Knowledge and Practices of Nursing Students regarding Risks of Antibiotics Self-Medication in Beni-Suef City

(1) Rehab Abd el aleim, (2) Aml Abd El - Haziem Mohamed, (3) Eman Mohamed Al Sherbeny

(1) Nursing Secondary School in Beni-Suef (2), (3) Assist Professor of Community Health Nursing, Faculty of Nursing, Beni Suef University

Abstract

Background: Antibiotic self medication is global health issue and associated with many complications. Nursing students are susceptible to self medication on the account of handling and having access to different types of antibiotics in their future practice. **Aimof The study:** Assess knowledge and reported practices of nursing students regarding risks of antibiotics self-medication. **Research Design:** A descriptive research design was applied in this study. **Sample:** Simple random sample was equal 222 nursing students at first year in Faculty of Nursing at Beni suef city. **Setting:** Faculty of Nursing in Beni Suef city, Egypt.**Tools:** One tool used to achieve the aim of this study: Interviewing Questionnaire Sheet which consisted of three parts to assess personnel characteristics, knowledge about risks of antibiotics self-medication, reported practices of antibiotics self-medication. **Results:** The study showed that, 52.3% of the studied students had a fair level of knowledge regarding effective using of antibiotic, 48.2% of the studied students had a satisfactory level of self-reported practice about risks for using antibiotics. **Conclusion:** There was a highly significant association between studied student knowledge and self-reported practice scores regarding risks of antibiotics self- medication. **Recommendations:** further research about a health education program to increase awareness about the use of medicines among nursing student and to enable them to make the right decisions relating to health problems.

Key Words: Self medication, Nursing student, Antibiotics.

Introduction:

Adolescence means "to grow to maturity and is usually associated with the teenage years or the second decade of life". The physical, psychological, and cultural expressions of adolescence can appear at different times in a young person's life, adding to confusion in applying narrow definitions to this period. The biological phenomena associated with adolescence are likely to be the most recognized, but encompass within the biology a number of domains, including neuro scientific, hormonal, and cognitive **(Hussain et al., 2021).**

There is no universal agreement on the nature of adolescence, when adulthood begins, or the values to ascribe to this period of life, although adolescence is often defined as the developmental period from the onset of puberty until the transition to adulthood as marked by marriage, parenthood, completion of formal education, financial independence from parents, or a combination of these milestones **(Baruzaig, Bashrahil, & 2021).**

Self-medication is diagnosing and prescribing drugs by an ordinary person without taking a physician's advice leading to the unnecessary expense of time and money, morbidities due to the adverse effects, and eventually, the development of antibiotic resistance (AR) by a reduction in the efficacy of antibiotics. It is a widespread practice all over the globe, especially in developing nations, and is seen as a substitute for those who are unable to afford the costs of healthcare amenities. The primary causes of self-medication include a shortage of medical supplies, long travel times to medical facilities, unfriendly attitudes of healthcare workers toward patients, and prior knowledge of the illness and its treatments (**Sado & Gedif, 2021)**.

When people use medicines to alleviate illnesses or symptoms that they have recognized on their own, or when they use a prescribed drug consistently or long-term to treat chronic or recurring diseases or symptoms,

this phenomenon is referred to as self-medication. Obtaining pharmaceuticals without a prescription, resubmitting old prescriptions to purchase medications, exchanging medication information with friends or family members, and using unnecessary pills kept at home are all common examples of self-medication. Nowadays, self-medication is becoming more common in developing countries, and antibiotic along with other drugs, are more widely self-administering **(Klemenc-Ketis, et al., 2021).**

Most people believe bacteria to be microorganisms or pathogens causing trauma to their already ageing viscera. Antibiotics counter these bacteria and are the silver bullet solution to many medical problems. Without prescriptions, people also unknowingly consume antibiotics to counter "viral" diseases like cough, cold, and flu **(Lukovic et al., 2020).**

Antibiotics are medicines against bacteria that kill or inhibit their growth and multiplication. They can be administrated through various routes of administration (i.e., oral, topical, or injections). They can be considered a non-renewable resource for the body since their effect reduces on their successive use. Patients who do not finish the entire course of antibiotics run a higher chance of developing resistance. Patients frequently stop receiving the treatment as they start to feel better **(Lei et al., 2021).**

Antibiotic self-administration is a significant concern for people all around the world. Since their discovery, antibiotic saved and continue to save hundreds of thousands of lives each year. Nowadays, numerous consumers utilize antibiotics, and the demand is constantly rising nearly every day. According to a systematic review and meta-analysis, between 26.2% and 92% of people self-administered antibiotic **(Pavyd et al., 2021).**

All these factors prevail in low and middle-income countries and add to the development of resistance. Antibiotic resistance is a global issue that poses a therapeutic conundrum for doctors from all specialties, like drug selection for a particular illness and dosage selection. The absence of antibiotic alternatives, ignorance, and avoidance of the hazardous effects of misuse, and lack of knowledge on the part of the general population have led to the emergence of this global crisis **(Onchonga, 2019)**.

Self-medication with antibiotics is also prevalent in China. Even higher rates of self-medication with antibiotic have been reported among Chinese university students. This requires particular attention for the reasons that higher education level and younger age are risk factors for self-medicating with antibiotics, although the practice may be modifiable through education. At an individual level, knowledge and beliefs affect health-related behavior, including behavior concerning antibiotics use. Misconceptions about antibiotics among students potentially cause antibiotic abuse **(Kalam et al., 2022).**

Given that abuse of antibiotics in undergraduates continues to be a significant problem in both developed and developing countries, reducing misconceptions regarding antibiotic use among this population is imperative. Knowledge, attitudes and practices regarding self-medication with antibiotics in developed countries, among undergraduates in particular, have been widely reported. A previous study found, at the national level, that a higher gross domestic product (GDP) was independently associated with a lower likelihood of self-medication **(Okoye et al., 2022).**

Community health nurses as healthcare providers and community members are involved in self-medication. For example, nurses are commonly asked by the public to administer injectable medicines that are obtained without prescription like pain relievers and antibiotics. In such cases nurses should ask for prescriptions otherwise they should not administer the medication. Community health nurses are responsible for correcting public malpractices regarding self-medications. They play an important role in guarding the public against irrational use of medicines, and disseminating reliable pharmacological and non-pharmacological

advice and information **(Shattuck et al., 2022).**

Significance of the Study

Self-medication with antibiotics (SMA) has been identified as inappropriate and irrational use of antibiotics which included taking the antibiotics without prescription, sharing or the use of leftovers by oneself or other people, and using old prescriptions or someone else's prescription to buy medications. It was found to have a global prevalence of 32.5–81.5%. It is a serious public health issue affecting both developed and developing countries. SMA may lead to inappropriate medicine selection based on inaccurate diagnosis, incorrect dosage, delay in seeking appropriate healthcare when needed, adverse drug interaction, and antibiotic resistance **(Yin et al., 2021)**.

