



Research Article

Volume 22 Issue 3 - November 2021
DOI: 10.19080/JGWH.2021.22.556089

J Gynecol Women's Health

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Prevalence of and Factors Associated with Hormonal Contraceptive use among Undergraduate Students Studying Health-Related Fields



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Submission: November 01, 2021; Published: November 10, 2021

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Abstract

Introduction: Contraceptive use by females of reproductive age has significantly increased. Studies of contraceptive use have shown that choice of the method is dependent on several factors. Objective: This study investigated contraceptive use by university students and attempted to verify the factors associated with hormonal contraceptive use.

Methods: A cross-sectional, school-based study was conducted among female university students studying health-related fields who were 18 years or older, sexually active, and enrolled full-time at the institution. A standard-ized, pre-coded, self-administered questionnaire comprising specific questions related to contraceptive use was completed by participants and 1288 females were included in the study. Demographic, socioeconomic, academic, religious, sexual, and reproductive factors were evaluated from October to December 2018. Descriptive statistics were used for data. Poisson regression with robust variance was used according to the conceptual analysis model. Variables associated with the outcome were retained in the model ($p \leq 0.20$ was used to adjust for confounding factors; $p < 0.05$ was considered significant). Results: The most frequently used contraceptive methods were contraceptive pills (66.5%) and male condoms (43.9%). The prevalence of all hormonal contraceptives was 81.50%. The multivariate regression analysis showed that hormonal contraceptive use was most prevalent among female students 23 to 24 years of age who were living with friends, from economic class A, and did not practice any religion.

Conclusion: Contraceptive use by students has limited diversity; therefore, more studies involving representative samples of this population are necessary to monitor trends in and guide intervention efforts for sexual and reproductive health.

Keywords: Contraception; Contraceptive methods; Hormonal contraceptives; Undergraduate students

Abbreviations: HIV: Human Immunodeficiency Virus; STI: Sexually Transmitted Infection

Introduction

Recently, there has been an increase in the number of adolescents and young adults engaging in sexual activity, and the average age at which sexual activity is initiated has become younger [1]. Concomitantly, there has been a significant increase in the use of contraception, with approximately 60% of females of reproductive age using some form of contraception [2]. In Brazil, contraceptive use was investigated using the Brazilian National Survey of Demography and Health (PNDS), which was conducted

in 1996 and 2006. The 2006 results showed that 66% of sexually active individuals 15 to 19 years of age have used at least one contraceptive method [3].

Studies of contraceptive use have shown a high prevalence among youth (age 15-24 years), and that the choice of method depends on the relationship, partner, reproductive intentions, sociocultural and religious issues, method affordability, and access to different methods [4-7]. However, other factors, such as the

absence of a stable relationship, influence the use, non-use, and inappropriate use of contraception [8,9]. Studies involving female university students confirmed a high prevalence of contraceptive use among them [10], as well as inconsistent usage practices and misuse, thereby exposing them to the risks of unplanned pregnancies, induced abortions, and sexually transmitted infections (STIs). Therefore, the use of contraception, especially by young individuals, is associated with the prevention of STIs, unwanted pregnancies, and other consequences [11,12].

According to the World Health Organization and the eligibility criteria for the use of different contraceptive methods, there is no ideal contraceptive for all individuals, and age is not a limitation to any contraceptive method [4]. It is important to know the available contraceptive options so individuals can make the most appropriate choice by considering characteristics such as frequency of sexual activity, number of partners, desire to avoid pregnancy, and lifestyle, as well as the characteristics inherent to each method, such as its function, effectiveness, possible side effects, and whether it requires follow-up (such as a prescription or medical examination).

Currently, several contraceptive methods are available. Oral hormonal contraceptive pills are the most commonly used method of contraception. This method is quite effective if used correctly. Additionally, hormonal contraceptives may have additional benefits, such as the treatment of dysmenorrhea, acne, premenstrual tension, ovarian cysts, and endometriosis. However, they may have adverse effects as well; for example, they can cause slight increases in blood pressure, thromboembolism, diabetes mellitus, and cardiovascular events [13].

