

Khat chewing practice and associated factors among medical students in university of Gondar, Ethiopia, 2019: a cross-sectional study

Tsegaye Adane Birhan (✉ tseg729@gmail.com)

University of Gondar <https://orcid.org/0000-0003-3006-6169>

Walelegn Worku

University of Gondar

Jember Azanaw

University of Gondar

Lamrot Yohannes

University of Gondar

Research

Keywords: Khat chewing, University of Gondar, Medical Students

Posted Date: March 28th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-19242/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: Globally, khat chewing practice becoming an alarming and common among the youth generation especially in higher educational institutions. It may also leads to frequent misbehavior, poor academic performance and memory impairment among students. This study aimed to determine the prevalence of khat chewing and associated factors among medical students in University of Gondar, Northwest Ethiopia, 2019.

Method: An institution-based cross-sectional study was employed on 422 medical students. Data were collected using a self-administered questionnaire and analyzed using SPSS 20 software. Stratified followed by random sampling was employed to select the samples. Multivariable logistic regression model was fitted to identify the predictors. $P \leq 0.05$ was used to select statistically significant factors.

Result: The current prevalence of khat chewing among medical students was 21.5%. The odds of khat chewing was higher among males [AOR=3.353; 95%CI (1.460-7.701)], Muslims [AOR=6.390; 95%CI (1.903-21.460)], fifth and six year students [AOR= 3.391; 95%CI (1.354-8.488)], smokers [AOR=5.081; 95%CI (1.898-13.601)], alcohol users [AOR=4.872; 95%CI (2.094-11.332)], students who had khat chewer close friends [AOR=30.645; 95%CI (12.261-76.589)].

Conclusion: Since a significant proportion of students chew khat, continuous awareness creation on the impact of khat chewing and counseling services are recommended.

Introduction

Khat (*Catha edulis*) is an herbal product consisting of the leaves and shoots of the *Catha edulis* Forsk shrub, a member (genera) of the evergreen celastraceae family that is cultivated in most parts of the world, particularly in Eastern Africa and Arabia [1, 2]. It is also widely cultivated in Ethiopia [3]. Khat is chewed for its stimulatory effect due to the presence of more than 40 psychoactive substances contained in fresh leaves of the herb [4]. The dominant stimulator ingredients includes cathinone, cathine, and norephedrine [5]. These psychoactive substances stimulate chewers through the autonomic sympathetic nervous system, commonly called the 'fight or flight' response [6].

Studies have documented the number of khat chewers in Ethiopia has significantly increased over time, and now, it has become popular in all segments of the Ethiopian population [7]. Currently, it has become a significant practice in youth, especially university students, and quickly becoming a significant public health problem[8–10]. The prevalence of khat chewing was 27.7% among high school students in Dire Dawa [11], 6.7% among Adigrat University students[12], 28.7% among Axum University students [13], 23.6% among preparatory school students in Bale Zone [14], 33.1% among health officer and medical students of Jimma university [15], 40.0% among Adama university students[16], 24.2% high school students in Harare town [17], 37.8% among Jimma university students (29), 7.8% among Students at Debre Markos Poly Technique College[18], and 7% among medical students of Addis Ababa University [19]. The major factors that influence khat chewing includes being male[14, 15, 17–20], being Muslim[15,

17], their age [15, 17], having friends who chewed khat [13, 17, 18, 20], Cigarette smoking [13], alcohol use [14, 19], similar habits by their family members [13, 14, 17, 20], year of study [15], pocket money [20], and others.

Students consumed khat to remain alert and wakeful at night, especially during examination periods. The detrimental personal and social effects of khat chewing are well understood. In addition to economic and social impacts, chronic use of khat is associated with increased blood pressure/hypertension [21, 22], development of gastrointestinal tract problems [22], cytotoxic effects on liver and kidneys [22–25], and keratotic lesions at the site of chewing [21], malnutrition, psychotic reactions after chronic use, depressive reactions, myocardial infarction and cardiovascular disorders [22, 26, 27], male sexual dysfunction [26], stroke and death [28]. Despite its health, social and economic impact; khat chewing becomes common practice among students and youths in Ethiopia. Khat chewing practices among university students, particularly those of medical students who spend a long time studying in universities, must be further studied. Therefore, the aim of this study was to assess the prevalence and associated factors of khat chewing among medical students enrolled at the University of Gondar in northwest Ethiopia.