Medical students and health-care professionals are usually facing difficulty when seeking health care. Prevalence of self-medication among nursing students in Egypt ranges from 12% to 99%. Knowledge about drugs and diseases has shown to influence self-medication practice. Self-medication There is a growing consensus that antibiotics abuse is a serious problem that needs new strategies for prevention. The study of the knowledge and practices regarding risks of self-medication of antibiotics is necessary to help with the planning of tailored interventions to reduce this practice among Egyptians. Compliance of researches to national priorities generates knowledge that promotes health and prevents health problems in Egypt. Despite the risk of this problem, few studies regarding students' self-medication practices have been conducted in Egypt (**Fahmy et al., 2020)**.

Therefore, this study was conducted to assess knowledge and reported practices of nursing students regarding risks of antibiotics self- medication.

Aim of the Study

This study aims to assess knowledge and reported practices of nursing students regarding risks of antibiotics self-medication in Beni-Suef City.

This aim was achieved through some specific objectives to: -

- Assess knowledge of Faculty of Nursing students regarding risks of antibiotics self-medication in Beni-Sufe city.
- Assess Reported practices of Faculty of Nursing students regarding risks of antibiotics self-medication in Beni-Sufe city.

RESEARCH QUESTIONS

To fulfill the study purposes, the following research questions will be answered:

1. What are the Faculty of Nursing student's knowledge level regarding risks of antibiotics self-medication in Beni-Sufe city?
2. What are the Faculty of Nursing student's reported practices level regarding risks of antibiotics self-medication in Beni-Sufe city?
3. What is the relationship between personnel characteristics & knowledge?
4. What is the relationship between personnel characteristics & reported practices?
5. What is the relationship between knowledge & reported practices?

Subjects and Methods

The Subjects and methods for this study will portray under the following four designs as follows:

I. Technical Design
II. Operational Design
III. Administrative Design
IV. Statistical Design.

I. Technical design:

The technical item includes research items, settings, subjects, and tools for data collection.

Research Design:

A descriptive research design was applied used to achieve the aim of the current study.

Setting

The study was conducted at faculty of nursing in Beni suef city. This faculty is at Beni Suef University affiliated to the Egyptian ministry of high education founded in East Nile; it is a separate building of 3 floors and equipped with teaching and practical rooms, a library, a computer rooms, 7 nursing skills laboratories and numer of administrative offices. Faculty of nursing provided medical and nursing education and training for both boys and girls, it consists of 7 departments included: (fundamental of nursing, medical-surgical nursing, obestatric nursing, pediatric nursing, community health nurding, administrative nursing and psychiatric nursing department). The 1st year faculty of nursing students study fundamentals of nursing even theoretical and practical.

Faculty of nursing accepts those who have a secondary school certificate and students had a technical health institute certificate. The study for a period of 5 years (4 years theortical and one year practical), after graduation, the student obtains a nursing bachelor certificate, in addition to obtaining a license to practice a profession from the Ministry of Health and obtaining a nursing syndicate card.

Sample size:

A simple random sample was used to achieve the aim of the study. The study sample consists of 222 of first year students of Faculty of Nursing Beni-Sufe University, the sample number calculate according to the following equation (n = N / 1 + N (e2)) n = Number of samples, N = Total population, e = Margin of error, for 6 months from the beginning of the study, an average of 2 day/week.

Tools for Data Collection: One tool used to achieve the aim of this study.

Tool I: Interviewing Questionnaire Sheet:

It was developed by researcher after reviewing the national and international related literature. It was containing 3 parts.

Part I: Personnel characteristics

(A): This part includes age, gender and residence.

(B): This part includes father educational level, mother educational level, father occupation, mother occupation, family income and having a family member who is healthcare worker.

Part II: knowledge questionnaire.

This tool was itemed by the investigator based on the literature review and, this tool was concerned with knowledge of students about risks of antibiotics self-medication. that contains 29 items such as:

1. Antibiotics are the same as anti-inflammatories.
2. Antibiotic can be effective for viral infection.
3. Antibiotics are effective against cold and flu.
4. Antibiotics should not be purchased without prescriptions.
5. Antibiotics are preferred to be used for fever.
6. It is safe to use any antibiotic during pregnancy.
7. Taking antibiotics has associated side effects or risks such as diarrhea, colitis, allergies.
8. Amoxicillin and penicillin are antibiotics.
9. Paracetamol is an antibiotic.
10. Unnecessary use of antibiotics makes people have strong immunity.
11. Broad-spectrum antibiotics are more effective than narrow spectrum.
12. Higher doses result in faster recovery.
13. Antibiotic can treat skin infects when they are poured into the wound.

14. Must be take many types of antibiotics at the same time during the course of a single illness.
15. Oral administration is preferable antibiotic under any circumstance than intravenous administration.
16. Every person can stop antibiotic as soon as the symptoms had disappeared.
17. Antibiotic overuse can result in antibiotic resistance.
18. Antibiotic resistance occurs when your body becomes resistant to antibiotics and they no longer work.
19. Repeated non-compliance to the treatment course of antibiotic would increase bacterial resistance.
20. Antibiotic resistance is an issue in other countries but not here.
21. Switching antibiotics reduces adverse reactions.
22. Antibiotic-resistant infections could make medical procedures like surgery, organ transplants and cancer treatment much more dangerous.
23. Healthy people can carry antibiotic resistant bacteria.
24. Allergic reactions can occur from using antibiotics.
25. Switching antibiotics enhances drug effects.
26. During antibiotic treatment, skipping off some doses does not contribute to the development of antibiotic resistance.
27. Antibiotics will always be effective in treating the same diseases in future.
28. Antibiotics can be used to treat bilharzias.
29. All sore throats are treated with antibiotics.

Scoring system:

For each questions the answer of correct scored as (1), and incorrect answer scored with (0), the total knowledge score was calculated as the following: -

Good ---------- > 75% of the total knowledge score.

Fair---------- 60- 75% of the total knowledge score.

Poor ---------- <60 % of the total knowledge score.