This study aimed to describe the contraceptive methods used by female undergraduate students studying health-related fields at a university in midwestern Brazil. It also intended to verify the use of and factors associated with hormonal contraceptive methods to help guide intervention efforts for reproductive planning.

Materials and Methods

This research study was performed to verify the living and health conditions of students studying health-related fields at the University of Rio Verde. In 2018, the University of Rio Verde had approximately 7000 students enrolled in 21 undergraduate programs and 15 postgraduate programs. The University of Rio Verde has three campuses, Rio Verde (southwest region), Aparecida de Goiânia (metropolitan region of Goiânia), and Goianesia (north-ern region). This cross-sectional study included female undergraduate students who were studying nursing, dentistry, medicine, physiotherapy, pharmacy, or physical education courses, 18 years or older, sexually active, and not pregnant at the time of data collection (N=2620 students).

The sample size was calculated based on a 60% prevalence of contraceptive use. A power of 80% was considered to identify

a prevalence ratio of 1.13 with a confidence level of 95% and an error rate of 3%. The sample size was increased by 10% to account for possible losses and refusals, and by 15% to control for confounding factors. Therefore, the sample size was estimated to be 743 participants. Ultimately, 1288 females were included in the study.

Data were collected using a standardized, pre-tested, self-administered questionnaire that was completed anonymously by university students from October to December 2018. The questionnaire consisted of 209 questions and was completed in the classroom. If students did not attend the first questionnaire session, then two more attempts were made so that they could complete it. The researchers involved in this project were responsible for distributing the questionnaire. Training was performed and an instruction manual was created to standardize the application of the data collection and coding instrument. Additionally, a pilot study was conducted with university students studying law to improve the instrument and its logistics.

The types of contraceptive methods used by sexually active females were described. For the association analysis, the outcome was the use of hormonal contraceptive methods such as contraceptive pills, injectable contraceptives, transdermal patches, vaginal rings, subcutaneous progesterone implants, and intrauterine hormonal systems. Demographic, socioeconomic, education, religion, and reproductive variables were analyzed. Demographic variables included age (age groups: 18–20 years; 21–22 years; 23–24 years; 25 years or older), self-reported race (white or non-white), relationship status (with or without a partner), and living situation (living alone; living with a partner, parents, or guardians; living with friends or colleagues).

Economic classes according to the Brazilian Association of Companies and Research were included in the analysis. Classes were categorized as A (high), B (medium), or C/D/E (low) based on the possession of certain material goods, education of the head of the family, presence of domestic servants, and availability of public services at the location of the residence.

The student variables were course of study (medicine, dentistry, and other health-related fields) and course periods (six or fewer semesters completed or seven or more semesters completed). The religion variable was categorized as Catholic, Protestant/Evangelical, other religions, and no religion. Regarding reproductive variables, the following were included in the analysis: sexarche (categorized by age group: 15 years or younger; 16–17 years; 18 years or older); number of sexual partners during the past year (one, two, three, or more than three); and parity (children or no children).

The database was created using the Epi data 3.1 program; double entry was performed to reduce typing errors. A descriptive analysis was performed to calculate the frequency of contraceptive use and the prevalence rates of the contraceptive methods. Crude

and adjusted analyses, confidence intervals, and significance levels were performed using the chi-square test and Stata software version 12.0 for hormonal contraceptive methods.

For the adjusted analysis, Poisson regression was performed using a hierarchical model. Therefore, the demographic and socioeconomic variables were placed at the distal level, the variables related to student characteristics and religion were placed at the second level, and the variables related to sexual and reproductive characteristics were placed at the proximal level; all of these determined the outcomes of using hormonal contraceptives. Variables were entered into the model if they had statistical significance of 20% ($p \leq 0.2$) in the crude analysis; furthermore, they were retained in the model if they had a significance level of 5% ($p < 0.05$).