Methods

Study design, area and period

Institutional-based cross-sectional study design was conducted at College of Medicine and Health Sciences (CMHS), University of Gondar from March 1 to June 26, 2019. There were a total of 1708 medicine students at CMHS, University of Gondar, which was chosen for this study because medical students study for long periods of time and generally have more exposure to stress.

Source and study population

All medical students in the CMHS were the source population, and the students who were present during the data collection period were the study population.

Inclusion and exclusion criteria

Medical students who were severely ill during the data collection period and students who had hearing and speaking difficulty were excluded.

Sample size and sampling procedure

A single population formula was used to estimate the sample size by considering the prevalence of khat chewing was 50%, confidence level of 95%, 5% margin of error and with the assumption of 10% non-response rate. Then, the final sample size became 422. After taking the list of medical students from the registrar office of the University of Gondar, stratified proportional sampling followed by a computer-generated simple random sampling technique was used to select the study participants for this study. The stratification was formed from 1st - 6th year medicine students.

Data collection procedure

Data were collected by three environmental health professionals using a pre-tested self-administered structured questionnaire. The training was also given for data collectors before data collection period.

Operational definition

Khat chewer: the one who chew khat for at least one time in his life [29].

Lifetime prevalence of khat: the proportion of students who had ever use khat in their lifetime [13].

Current prevalence of khat: the proportion of students who were chewing within 30 days preceding the study [13]).

Data quality control

The questionnaire was pre-tested and training was also given for data collectors. Data were checked for completeness, coded and entered appropriately prior to the analysis.

Data processing and analysis

Data were entered and cleared using EPI-INFO version 7.0.0 statistical package and export into SPSS software version 20 for further analysis. Bivariable logistic regression analysis was performed to find the association of each independent variable with khat chewing. All variables with a P-value of 0.25 at bivariable logistic regression analysis were entered into the multivariable logistic regression model. P-value ≤ 0.05 was considered statistically significant. Adjusted odds ratio (AOR) and its 95% confidence interval (CI) were calculated for potential associated factors included in the final model.

Results

Socio-demographic characteristics of respondents

Four hundred and twenty two subjects were included in the study and the overall response rate was 409 (96.95%). About half (50.4%) of the respondents were males. The majority of students were within the age of 20-24 years old (72.1%). Most of them were orthodox 264 (64.5%) and followed by Muslims 55 (13.4%) (table.1).

Table 1: Socio-demographic characteristics of Gondar university medical students, Gondar, Ethiopia, June 2019 (N=409)

Variables	Frequency (N=409)	Percentage
Age		
17-19	46	11.2
20-24	295	72.1
>/=25	68	16.6
Sex		
Male	206	50.4
Female	203	49.6
Religion		
Orthodox	264	64.5
Muslim	55	13.4
Other	90	22.0
Marital status		
Married	15	3.7
Not married	394	96.3
Year of study		
First and second year	116	28.4
Third and fourth year	150	36.7
Fifth and sixth year	143	35.0
Family member khat chewing		
No	354	86.6

Yes	55	13.4
Close friends khat chewing		
No	340	83.1
Yes	69	16.9
Alcohol use		
No	270	66.0
Yes	139	34.0
Cigarette smoking		
No	367	89.7
Yes	42	10.3
Ever chewed khat		
No	312	76.3
Yes	97	23.7
Currently khat chewing		
No	321	78.5
Yes	88	21.5

Prevalence of khat chewing and associated factors

Current prevalence of khat chewing was 21.5% (table 1). Variables that were associated with khat chewing practice in bivariable logistic regression ($P < 0.25$), were fitted in multivariable logistic regression model. Sex, religion, year of study, smoking habit, alcohol drinking and having khat chewing friends were associated with khat chewing practice among medical students. Being male was 3.353 times more likely to chew khat than female students. The odds of Muslim students to chew khat was 6.390 times the odds

of other religion followers. Being fifth and sixth year medicine student in the university were 3.391 more likely to chew khat than first and second year medicine students (table 2).