Part III: Reported practices questionnaire.

This tool was itemed by the investigator based on the literature review and, this tool was concerned with reported practice of students about about risks of antibiotics self-medication, that contains 20 items such as:

1. You get antibiotics from other people treated by it.
2. You bought antibiotics online
3. You store antibiotics after cure to reuse again
4. You use antibiotics because of advice from others
5. You recommend the antibiotics for your family members
6. Using antibiotics at the prescribed dose and timeframe by doctor
7. You take antibiotics to speed up the healing
8. You check expiry date of the antibiotic before using
9. How often do you use antibiotics to prevent common cold?
10. You choose broad-spectrum antibiotics when you are sick?
11. You choose intravenous antibiotics earlier when you are sick
12. You choose more expensive or new antibiotics when you are sick
13. You take multiple antibiotics at the same time during the course of a single infectious disease

14. How often do you read the instruction in the package insert carefully before taking antibiotics
15. How often do you change the dosage during the course of self-treatment
16. How often do you switch antibiotics during the course of self-treatment
17. How often do you experience adverse reactions during self-medication and change the type of antibiotics
18. When you fall sick, your immediate response is self-medication
19. You take the course of self-treatment antibiotics dose after reading the leaflet
20. When using intravenous antibiotics, you administer them yourself.

Scoring system:

Each item was scored as (0), for rarely response, (1) for sometimes, and (2), for always responses, the total self-reported score was calculated as the following:

High satisfactory ---------- > 75% of the total self-reported practice score.

Satisfactory ----------60- 75% of the total self-reported practice score.

Unsatisfactory ---------- > 75% of the total self-reported practice score.

Validity and Reliability:

The tool was tested for the content validity by a jury of 5 experts in the field of health community nursing department. Necessary modifications were be done. The tool was tested for internal reliability by using Cronbach's alpha test.

Ethical considerations:

A written initial approval was obtained from the research ethics committee of the Faculty of Nursing, then interviewing the Dean of Faculty of Nursing and the faculty students after the investigator introduced herself and explained the nature and the purpose of the study. The aim and process of study was explained through direct personal communication with the faculty student, as well as to assess their approval prior starting their participation in the study to gain their cooperation, voluntary participation and confidentiality were assured. After that, data collection was started.

II- Operational design

The operational design includes preparatory phase, pilot study, and field work.

A- Preparatory phase:

It included reviewing past, current, national, and international related literature and theoretical knowledge of various aspects of the study using books, articles, the internet, periodicals, and magazines to develop tools for data collection.

B- Pilot study:

A pilot study was carried out before starting data collection on (10% of total subjects). The aim of this pilot study is to test the clarity, comprehensiveness and applicability of the tool and to estimate the appropriate time required to fill the questionnaire. The necessary modifications were made based on the results of the piolt study such as deleting or adding some question, from tool, in order to strengthen its content or for more simplicity & clarity the experimental simple was excluded from the main study sample.

C- Field work:

Data collection for the study consumed 6 months from the beginning of October 2022 until the end of March 2023; The researcher attended a Faculty of Nursing in Beni Suef city, from 9 am to 12 pm; 2 days/ a week (Saturday, Monday) to collect patients' data. At the beginning, the researcher explained the purpose of the study to the students and reassured them that the collected information is strictly confidential and that it is used only for the purpose of the research. An interview questionnaire sheet was filled out and completed

by the participants and returned within 15:20 minutes.

III- Administrative design:

Approval to conduct this study was obtained from the Dean of the Faculty of Nursing, Beni-Suef University in Beni-Suef city to conduct the study. Explanation of the study steps for the Dean of Faculty of Nursing students then obtaining their consent.

IV-Statistical design:

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X^2). Different between the groups during the two visits were assessed by paired t test. In addition, r- test were used to identify the correlation between the study variables and measure the statistical significance of the study.

The degree of significance of results was identified at:

- Statistically significant $p < 0.05$
- Highly statistically significant $p < 0.001$
- Not significant $P > 0.05$

Results:

Table 1; reveals that the studied students age ranged from 18 to 21 years old, 38.8% of the studied students age was 19 years old, with mean **±SD** of 18.72±2.98. In addition, 66.7% of the students were female, and 80.2% of them lived at rural setting.

Table 2; shows that 44.6% & 48.6% of the studied student's fathers and mothers had a secondary education, 82.0% of the students' fathers were not health care workers, 70.3% of the studied students' mothers were not working, and 70.7% of the students had no members at health working sector. Moreover 68.0% of the studied students reported that they had not enough family income.

Table 3; clears that 80.6%, 83% & 87.4% respectively, of the studied students had correct knowledge regarding Amoxicillin and penicillin are antibiotics, Paracetamol is an antibiotic and antibiotics are preferred to be used for fever. While, 86% respectively, of them had incorrect knowledge regarding taking antibiotics has associated side effects or risks such as diarrhea, colitis, allergies. Also**,** represents that 80.6% & 85.1% respectively, of the studied students had correct knowledge regarding repeated non-compliance to the treatment course of antibiotic would increase bacterial resistance and oral administration is preferable antibiotic under any circumstance than intravenous administration. While, 74.8% of them had incorrect knowledge regarding Broad-spectrum antibiotics are more effective than narrow spectrum.

Table 4; demonstrates that 82% & 88.7% respectively, of the studied students had correct knowledge regarding healthy people can carry antibiotic resistant bacteria and switching antibiotics enhances drug effects. While, 76.6% of them had incorrect knowledge regarding allergic reactions can occur from using antibiotics.

Figure 1: displays that 52.3% of the studied students had a fair level of knowledge regarding effective using of antibiotic, 34.2% of them a poor level of knowledge and only 13.5% of them had a good knowledge.

Table 5; represents that 68.5% & 74.3% respectively, of the studied students were always take antibiotics to speed up the healing and use antibiotics to prevent common cold and 55.4% of them were sometimes choose broad-spectrum antibiotics when they are sick. While, 83.8% of them were rarely store antibiotics after cure to reuse again. **Also,** reveals that 42.3% respectively, of the studied students were always changing the dosage during the course of self-treatment and 50.5% of them were sometimes choosing intravenous antibiotics earlier when they are sick. While, 56.8% & 64% respectively, of them were rarely choose

more expensive or new antibiotics when they are sick and read the instruction in the package insert carefully before taking antibiotics.

