standard error, SE ( $\hat{\pi}$ )) and the 95% confidence interval for the determined proportion  $\hat{\pi}$  at preassigned probability 'p' and sample size 'n' in the following tables respectively.

**Table 8:** Comparison of proportion ( $\hat{\pi}$ ) and SE ( $\hat{\pi}$ ) at  $n = 373$  for the drugs being involved

	Proportion and SE (%)	95% C.I
Proportion of 'yes' responses	19.16 ( $\pm 4.9$ )	(9.48, 28.82)
Male	75.6 ( $\pm 8.5$ )	(58.92, 92.24)
Female	24.4 ( $\pm 8.5$ )	(7.65, 41.14)

Table 8 shows a comparison of proportions ( $\hat{\pi}$ ) and SE ( $\hat{\pi}$ ) at  $n = 373$  from the total administered questionnaires and the proportion of each gender. It is clear from the table above that male students are mostly involved in drug abuse more than their female counterparts.

**Table 9:** Comparison of proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) at  $n = 129$  for the drugs being involved

Sensitive Attribute	Proportion and SE (%)	95% C.I
Alcohol	98.01 ( $\pm 7.7$ )	(82.81, 99.99)
Cigarette	24.41 ( $\pm 8.5$ )	(7.67, 41.16)
Heroin	-	-
Marijuana	-	-
Aspirin/codeine	-	-
Others	-	-

**Table 10:** Comparison of proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) at  $n = 129$  of respondents' reasons for using drugs

Sensitive Attribute	Proportion and SE (%)	95% C.I
Motivation	64.72 ( $\pm 8.7$ )	(47.58, 81.85)
Reduce stress	4.26 ( $\pm 7.9$ )	(-11.14, 19.67)
Build up self-esteem	-	-
Increase Performance	22.86 ( $\pm 8.5$ )	(16.73, 39.53)

**Table 11:** Comparison of proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) at  $n = 129$  for the factors that contributed to drug abuse among respondents

Sensitive Attribute	Proportion and SE (%)	95% C.I
Peer Group	96.3 ( $\pm 7.8$ )	(15.36, 99.98)
Depression	-	-
Self-esteem	-	-

**Table 12:** Comparison of proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) at  $n = 129$  on occasions they use drugs.

Sensitive Attribute	Proportion and SE (%)	95% C.I
Before exam	-	-
On the street	-	-
Before doing sport	-	-
At Parties	91.08 ( $\pm 8.1$ )	(75.38, 100)
At home	67.82( $\pm 8.7$ )	(17.04, 84.87)

**Table 13:** Comparison of proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) at  $n = 129$  of the abused drugs between male and female respondents

<b>Alcohol</b>		
Male	72.4( $\pm 8.6$ )	(16.88, 89.23)
Female	18.2 ( $\pm 8.3$ )	(16.42, 89.23)
<b>Cigarette</b>		
Male	18.2 ( $\pm 8.4$ )	(16.43, 34.64)
Female	-	-

**Table 14:** Comparison of proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) at  $n = 129$  for the gender's reasons for engaging in drug abuse

<b>Motivations</b>		
Male	33.7( $\pm$ 8.7)	(17.09, 50.79)
Female	-	-
<b>Performance</b>		
Male	4.3( $\pm$ 7.9)	(7.55, 22.65)
Female	-	-

**Table 15:** Comparison of proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) at  $n = 129$  for the factor (s) that contributed to the gender engaging in drug abuse

<b>Peer Group</b>		
Male	30.81( $\pm$ 8.7)	(13.81, 47.81)
Female	4.3( $\pm$ 7.9)	(-11.14, 19.67)

**Table 16:** Comparison of proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) at  $n = 129$  on occasions the gender engages in drug abuse  
Generally, tables (9 -12) show the proportion ( $\hat{\pi}$ ) and and SE ( $\hat{\pi}$ ) of drugs, reasons, factors and occasions the undergraduate

<b>At Parties</b>		
Male	47.67( $\pm$ 8.8)	(30.35, 64.99)
Female	-	-
<b>At Home</b>		
Male	18.22( $\pm$ 8.4)	(17.91, 34.64)
Female	-	-

students engage in drug abuse. Table 9 shows that out of the 129 respondents that abused drugs, alcohol (98.01% ( $\pm$  7.7)) and cigarettes (24.41% ( $\pm$  8.5)) are the most abused drugs. Table 10 shows that the drugs are used for motivation (64.72% ( $\pm$  8.7)), reducing stress (4.26% ( $\pm$  7.9)) and increasing performance (22.86% ( $\pm$  8.5)) as the reasons for abusing drugs. Table 11 shows that the peer group (96.3% ( $\pm$  7.8)) was a factor that contributed most to drug abuse. Similarly, Table 12 shows that drug abuse is used mostly at parties (91.08% ( $\pm$  8.1)) followed by Home (67.82 % ( $\pm$  8.7)). Tables 13-16 show the proportional analysis of individual respondent's contribution to drug abuse. It can be seen that male respondents are mostly involved in drug abuse.

**Table 17:** Summary of findings of the survey on drug abuse among undergraduate students of the University

Sensitive Attribute	Proportion and SE (%)	95% C.I
Alcohol (drugs)	98.01 ( $\pm$ 7.7)	(82.81, 99.99)
Cigarette (drugs)	24.41 ( $\pm$ 8.5)	(7.67, 41.16)
Motivation (reason)	64.72 ( $\pm$ 8.7)	(47.58, 81.85)
Reduce stress (reason)	4.26 ( $\pm$ 7.9)	(-11.14, 19.67)
Increase Performance (reason)	22.86 ( $\pm$ 8.5)	(16.73, 39.53)
Peer Group (factor)	96.3 ( $\pm$ 7.8)	(15.36, 99.98)
At Parties (occasions)	91.08 ( $\pm$ 8.1)	(75.38, 100)
At home (occasions)	67.82( $\pm$ 8.7)	(17.04, 84.87)

From the summary table 17 above, it can be inferred that alcohol (98.01 ( $\pm$  7.7)) with confidence interval (82.81, 99.99) is the most abused drug. Motivation (64.72 ( $\pm$  8.7)) with confidence interval (47.58, 81.85) is the most adduced reason for engaging in drug abuse, peer group (96.3 ( $\pm$  7.8)) with confidence interval (15.36, 99.98) is the factor

that contributed most to drug abuse among the undergraduate students while parties (91.08 ( $\pm$  8.1)) with confidence interval (75.81, 100) is the occasion where drug abuse is predominant among the surveyed undergraduate students of the University respectively.

**Conclusion**

This study elaborately involved statistical analysis of various factors, reasons and occasions that may contribute to drug abuse among the undergraduate students of the University. Furthermore, the proportions as well as the standard errors of various parameters that can induce drug

abuse using the randomized response technique proposed by Warner were determined. The summary of findings of this study revealed that alcohol and cigarettes are the most abused drugs respectively. The study also revealed that the main factor that contributed to the abuse of drugs is peer group and the results also revealed that male students abuse drugs more than female students in the University  
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