Table 2: Bivariable and multivariate logistic regression analysis of factor associated with khat chewing among medical students, university of Gondar, Gondar, Ethiopia, June 2019 (N=409)

Variables	Chat chewing		Odds ratio	
	Yes	No	COR (95%CI)	AOR (95%CI)
Sex				
Male	67	139	4.177 (2.440-7.151)	3.353(1.460-7.701)*
Female	21	182	1	1
Religion				
Orthodox	51	213	1.720 (0.853-3.466)	2.039(0.779-5.337)
Muslim	26	29	6.439 (2.826-14.670)	6.390(1.903-21.460)*
Other	11	79	1	1
Marital status				
Married	8	7	4.486 (1.580-12.738)	4.002(0.654-24.731)
Not married	80	314	1	
<i>Year of study</i>				
First and second year	15	101	1	1
Third and fourth year	26	124	1.412 (0.710-2.808)	1.338(0.442-4.045)
Fifth and sixth year	47	96	3.297 (1.730-6.282)	3.391(1.354-8.488)*
<i>Stressful condition</i>				
No	13	129	1	1
Yes	75	192	3.876 (2.065-7.276)	1.506(0.528-4.291)
<i>Peer pressure</i>				

No	13	119	1	1
Yes	74	202	3.353 (1.783-6.305)	2.548(0.841-7.7724)
<i>Smoking habit</i>				
No	61	306	1	1
Yes	27	15	9.030 (4.536-17.974)	5.081(1.898-13.601)*
<i>Drinking alcohol</i>				
No	28	242	1	1
Yes	60	79	6.564 (3.920-10.991)	4.872(2.094-11.332)*
<i>Use of other substance</i>				
No	74	315	1	1
Yes	14	6	9.932 (3.693-26.712)	3.437(0.796-14.839)
<i>Close friend chewing khat</i>				
No	44	296	1	1
Yes	44	24	11.840 (6.602-21.235)	30.645(12.261-76.589)*

*p ≤ 0.05 = significant at 95% level of significance.

Discussions

The finding of the present study revealed a significant proportion of medical students found to be khat chewer, which implies the university and other responsible bodies need to have a series of attention in controlling of the increasing khat chewing practice. Sex, Religion, year of study, smoking habit, drinking alcohol habit and having khat chewer close friends were significantly associated with khat chewing practice among medical students. In this study, the lifetime and current prevalence of khat chewing among medical students of university of Gondar found to be 23.7% and 21.5 respectively. This finding

was consistent with other studies conducted among preparatory school students in Bale Zone 23.6% [14], high school students in Harare town 24.2% [17] and in Dire Dawa 27.7% [11]. This consistency may be due to cultural and age group similarity between the study populations. However, the result of the study was lower compared to the study conducted among college students in Gondar town 42% [30], among Adama university students 40.0% [16] and among Axum university students 28.7% [13]. The reason might be the difference in the surrounding in the universities and most students in our study area are on campus where there is high control as compared to the above mentioned areas. The result of the study was also higher than other study conducted among medical students of Addis Ababa University 7% [19], among students of Debre-Markos Poly Technique College 7.8% [18]. The reason might be the accessibility and availability of khat chewing to the university and acceptance of the student to the habit.

This study showed that the habit of khat chewing was 3.353 times higher in males than females, which is in line with research findings reported for Jimma university students [15], for college students in Northwest Ethiopia [17] and for college students in Saudi Arabia [31]. This might be due to the common social and cultural restrictions on females khat chewing practice compared to males in Ethiopia.

Muslim students were 6.390 [AOR 95% CI= (1.903–21.460)] times more likely to chew khat than other religious followers. This is also consistent with the finding of other studies in Ethiopia and abroad [13–15, 19]. This association might be due to the fact that khat hewing practice has traditionally been confined to Muslim populations, and also it might be due to the religious dogma.

This study showed that fifth and sixth year students are 3.391 times more likely to chew khat. The reason might be their long waiting time in the university may cause depression and also faces more peer pressure/influence and they focus more on social interactions than academic issues than other year students.

Students who have chat chewer friends were 30.645 times more likely to chew khat. This finding is also in line with other studies [13, 17, 19]. This is because respondents who had khat chewing friends tend to imitate and exercise what they see from their peers due to peer-pressure and need of socialization.