Figure (2): displays that 48.2% of the studied students had a satisfactory level of self-reported practice about risks for using antibiotics, 38.7% of them had unsatisfactory self-reported practice, and on the other hand only 13.1% of them had a high satisfactory level of self-reported practice.

Table 6; clears that, there was no statistically significant relation between studied students' knowledge score and their age p value ($p > 0.05$). In addition, there was no statistically significant relation between studied students' level of knowledge and their gender as there was no difference in knowledge score between male and female students. Moreover, there was no statistically significant relation between studied students' knowledge score and their residence p value ($p > 0.05$).

Table 7; shows that, there was no statistically significant relation between studied students' knowledge score and their personal characteristics concerning mother education and occupation p value ($p > 0.05$). In addition, there was no statistically significant relation between studied students' family income and their level of knowledge p value ($p > 0.05$).

Table 8; reveals that, there was no statistically significant relation between studied students' self-reported practice score and their age p value ($p > 0.05$). In addition, there was no statistically significant relation between studied students and their gender as there was no highly difference in self-reported practice score between male and female students. Moreover, there was no statistically significant relation between studied students' self-reported practice score and their residence p value ($p > 0.05$).

Table 9; represents that, there was no statistically significant relation between studied students' reported practice score and their personal characteristics concerning concerning father and mothers' educational level and occupation. In addition, there was no statistically significant relation between studied students' reported practice score and their family income p value ($p > 0.05$).

Table 10; shows that, there was a highly significant association between studied student knowledge and self-reported practice scores regarding risksof antibiotics self-medication, that means increase knowledge is highly associated with increased level of self-report.

Table (1): Frequency Distribution of personnel characteristics of the studied students (n=222).

Personnel characteristics	Frequency	%
Age in years		
18- < 19	78	35.1
19-< 20	86	38.8
20-21	58	26.1
Mean ±SD	18.72±2.98	
Gender		
Male	74	33.3
Female	148	66.7
Residence		
Rural	178	80.2
Urban	44	19.8

Table (2): Frequency Distribution of personnel characteristics of the studied students (n=222).

Personnel characteristics	Frequency	%
Father education level		
Illiterate	15	6.8
Read & write	28	12.6
Secondary	99	44.6
High education	80	36.0
Mother education level		
Illiterate	48	21.6
Read & write	32	14.4
Secondary	108	48.6
High education	34	15.3
Father occupation		
Not work	28	12.6
Health care worker	12	5.4
Others	182	82.0
Mother occupation		
Not work	156	70.3
Health care worker	10	4.5
Others	56	25.2
Having a family member who is healthcare worker		
No	157	70.7
Yes	65	29.3
Family income		
Not enough	151	68.0
Enough	71	32.0

Table (3): Frequency Distribution of studied students' knowledge regarding risks of antibiotics self-medication (n=222).

Items	Correct		Incorrect	
	No	%	No	%
Antibiotics are the same as anti-inflammatories.	160	72.1%	62	27.9%
Antibiotic can be effective for viral infection.	123	55.4%	99	44.6%
Antibiotics are effective against cold and flu.	61	27.5%	161	72.5%
Antibiotics should not be purchased without prescriptions.	165	74.3%	57	25.7%
Antibiotics are preferred to be used for fever.	194	**87.4%**	28	12.6%
It is safe to use any antibiotic during pregnancy.	107	48.2%	115	51.8%
Taking antibiotics has associated side effects or risks such as diarrhea, colitis, allergies.	31	14.0%	191	**86.0%**
Amoxicillin and penicillin are antibiotics.	179	**80.6%**	43	19.4%
Paracetamol is an antibiotic.	182	**82.0%**	40	18.0%
Unnecessary use of antibiotics makes people have strong immunity.	112	50.5%	110	49.5%
Broad-spectrum antibiotics are more effective than narrow spectrum.	56	25.2%	166	**74.8%**
Higher doses result in faster recovery.	135	60.8%	87	39.2%
Antibiotic can treat skin infects when they are poured into the wound.	177	79.7%	45	20.3%
Must be taken many types of antibiotics at the same time during the course of a single illness.	102	45.9%	120	54.1%
Oral administration is preferable antibiotic under any circumstance than intravenous administration.	189	**85.1%**	33	14.9%
Every person can stop antibiotic as soon as the symptoms had disappeared.	112	50.5%	110	49.5%
Antibiotic overuse can result in antibiotic resistance.	128	57.7%	94	42.3%
Antibiotic resistance occurs when your body becomes resistant to antibiotics and they no longer work.	174	78.4%	48	21.6%
Repeated non-compliance to the treatment course of antibiotic would increase bacterial resistance.	179	**80.6%**	43	19.4%
Antibiotic resistance is an issue in other countries but not here.	142	64.0%	80	36.0%

Continue…., Table (4): Frequency Distribution of studied students' knowledge regarding risks of antibiotics self-medication (n=222).

Items	Correct		Incorrect	
	No	%		No
Switching antibiotics reduces adverse reactions.	142	64.0%	80	36.0%
Antibiotic-resistant infections could make medical procedures like surgery, organ transplants and cancer treatment much more dangerous.	146	65.8%	76	34.2%
Healthy people can carry antibiotic resistant bacteria.	182	**82.0%**	40	18.0%
Allergic reactions can occur from using antibiotics.	52	23.4%	170	**76.6%**
Switching antibiotics enhances drug effects.	197	**88.7%**	25	11.3%
During antibiotic treatment, skipping off some doses does not contribute to the development of antibiotic resistance.	139	62.6%	83	37.4%
Antibiotics will always be effective in treating the same diseases in future.	109	49.1%	113	50.9%
Antibiotics can be used to treat bilharzias.	166	74.8%	56	25.2%
All sore throats are treated with antibiotics.	109	49.1%	113	50.9%