This research project was approved by the research ethics committees of the University of Vale do Rio dos Sinos (no.

2,892,764; September 13, 2018) and the University of Rio Verde (no. 2,905,704; on September 19, 2018). The participants were informed about the objectives and procedures of the research and were allowed to participate after signing the informed consent form.

Result

Of the total sample of university students participating in the project, 1593 were female; of these, 1288 (80.8%) reported being sexually active. The prevalence of contraceptive use was 85.9% (95% confidence interval, 83.3%-87.2%), and the most frequently used contraceptive methods were contraceptive pills (66.5%) and male condoms (43.9%). Additionally, the analysis showed that 257 (20%) participants reported withdrawal as their method of contraception, 234 (18.2%) reported the morning-after pill as their method of contraception, and 124 (9.6%) reported using other methods of contraception (Table 1).

Table 1: Use of contraceptive methods among female university students in Goiás, Brazil, in 2018.

Contraceptive Methods	N	(%)
Hormonal pill	856	66,5
Hormonal injectable contraceptive	57	4,4
Hormonal patch	5	0,4
Hormonal vaginal ring	15	1,2
Hormonal Intrauterine System	107	8,3
Hormonal Implant	9	0,7
Male Condom	566	43,9
Female Condom	18	1,4
Intrauterine device	14	1,1
Sterilization	2	0,2
Calendar Method	124	9,6
Withdrawal	257	20,0
Vaginal Ring or patch	143	11,1
Emergency contraceptive	234	18,2
Others	7	0,5
Total	1288	

The prevalence of hormonal contraceptive use was 81.5%. In addition to contraceptive pill users, 8.3% of the participants reported using a hormonal intrauterine system, 4.4% reported using injectable hormonal contraceptives, 1.2% reported using a vaginal contraceptive ring, 0.7% reported using subdermic hormonal implants, and 0.4% reported using an intradermic contraceptive adhesive (Table 1).

According to the demographic variables of the sample, most participants were between 21 and 22 years old (36%) and were white (58.3%). Regarding the relationship status, there

was a predominance of females without a partner (86.8%). The economic class distribution showed that 87.6% of females were classified as classes A and B. Furthermore, 52.4% lived with parents, guardians, or partners, 68.1% were studying medicine, and 61.7% completed up to six semesters of courses. The predominant religion was Catholic (56.2%). Regarding sexual and reproductive characteristics, the majority (41.3%) reported that their age when they first had sexual intercourse was older than 18 years, 61.7% reported having only one sexual partner, and 92.9% reported having no children (Table 2).

Table 2: Sample distribution and prevalence of hormonal contraceptive use according to sociodemographic, education, and behavioral characteristics of female university students in Goiás, Brazil, in 2018 (N=1288).

Variables	N (%)	Use of Hormonal Contraceptives N (%)
Age (years)		
18 a 20	296 (23,0)	227 (76,6)
21 a 22	464 (36,0)	379 (81,7)
23 a 24	291 (22,6)	242 (83,2)
25 or more	237 (18,4)	170 (71,7)
Skin Color		
White	751 (58,3)	594 (79,1)
Non - White	537 (41,7)	424 (79,0)
Relationship Status		
With partner	169 (13,2)	125 (74,0)
Without partner	1116 (86,8)	892 (79,9)
Living Situation		
Alone	451 (35,2)	371 (82,3)
With parents, partner or guardians	672 (52,4)	508 (75,6)
With friends or colleagues	159 (12,4)	135 (84,9)
Economic Class		
A (high)	516 (41,4)	428 (82,9)
B	575 (46,2)	447 (77,7)
C - E (low)	154 (12,4)	112 (72,7)
Course		
Medicine	876 (68,1)	708 (80,8)
Dentistry	284 (22,1)	225 (79,2)
Others	126 (9,8)	84 (66,7)
Course Period (semester)		
1st- 6th	793 (61,7)	620 (78,2)
7th or more	493 (38,3)	398 (80,7)
Religion		
Catholic	718 (56,2)	590 (82,2)
Protestant or Evangelical	276 (21,6)	199 (72,1)
Others	267 (20,9)	209 (78,3)
Non religion	17 (1,3)	15 (88,2)
Sexarche (years)		
Up to 15	256 (20,2)	203 (79,3)
16 - 17	489 (38,5)	406 (83,0)
18 or more	525 (41,3)	396 (75,4)
Number of Sexual Partners		
One	771 (61,7)	604 (78,3)
Two	226 (18,1)	189 (83,6)
Three or more	253 (20,2)	200 (79,1)
Parity		
Without children	1196 (92,9)	961 (80,4)
With children	82 (7,1)	55 (67,1)