Students who smoked cigarette are 5.081 times more likely to chew khat. This finding is also in line with other studies [13, 15, 19]. Students who drank alcohol are 4.872 times more likely to chew khat. This indicates that there is a clustering of a substance use behaviors among students of khat chewing habit.

Conclusion

Significant proportion students were khat chewers. Sex, Religion, year of study, smoking habit, alcohol drinking and having close friend who chews khat were important predictors of khat chewing practice. The university is recommended to create awareness for students, strictly ban the use of khat and provide counseling programs for students to help in coping with the problem.

Limitations Of The Study

Since it is a descriptive cross sectional study, doesn't show cause and effect relationship. Since the issue is sensitive, there may be social desirability bias. Findings from this study may not be generalized to the whole young people, because the study involved only University students.

Abbreviations

AOR: adjusted odds ratio; CI: confidence interval; CMHS: college of medicine and health science

Declarations

Acknowledgments

We would like to thank University of Gondar for its support to conduct this research. We would also like to thank our study participants and data collectors for their willingness and cooperation in collecting all necessary data for the success of this work.

Authors' contributions

LY: prepare the tools, collect, analyze and interpret the data. WW: Advise throughout the process. TA: Advise throughout the process and prepare the manuscript. JA: reviewed the manuscript. All authors read and approved the final manuscript.

Funding

There is no specific funding for this study.

Availability of data and materials

All data underlying the findings are fully available without restriction. All relevant data are within the manuscript.

Ethics approval and consent to participate

Ethical approval was obtained from the Institutional Review Board of University of Gondar. Written informed consent was also taken from the study participants. Confidentiality of information was also kept properly.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

References

1. Corkery JM, Schifano F, Oyefeso A, Ghodse AH, Tonia T, Naidoo V, Button J: **Overview of literature and information on" khat-related" mortality: a call for recognition of the issue and further research.** *Annali dell'Istituto superiore di sanità* 2011, **47**:445-464.
2. Thomas S, Williams T: **Khat (Catha edulis): A systematic review of evidence and literature pertaining to its harms to UK users and society.** *Drug Science, Policy and Law* 2013, **1**:2050324513498332.
3. Kandari LS, Yadav HR, Thakur AK, Kandari T: **Chat (Catha edulis): a socio economic crop in Harar Region, Eastern Ethiopia.** *SpringerPlus* 2014, **3**(1):579.
4. Geisshusler S, Brenneisen R: **The content of psychoactive phenylpropyl and phenylpentenyl khatamines in Catha edulis Forsk. of different origin.** *Journal of ethnopharmacology* 1987, **19**(3):269-277.
5. Pantelis C, Hindler CG, Taylor JC: **Use and abuse of khat (Catha edulis): a review of the distribution, pharmacology, side effects and a description of psychosis attributed to khat chewing.** *Psychological medicine* 1989, **19**(3):657-668.
6. Yeshaw Y, Zerihun MF: **Khat chewing prevalence and correlates among university staff in Ethiopia: a cross-sectional study.** *BMC Research Notes* 2019, **12**(1):673.
7. Selassie SG, Gebre A: **Rapid assessment of drug abuse in Ethiopia.** *Bulletin on narcotics* 1996, **48**(1-2):53-63.
8. Al-Mugahed L: **Khat chewing in Yemen: turning over a new leaf.** *Bulletin of the World Health Organization* 2008, **86**(10):741-742.
9. Carroll FI, Lewin AH, Mascarella SW, Seltzman HH, Reddy PA: **Designer drugs: a medicinal chemistry perspective.** *Annals of the New York Academy of Sciences* 2012, **1248**:18-38.
10. Ayano G, Yohannis K, Abraha M: **Epidemiology of khat (Catha edulis) consumption among university students: a meta-analysis.** *BMC Public Health* 2019, **19**(1):150.
11. Negussie B: **Substance use among high school students in Dire Dawa, Ethiopia.** *Harar Bull Health Sci* 2012, **4**:38-42.
12. Mossie TB, GebreMichael GB, Ayele AD: **Magnitude of psychoactive substance abuse among university students, Adigrat, North Ethiopia: cross-sectional study.** *J Psych* 2015, **18**:281.
13. Gebreslassie M, Feleke A, Melese T: **Psychoactive substances use and associated factors among Axum university students, Axum Town, North Ethiopia.** *BMC Public Health* 2013, **13**(1):693.
14. Dida N, Kassa Y, Sirak T, Zerga E, Dessalegn T: **Substance use and associated factors among preparatory school students in Bale Zone, Oromia Regional State, Southeast Ethiopia.** *Harm reduction journal* 2014, **11**:21.
15. Meressa K, Mossie A, Gelaw Y: **Effect of substance use on academic achievement of health officer and medical students of Jimma University, Southwest Ethiopia.** *Ethiop J Health Sci* 2009, **19**(3).
16. Dessie Y, Ebrahim J, Ayele T: **Mental distress among university students in Ethiopia: A cross sectional survey.** *The Pan African medical journal* 2013, **15**:95.