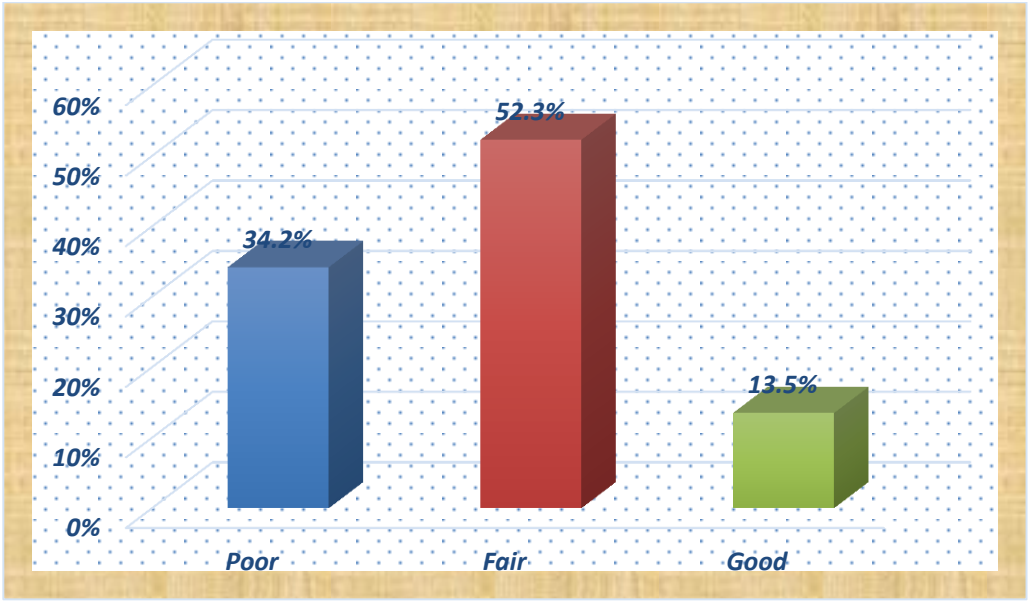

Figure (1): Percentage distribution of total knowledge score about risks of antibiotics self-medication of the studied students regarding antibiotics.

Table (5): Frequency Distribution of studied students reported practices regarding risks of antibiotics self-medication (n=222).

Items	Always		Sometimes		Rarely	
	No	%	No	%	No	%
You get antibiotics from other people treated by it.	13	5.8%	71	32.0%	138	62.2%
You bought antibiotics online	22	9.9%	104	46.8%	96	43.3%
You store antibiotics after cure to reuse again	13	5.8%	23	10.4%	186	**83.8%**
You use antibiotics because of advice from others	49	22.1%	89	40.1%	84	37.8%
You recommend the antibiotics for your family members	26	11.7%	105	47.3%	91	41.0%
Using antibiotics at the prescribed dose and timeframe by doctor	27	12.2%	104	46.8%	91	41.0%
You take antibiotics to speed up the healing	152	**68.5%**	50	22.5%	20	9.0%
You check expiry date of the antibiotic before using	81	36.5%	109	49.1%	32	14.4%
How often do you use antibiotics to prevent common cold?	165	**74.3%**	37	16.7%	20	9.0%
You choose broad-spectrum antibiotics when you are sick?	45	20.3%	123	**55.4%**	54	24.3%
You choose intravenous antibiotics earlier when you are sick	68	30.6%	112	**50.5%**	42	18.9%
You choose more expensive or new antibiotics when you are sick	27	12.2%	69	31.1%	126	**56.8%**
You take multiple antibiotics at the same time during the course of a single infectious disease	47	21.2%	93	41.9%	82	36.9%
How often do you read the instruction in the package insert carefully before taking antibiotics	16	7.2%	64	28.8%	142	**64.0%**
How often do you change the dosage during the course of self-treatment	94	**42.3%**	100	45.0%	28	12.6%
How often do you switch antibiotics during the course of self-treatment	26	11.7%	103	46.4%	93	41.9%
How often do you experience adverse reactions during self-medication and change the type of antibiotics	30	13.5%	90	40.5%	102	46%
When you fall sick, your immediate response is self-medication	20	9.0%	104	46.8%	98	44.2%
You take the course of self-treatment antibiotics dose after reading the leaflet	39	17.6%	98	44.1%	85	38.3%
When using intravenous antibiotics, you administer them yourself.	76	34.2%	92	41.4%	54	24.4%

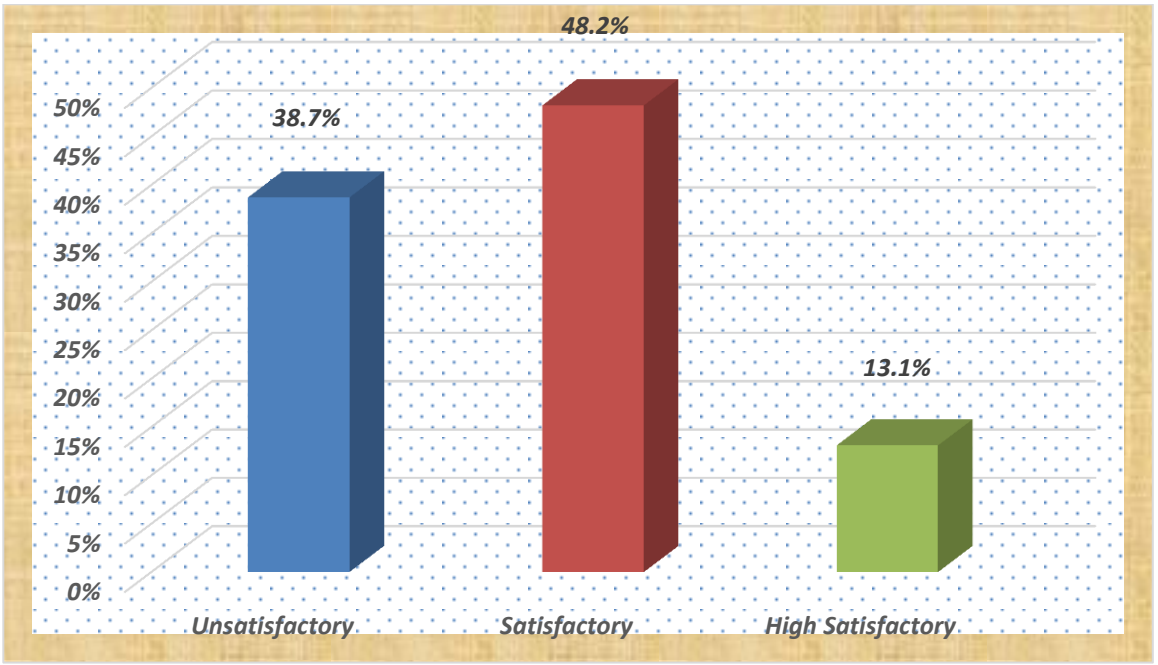

Figure (2): Percentage distribution of total self-practice score about risks of antibiotics self-medication of the studied students regarding antibiotics.

Table (6): Relationship between total knowledge score and personnel characteristics (Table 1) of the studied students (n=222).