The distribution of the use of hormonal contraceptive methods was observed according to the characteristics of the study sample. The highest prevalence of use was observed among females who were 23 to 24 years of age, without a partner, from economic classes A and B, living with friends, studying medicine, practicing no religion, and completing the second half of their coursework. Regarding behavioral characteristics related to sexual and/or reproductive life choices, a higher prevalence of hormonal contraceptive use was observed among those who were between 16 and 17 years old when they first had sexual intercourse, had two sexual partners, and had no children.

The crude analysis showed an association between age and the use of hormonal contraceptive methods; however, the confidence intervals encompassed unit values. Regarding the relationship status, statistically significant differences indicating that females without a partner chose hormonal contraceptives more often than females with a partner were observed. Students living with friends and living alone also had a higher prevalence of hormonal contraceptive use. Race was not a statistically significant variable for the use of hormonal contraceptive methods. The analysis of socioeconomic characteristics showed significant differences and revealed a higher prevalence of hormonal contraceptive use among females from economic class A (Table 3).

Table 3: Crude and adjusted analysis results regarding the use of hormonal contraceptive methods and their associations with sociodemographic, education, and behavioral characteristics of female university students in Goiás, Brazil, in 2018.

Variables	Use of hormonal contraceptives					
	Unadjusted Model			Adjusted Model		
	PR	CI 95%	P-value	PR	CI 95%	P-value
Age (years)1			0,010			0,026
18 - 20	1			1		
21 - 22	1,05	0,97 - 1,13		1,04	0,97 - 1,13	
23 - 24	1,07	0,99 - 1,16		1,08	0,99 - 1,17	
25 or more	0,91	0,82 - 1,01		0,94	0,85 - 1,04	
Skin color1			0,652			
White	1					
Non white	0,99	0,93 - 1,04				
Relationship status1			0,110			0,759
With partner	1			1		
Without partner	1,08	0,99- 1,18		1,01	0,92 - 1,11	
Living Situation 1			0,004			0,014
With parents, partner or guardians	1			1		
Alone	1,08	1,02 - 1,15		1,08	1,01 - 1,15	
With friends or colleagues	1,22	1,03 - 1,21		1,11	1,02 - 1,20	
Economic Class1			0,009			0,024
A (high)	1			1		
B	0,93	0,88 - 0,99		0,94	0,87 - 1,00	
C - E (low)	0,87	0,78 - 0,96		0,89	0,80 - 0,98	
Course2			0,012			0,489
Medicine	1			1		
Dentistry	0,97	0,90 - 1,04		1,00	0,93 - 1,08	
Others	0,83	0,73 - 0,94		0,92	0,81 - 1,05	
Course Period (semester)2			0,387			
1st - 6th	1					
7th or more	1,02	0,97 - 1,09				
Religion2			0,008			0,029
Catholic	1			1		