17. Reda AA, Moges A, Biadgilign S, Wondmagegn BY: **Prevalence and determinants of khat (*Catha edulis*) chewing among high school students in eastern Ethiopia: a cross-sectional study.** *PLoS one* 2012, **7**(3):e33946.
18. Aklog T, Tiruneh G, Tsegay G: **Assessment of substance abuse and associated factors among students of debre markos poly technique college in debre markos town, East Gojjam Zone, Amhara Regional State, Ethiopia, 2013.** *Global journal of medical research* 2013.
19. Deressa W, Azazh A: **Substance use and its predictors among undergraduate medical students of Addis Ababa University in Ethiopia.** *BMC Public Health* 2011, **11**(1):660.
20. Teshome G: **Magnitude and Factors Associated with Khat Chewing among Undergraduate Students of Adama University, Oromia National Regional State, January 2012.** *Open Access Library Journal* 2015, **2**(01):1.
21. Hassen K, Abdulahi M, Dejene T, Wolde M, Sudhakar M: **Khat as a risk factor for hypertension: A systematic review.** *JBI library of systematic reviews* 2012, **10**(44):2882-2905.
22. Al-Habori M: **The potential adverse effects of habitual use of *Catha edulis* (khat).** *Expert opinion on drug safety* 2005, **4**(6):1145-1154.
23. Alsalahi A, Abdulla MA, Al-Mamary M, Noordin MI, Abdelwahab SI, Alabsi AM, Shwter A, Alshawsh MA: **Toxicological Features of *Catha edulis* (Khat) on Livers and Kidneys of Male and Female Sprague-Dawley Rats: A Subchronic Study.** *Evidence-Based Complementary and Alternative Medicine* 2012, **2012**:11.
24. Ramzy I, Abdelbary M, Abdelhafez H, Omran D, Al-Amrany M, Al-Shami AM: **The effect of chronic khat chewing on liver enzyme levels (a Yemenian study).** *The Egyptian Journal of Internal Medicine* 2013, **25**(1):37.
25. Chapman MH, Kajihara M, Borges G, O'Beirne J, Patch D, Dhillon AP, Crozier A, Morgan MY: **Severe, acute liver injury and khat leaves.** *The New England journal of medicine* 2010, **362**(17):1642-1644.
26. Odenwald M, Al'Absi M: **Khat use and related addiction, mental health and physical disorders: the need to address a growing risk.** *Eastern Mediterranean Health Journal* 2017, **23**(3).
27. Wabe NT: **Chemistry, pharmacology, and toxicology of khat (*catha edulis* forsk): a review.** *Addict Health* 2011, **3**(3-4):137-149.
28. Ali WM, Zubaid M, Al-Motarreb A, Singh R, Al-Shereiqli SZ, Shehab A, Rashed W, Al-Sagheer NQ, Saleh AH, Al Suwaidi J: **Association of khat chewing with increased risk of stroke and death in patients presenting with acute coronary syndrome.** *Mayo Clin Proc* 2010, **85**(11):974-980.
29. Alsanosy RM, Mahfouz MS, Gaffar AM: **Khat chewing among students of higher education in Jazan region, Saudi Arabia: prevalence, pattern, and related factors.** *BioMed research international* 2013, **2013**.
30. Teni F, Surur A, Hailemariam A, Aye A, Mitiku G, Gurmu A, Tessema B: **Prevalence, reasons, and perceived effects of khat chewing among students of a college in Gondar town, Northwestern Ethiopia: A Cross-sectional study.** *Annals of medical and health sciences research* 2015, **5**(6):454-460.