Personnel characteristics	Total knowledge score						Chi square	P value
	Poor		Fair		Good			
	No	%	No	%	No	%		
Age in years							3.37	>0.05
18-<19	27	35.5%	39	33.6%	12	40.0%		
19-<20	26	34.2%	51	44.0%	9	30.0%		
≥20 years	23	30.3%	26	22.4%	9	30.0%		
Gender							5.32	>0.05
Male	33	43.4%	33	28.4%	8	26.7%		
Female	43	56.6%	83	71.6%	22	73.3%		
Residence							0.327	>0.05
Rural	62	81.6%	93	80.2%	23	76.7%		
Urban	14	18.4%	23	19.8%	7	23.3%		

Table (7): Relationship between total knowledge score and Personnel characteristics (Table 2) of the studied students (n=222).

Personnel characteristics	Total knowledge score						Chi square	P value
	Poor		Fair		Good			
	No	%	No	%	No	%		
Father education							5.53	>0.05
Illiterate	8	10.5%	5	4.3%	2	6.7%		
Read & write	8	10.5%	17	14.7%	3	10.0%		
Secondary	31	40.8%	51	44.0%	17	56.7%		
High education	29	38.2%	43	37.1%	8	26.7%		
Mother education							3.35	>0.05
Illiterate	20	26.3%	24	20.7%	4	13.3%		
Read & write	11	14.5%	17	14.7%	4	13.3%		
Secondary	32	42.1%	59	50.9%	17	56.7%		
High education	13	17.1%	16	13.8%	5	16.7%		
Father occupation							2.07	>0.05
Not work	12	15.8%	13	11.2%	3	10.0%		
Health care worker	3	3.9%	8	6.9%	1	3.3%		
Others	61	80.3%	95	81.9%	26	86.7%		
Mother occupation							6.63	>0.05
Not work	53	69.7%	82	70.7%	21	70.0%		
Health care worker	7	9.2%	2	1.7%	1	3.3%		
Others	16	21.1%	32	27.6%	8	26.7%		
Having a family member who is healthcare worker							0.739	>0.05
No	51	67.1%	84	72.4%	22	73.3%		
Yes	25	32.9%	32	27.6%	8	26.7%		
Family income							0.161	>0.05
Not enough	53	69.7%	78	67.2%	20	66.7%		
Enough	23	30.3%	38	32.8%	10	33.3%		

Table (8): Relationship between total reported practices score and Personnel characteristics (Table 1) of the studied students (n=222).

Personnel characteristics	Total self-reported practice score						Chi square	P value
	Unsatisfactory		Satisfactory		High satisfactory			
	No	%	No	%	No	%		
Age in years								
18-<19	35	40.7%	32	29.9%	11	37.9%	4.12	>0.05
19-<20	28	32.6%	45	42.1%	13	44.8%		
≥20 years	23	26.7%	30	28.0%	5	17.2%		
Gender								
Male	23	26.7%	39	36.4%	12	41.4%	2.99	>0.05
Female	63	73.3%	68	63.6%	17	58.6%		
Residence								
Rural	70	81.4%	83	77.6%	25	86.2%	1.20	>0.05
Urban	16	18.6%	24	22.4%	4	13.8%		

Table (9): Relationship between total reported practices score and Personnel characteristics (Table 2) of the studied students (n=222).

Personnel characteristics	Total self-reported practice score						Chi square	P value
	Unsatisfactory		Satisfactory		High satisfactory			
	No	%	No	%	No	%		
Father education								
Illiterate	4	4.7%	9	8.4%	2	6.9%	5.23	>0.05
Read & write	9	10.5%	17	15.9%	2	6.9%		
Secondary	41	47.7%	47	43.9%	11	37.9%		
High education	32	37.2%	34	31.8%	14	48.3%		
Mother education								
Illiterate	13	15.1%	29	27.1%	6	20.7%	4.55	>0.05
Read & write	15	17.4%	13	12.1%	4	13.8%		
Secondary	44	51.2%	50	46.7%	14	48.3%		
High education	14	16.3%	15	14.0%	5	17.2%		
Father job								
Not work	8	9.3%	15	14.0%	5	17.2%	5.31	>0.05
Health care worker	2	2.3%	7	6.5%	3	10.3%		
Others	76	88.4%	85	79.4%	21	72.4%		
Mother job								
Not work	55	64.0%	79	73.8%	22	75.9%	3.62	>0.05
Health care worker	6	7.0%	3	2.8%	1	3.4%		
Others	25	29.1%	25	23.4%	6	20.7%		
Having a family member who is healthcare worker							0.050	>0.05
No	61	70.9%	76	71.0%	20	69.0%		
Yes	25	29.1%	31	29.0%	9	31.0%		
Family income								
Not enough	63	73.3%	71	66.4%	17	58.6%	2.39	>0.05
Enough	23	26.7%	36	33.6%	12	41.4%		

Table (10): Correlation between studied students' total knowledge and total reported practices score regarding risks of antibiotics self-medication.

Variables	Self-reported practice score	
	R	P value
Knowledge score	**0.232**	**<0.001****

Discussion

Adolescence is a period of significant development that begins with the onset of puberty and ends in the mid-20s. The trajectory between those two ages involves a profound amount of change in all domains of development biological, cognitive, psychosocial, and emotional. Personal relationships and settings also change during this period, as peers and romantic partners become more central and as the adolescent moves into and then beyond secondary school or gains employment **(Karimy et al., 2020).**

Adolescence is a unique stage of human development and an important time for laying the foundations of good health. There are nearly 1.2 billion adolescents (10-19 years old) worldwide. In some countries, adolescents make up as much as a quarter of the population and the number of adolescents is expected to rise through 2050, particularly

in low- and middle-income countries **(Zajmi et al., 2020)**.

Self-medication among university students and professionals, especially within healthcare, has become common in recent years, which could become an occupational problem. Lack of time to go to the doctor, previous experience with the medication, influence of the media, mild symptoms, or distance from a medical center are some of the reasons why university students take medications without a proper prescription. Nursing students are at risk of self -medication and this is attributed to the fact that they have more access to these drugs during their professional training **(Pavydė et al., 2020)**.