Protestant or Evangelical	0,88	0,81 - 0,95		0,90	0,82 - 0,97	
Others	0,96	0,89 - 1,03		0,95	0,89 - 1,03	
Non religion	1,08	0,90 - 1,29		1,09	0,90 - 1,32	
Sexarche (years)3			0,011			0,482
Up to 15	1			1		
16 - 17	1,05	0,97 - 1,13		1,03	0,87 - 1,23	
18 or more	0,95	0,88 - 1,03		0,94	0,79 - 1,13	
Number of sexual partners3			0,168			0,793
One	1			1		
Two	1,07	1,00 - 1,14		1,04	0,88 - 1,23	
Three or more	1,01	0,94 - 1,09		0,97	0,82 - 1,15	
Parity3			0,60			
Without children	1					
With children	0,95	0,81 - 1,12				

Regarding student characteristics, females studying medicine had a higher prevalence of hormonal contra-ceptive use. The course period was not associated with the outcome (Table 3). The university students who declared that they practice no religion, those who first had sexual intercourse between the ages of 16 and 17 years, and those who reported two sexual partners more often chose hormonal con-traceptive methods. Parity was not associated with the use of hormonal contraceptives (Table 3).

According to the adjusted analysis, age, living situation, economic class, and religion were retained in the adjusted analysis, which showed that those 23 to 24 years of age, living with friends, from economic class A, and without religion were more likely to use hormonal contraceptives (Table 3).

95% CI: 95% confidence interval; PR, prevalence ratio. Each variable was adjusted to the others at the same or pre-vious level in a hierarchical model of causality. Only variables associated with the outcome at $P \leq 0.20$ in the unad-justed model were subsequently entered and retained in the final multivariate-adjusted model. 1st Level - Variables adjusted to each other. 2nd Level - Variables adjusted to each other and for age, economic class and residence. 3rd Level - Adjustable variables among themselves and for age, economic class, residence, course and religion

Discussion

During this study, the majority of females who reported being sexually active had a high prevalence of con-traceptive use. A similar result was found during a European cross-sectional study of university students using a self-administered questionnaire that showed a 93% prevalence of being sexually active and an 86.9% prevalence of contraceptive use during the first sexual intercourse experience [14]. An analysis conducted in São Paulo, Brazil, involving 258 public university students found a high prevalence of contraceptive use during their last relationship with

sexual involvement, and 100% of the sample reported the general use of contraceptive methods [15]. A study performed in Curitiba in 2020 that involved 1036 university students with an average age of 21.2 years reported that 41.6% were enrolled in health-related courses, 87.2% were sexually active, and 89.3% used contraception [16]. Other studies of female university students showed a lower prevalence. One study including 23 universities from 22 countries in Asia and Africa showed a 57.4% prevalence of contraceptive use by a sample of female university stu-dents [10]. Another large study performed in the United States that analyzed trends in the use of contraceptive meth-ods by 97,376 university students from 2008 to 2013 found contraceptive use prevalence rates of 45% in 2008 and 44% in 2013 [17]. In the midwestern city of Goiânia in Brazil, a study involving 178 nursing students in 2014 showed a 52% prevalence of general contraceptive use [18].

In the present study, contraceptive pills and male condoms were the most commonly used contraceptive methods. Other school-based studies performed in Brazil found a higher prevalence, however. In the southeastern region of Brazil, a study performed at a public university in São Paulo in 2010 found rates of 69.5% and 79.2% for contraceptive pill and male condom use, respectively [15]. Another study performed in southern Brazil that aimed to verify the use of contraceptive methods during the first sexual intercourse experience among 293 university stu-dents in 2015 found prevalence rates of 82.7% and 87.7% for the contraceptive pill and male condom, respectively [19]. During the study in Curitiba, in 2020, the most commonly used methods were the contraceptive pill and the male condom, with prevalence rates of 79.1% and 37%, respectively [16]. In contrast, during a study conducted in the midwestern region of Brazil that included 270 females enrolled in health-related courses at a private university, the prevalence rates were only 24.8% for contraceptive pills and 30.7% for male condoms [20].