31. Elsanosi R, Bani I, Ageely H, Milaat W, El-Najjar M, Makeen A, Yagob U: **Socio-medical problem of the habituation of Khat chewing in Jazan region in Southern Saudi Arabia.** *Eur J Sci Res* 2011, **63**(1):122-133.

Figures

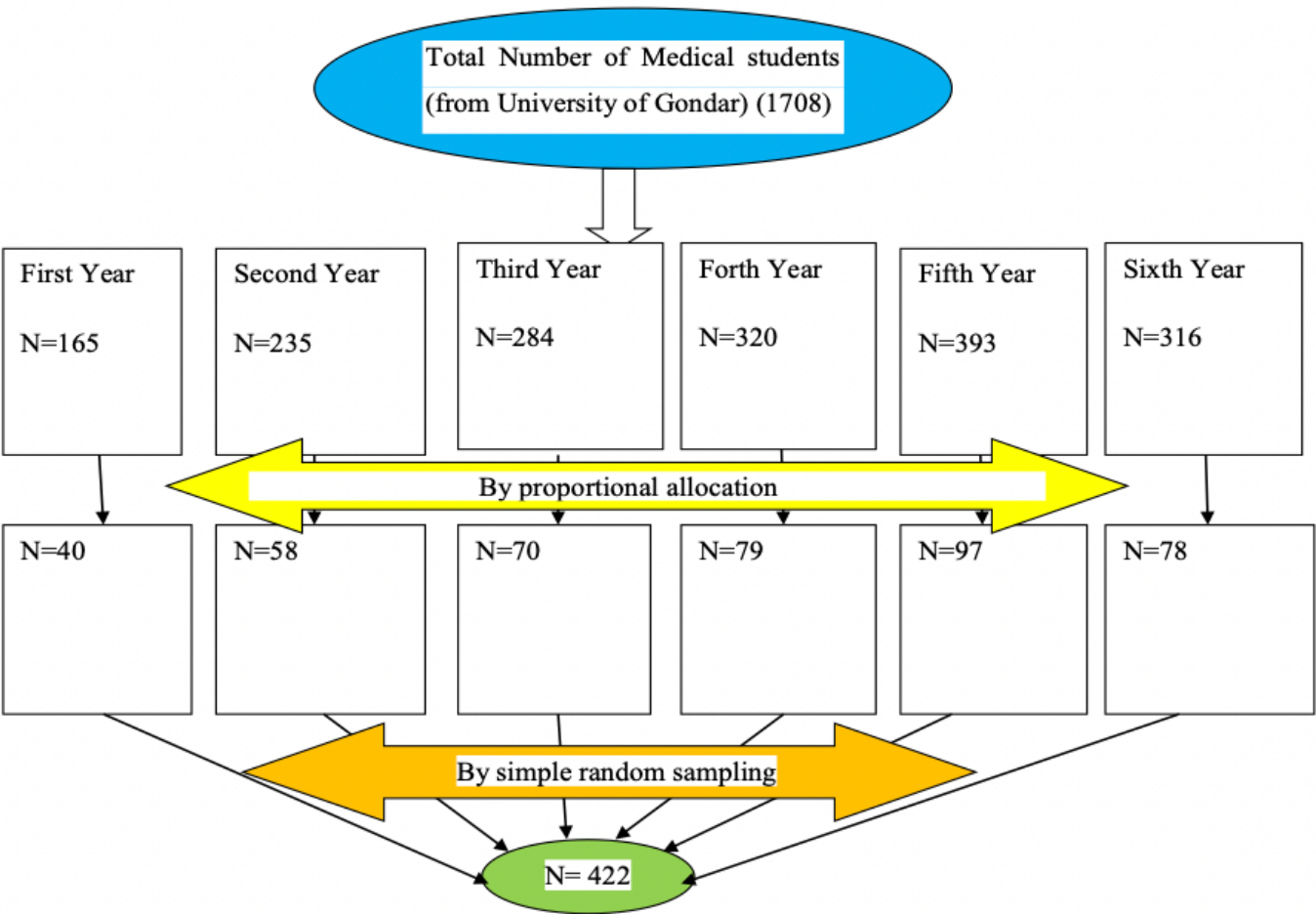


Figure 1
schematic presentation of sampling procedure employed among medical students, University of Gondar, 2019