So, the current study aimed to assess Knowledge and reported practices of nursing students regarding risks of antibiotics self-medication in Beni-Sufe City through the following: Assess knowledge of Faculty of Nursing students regarding risks of antibiotics self-medication in Beni-Sufe city. Assess Reported practices of Faculty of Nursing students regarding risks of antibiotics self-medication in Beni-Sufe city. Assess role of community health nurse for students of the Faculty of Nursing in Beni-Sufe city. The study indicates that more than half (52.3%) of the studied students had a fair level of knowledge regarding effective using of antibiotics **(Figure 1)** and less than half (48.2%) of them had satisfactory self-reported practice about risks for using antibiotics **(Figure 2).**

Regarding to age of the studied students, the results of the current study showed that, less than two fifths of the studied students their age was from 19 to < 20 years **(Table 1).** This result was in agreement with the study carried out by **Bown et al., (2020)** who studied "WHO guidelines for the regulatory assessment of medicinal products for use in self-medication" (n=195) and reported that less than two fifths of studied students were aged ranged from 15-19 years old **(Table1).**

In relation to gender of the studied students, the results of the current study revealed that, more than two thirds of them were female. These results were incongruence with **Kassie, Bifftu, & Mekonnen, (2021)** who studied" Self-medication practice and associated factors among adult household members in Meket district, Northeast Ethiopia, n= (450)" who cleared that more than three fifths of the studied students were female. **From the investigator's point of view,** this result might be due to the highest percent of the students in nursing school being females and the lowest percent being males **(Table1).**

Concerning to residence of the studied students, the results of the current study clarified that, the majority of them lived in rural areas. This result were similar to **Helal & Abou-ElWafa, (2020)** who studied Self-Medication in University Students from the City of Mansoura, Egypt " (n=271), who reported that the majority of the studied students were living in rural areas. **From the investigator's point of view**, this result might be associated with the increase in birth rate in rural areas more than in urban areas **(Table1).**

Regarding to personnel characteristics of the studied students, the results of the current study illustrated that less than half of their father and mothers had a secondary education respectively and the majority of their father work at other job. In addition, less than three quarters of studied students' mothers not work, less than three quarters of studied students' had no members health working sector and more than two thirds of them hadn't enough family income **(Table 2).**

These results were in the same line with **Zakaa El-din et al., (2019)** who studied" Egyptian community student pharmacists' attitudes and practices towards antibiotic dispensing and antibiotic resistance; a cross-sectional survey in Greater Cairo. (n=305)" and demonstrated that that less than half of the studied sample father and mothers had a secondary education respectively and not working in health sector.

These results were dissimilar with **Onchonga, (2019)** who studied" A Google Trends study on the interest in self-medication during the 2019 novel

coronavirus (COVID-19) disease pandemic, n= 175" and clarified that more than half of the studied sample their mothers working in governmental job and half enough family income. **From the investigator's point of view**, these results might be associated with different sample size and different place selection.

Concerning to knowledge about risks of antibiotics self-medication, the present study revealed that more than four fifths of the studied students had correct knowledge regarding Amoxicillin and penicillin were antibiotics, Paracetamol is an antibiotic and antibiotics were preferred to be used for fever. While, more than four fifths of them had incorrect knowledge regarding taking antibiotics has associated side effects or risks such as diarrhea, colitis, allergies **(Table 3).**

These results were supported by **Quincho-Lopez et al., (2021)** who studied" A. Self-medication practices to prevent or manage disease: A systematic review, n= 317" and mentioned that the majority of the studied subjects had correct knowledge concerning types and using of most common antibiotics.

The results of the current study revealed that, more than four fifths of the studied students had correct knowledge regarding repeated non-compliance to the treatment course of antibiotic would increase bacterial resistance and oral administration was preferable antibiotic under any circumstance than intravenous administration. While, nearly three quarters of them had incorrect knowledge regarding Broad-spectrum antibiotics are more effective than narrow spectrum **(Table 4).**

Conversely, these results were in disagreement with **Mudenda et al., (2020)** who studied" Self-medication and its Consequences during & after the Coronavirus Disease 2019 (COVID-19) Pandemic: A Global Health Problem. n= 70" and demonstrated that the majority of the studied sample had incorrect knowledge treatment course with antibiotics. This variation may be related to sample size and place selection.

The current study also illustrated that more than four fifths of the studied students had correct knowledge regarding healthy people can carry antibiotic resistant bacteria and switching antibiotics enhances drug effects. While, more than three quarters of them had incorrect knowledge regarding allergic reactions can occur from using antibiotics **(Table 5).** These results were in the same line with **Acharya, et al., (2022)** who studied "Self-medication among Medical Students and Staffs of a Tertiary Care Centre during COVID-19 Pandemic" n= 245 and showed that almost all of the studied students had correct knowledge regarding antibiotic resistance. **From the investigator's point of view**, these results might be associated with medical and nursing students should have good knowledge related to its concerned with their field of study.

These results weren't similar to **Nasir, et al., (2020)** who studied" Self-medication a cross sectional online survey in Dhaka city. N= 545" and cleared that the majority of the study sample had satisfactory knowledge about allergic reaction from antibiotic using.

Regarding to reported practices of the studied students about risks of antibiotics self-medication, the results of the present study clarified that less than three quarters of them were always take antibiotics to speed up the healing and use antibiotics to prevent common cold **(Table 6)**. These results were incongruence with **Patrick & Badyal, (2018)** who studied" Self-medication practices in patients attending a tertiary care teaching hospital in Urban North-West India n= 168" and found that more than two thirds of the studied sample had correct knowledge about taking antibiotic to prevent common cold. **From the investigator's point of view**, these results might be related to the majority of the students lived in rural places and people there had a concept that using antibiotic especially injections speed the recovery from diseases especially common cold.

The current study showed that more than half of the studied students were sometimes choose broad-spectrum antibiotics when they were sick. While more than four

fifths of them were rarely store antibiotics after cure to reuse again **(Table 6)**. These results were in the same line with **Karimy et al., (2020)** who studied" Risk factors associated with self-medication among women in Iran, n= 235" and revealed that more than four fifths of the study sample don't store antibiotics after cure.

The result of the present study also clarified that more than two fifths of the studied students were always changing the dosage during the course of self-treatment and more than half of them were sometimes choosing intravenous antibiotics earlier when they are sick **(Table 7)**. These results were supported by **Yin et al., (2021)** who studied" Prevalence of self-medication with antibiotics and its related factors among Chinese residents: a cross-sectional study, n= 185" and reported that less than half of the sample change dose of antibiotics during treatment.

The current study reported that more than half of the studied students were rarely chosen more expensive or new antibiotics when they are sick **(Table 7)**. This result was similar to **Elmahi et al., (2022)** who studied" Perception and practice of self-medication with antibiotics among medical students in Sudanese universities, n= 335." and cleared that more than half of the students not chosen expensive antibiotics during sickness.

From the investigator's point of view, this result may be due to that people in rural areas had low socio-economic status, so when they were sick the tried the less expensive medications such as antibiotics for treatment.

Conversely, this result was in disagreement with **Akinnawo, Akpunne, & Mopa-Egbunu, (2022)** who studied" Knowledge of COVID-19 and preventive measures on self-medication practices among Nigerian undergraduates, n= 371." And illustrated that the majority of the studied students chosen expensive antibiotics for treatment. The difference between two studies may be related to difference in place selection, lifestyle and culture variation.

Concerning relationship between total knowledge score and personnel characteristics of the studied students, the result of the present study showed that, there was no statistically significant relation between studied students' knowledge score and their age p value ($p > 0.05$). In addition, there was no statistically significant relation between studied students' level of knowledge and their gender as there was no difference in knowledge score between male and female students. Moreover, there was no statistically significant relation between studied students' knowledge score and their residence p value ($p > 0.05$) **(Table 8)**.

These results were agreed with **Geissler et al., (2019)** who studied" Children and medicines: self-treatment of common illnesses among Luo school children in western Kenya, n= 50." and clarified that there was no statistically significant relation between studied students' knowledge score and their age and gender p value ($p > 0.05$).

From the investigator point of view, this result may be due to male and female students in all ages are now have the same ability to acquire knowledge as adolescents had the desire to understand how things in the world operate.

These results were dissimilar to **Zajmi et al., (2020)** who studied" Public knowledge, attitudes and practices regarding antibiotic use in Kosovo. N= 237" and proved that there was highly statistically significant relation between studied sample knowledge score and their age and gender ($p<0.001$**). The variation between two studies might be related to sample place selection.

The results of the current study showed that there was no statistically significant relation between studied students' knowledge score and their personal characteristics concerning mother education and occupation p value ($p > 0.05$). In addition, there was no statistically significant relation between studied students' family income and their level of knowledge p value ($p > 0.05$) **(Table 9)**.

These results were in the same line with **Janssen et al., (2022)** who studied" Exploring the economic impact of inappropriate antibiotic use: The case of upper respiratory tract infections in Ghana, (n= 153)." And revealed that there was no statistically significant relation between studied sample' family income and their level of knowledge score p value ($p > 0.05$).

Regarding relationship between total reported practice score and Personnel characteristics of the studied students, the current study cleared that there was no statistically significant relation between studied students' self-reported practice score and their age p value ($p > 0.05$). In addition, there was no statistically significant relation between studied students self-reported practice score and their gender as there was no highly difference in self-reported practice score between male and female students. Moreover, there was no statistically significant relation between studied students' self-reported practice score and their residence p value ($p > 0.05$) **(Table 10)**.

These findings were disagreed with **Rijal et al., (2021)** who studied" Use of antimicrobials and antibiotics resistance in Nepal: A nationwide survey, n= 1150" and found that there was a statistically significant relation between studied students' practice score and their personal characteristics p value ($p < 0.001$).

Also, **Widayati et al., (2019)** who studied" Self-medication with antibiotics in Yogyakarta City Indonesia, n= 355." reported that there highly statistically significant relation between studied subjects' self-reported practice score and their age and place of residence. Difference could be related to sample size, place and culture variation.

Concerning to relationship between total reported practice score and personnel characteristics of the studied students, the present study revealed that there was no statistically significant relation between studied students' reported practice score and their personal characteristics concerning father and mothers' educational level and occupation. In addition, there was no statistically significant relation between studied students' reported practice score and their family income p value ($p > 0.05$)

These findings were in difference with **Alghadeer et al., (2018)** who studied" Self-medication with antibiotics in Saudi Arabia, n= 89" and agreed that there was highly statistically significant relation between studied sample reported practices score and their family characteristics ($p < 0.001$). **From the researcher point of view,** these results could be explained as difference of socio-demographic factors, study setting and the healthcare policy of the country.

These results were also dissimilar to **Pavydė et al., (2020)** who studied" Public knowledge, beliefs and behavior on antibiotic use and self-medication in Lithuania, n= 145" and demonstrated that educational status had about four odds of higher prevalence of antibiotics self-medication practice than those of uneducated residences.

The current study showed that there was a highly significant association between studied student knowledge and self-reported practice scores regarding risks of antibiotics self-medication, that means increase knowledge is highly associated with increased level of self-reported practice level ($p < 0.001$**)

These findings were supported by **McNulty et al., (2019)** who studied" Public understanding and use of antibiotics in England: findings from a household survey in 2017, n= 245" and illustrated that there was a highly positive association between studied sample knowledge and reported practices scores of antibiotics.

The results were also similar to **Ateshim et al., (2019)** who studied" Prevalence of self-medication with antibiotics and associated factors in the community of Asmara, Eritrea: a descriptive cross sectional survey, n= 371" and mentioned that increase knowledge is highly associated with increased level of self-reported practice level among the studied participants.

From the researcher point of view, these results might be related to good knowledge of knowledge of risks of antibiotics self-medications were significantly associated with antibiotics self-medication practices. This might be due to evidence of antibiotics use that would induce antibiotics self-medication practice and lower knowledge level was associated with antibiotics self-medication practices.

Conclusion

Based on the results of the present study and research questions, the researcher can conclude that Increase student awareness regarding risks of antibiotics self-medication will positively affect their practices toward use of antibiotics self medication. There was more than half of the studied students had a fair level of knowledge regarding effective using of antibiotics. Beside that nearly to half of the studied students had satisfactory level of reported practices about risks for using antibiotics. Finally, there was a highly significant association between studied students' total knowledge & self reported practice regarding risks of antibiotics self-medication.

Recommendations

Based on the previous results of the present study and conclusion, the following recommendations are suggested:

- Furthermore, local authorities may require to arrange community-level campaigning to limit antibiotic self-administration by promoting the significance of proper antibiotic administration and rising awareness among university students.
- The authority should respond by reforming the prevailing policy to ensure antibiotics' safe and effective use.
- Government legislation should be enacted to restrict the sale of prescription-only antibiotic that can only be obtained with the proper prescription.
- The government, the media, and healthcare organizations need to express their roles in educating and persuading nursing students about antibiotic administration.
- Increasing the awareness of the nursing students about the rational choice of getting medical assistance is a very important issue to control their health.

In further research:

A health education program to increase awareness about the use of medicines among nursing student and to enable them to make the right decisions relating to health problems.

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