As expected, contraceptive pills were the predominant form of hormonal contraception, followed by hormonal intrauterine systems, long-term reversible contraceptives, and injectable contraceptives. Studies conducted in different countries have shown different regional patterns in the use of hormonal contraceptive methods. Short-term reversible methods have been most commonly used in Africa and Europe, and long-term or permanent methods have been most commonly used in Asia and North America. In Latin America, the Caribbean, and Oceania, combinations of different methods are used [21]. In the United States, a study to verify contraceptive use trends over time showed a progressive increase in the use of long-term reversible contraceptives from 1% in 2008 to 4% in 2013, with race, age, relationship status, and sexual orientation being associated factors [16]. In Brazil, a cross-sectional, population-based study including 20,404 urban Brazilian households and data reported by females 15 to 49 years of age showed differences in the prevalence of oral contraceptive use, with higher rates in the southern region (37.5%) and lower rates in the northern region (15.7%). Regarding injectable contraceptives, no differences were detected between regions, with a total prevalence of 4.5% [22].

Interestingly, two contraceptive methods, the male condom and the contraceptive pill, were used most commonly, and the prevalence rates for more modern methods of contraception, such as the intrauterine contraceptive device, vaginal ring, and injectable hormonal implants, were low. There was also a high frequency of the use of other methods such as withdrawal and emergency contraception, even though they may not have been used routinely.

The male condom is a barrier method of contraception that has the advantage of providing protection against unwanted pregnancy and STIs such as HIV [23]. It is one of the oldest and most popular forms of contraception and is 95% effective if used correctly. Furthermore, it can be safely used by all age groups and is easily accessible from public and private health services [24]. Therefore, it would be expected to have a higher prevalence of use among adolescents (15-19 years) and young adults (20-24 years), especially university students, because they are highly educated and have access to information. Traditional or natural methods, such as withdrawal, are considered unreliable and have high failure rates [23]; therefore, they should be discouraged for contraception.

Emergency contraception consists of ingesting an isolated progesterone pill within 72 hours after sexual intercourse that was unprotected because of situations involving forgetting to use or inappropriate use of the regular contraceptive method, condom failure (broken condom), or sexual violence. However, routine use compromises the effectiveness of emergency contraception. A study of public university students in São Paulo, Brazil, found a 50% prevalence of emergency contraceptive use, and that 15% of females did not demonstrate adequate knowledge about emergency contraception, such as its inability to prevent STIs

[25]. Furthermore, 56.1% of female private university students in southern Brazil reported using emergency contraception, 11.4% of them reported having used it more than twice within 1 year, and 10.7% reported that they did not use contraception continuously [16]. Another study of university students studying nursing in the midwestern region of Brazil found a 29% prevalence rate of emergency contraception use, and that correct answers to questions about emergency contraception were provided by less than 50% of these students [18]. These results are worrying because the frequent use of emergency contraception is a marker of risky sexual behavior and may indicate exposure to unprotected sex or poor adherence to regular contraceptive use, resulting in vulnerability to unplanned pregnancy.

Several studies have shown that contraceptive practices by youth are related to several factors, such as their current relationship, partner, and sociocultural and religious issues, as well as other aspects such as socioeconomic level, method affordability, and access to different methods [5-7,26]. During this study, age, economic class, living situation, and religion significantly influenced the use of hormonal contraceptives. The results observed for university students aged 23 to 24 years with a higher economic class who were living with friends and did not practice any religion were related to a higher prevalence of contraceptive use and indicated trends among university students. Other studies have reported similar results. A multicenter study performed in Asia and Africa showed that factors such as younger age, having a religious affiliation, and sexually protective behavior (not being pregnant at the time of the interview and not having multiple sexual partners) were associated with the non-use of contraceptives among sexually active university students [10]. In the United States, a study that analyzed the prevalence of and factors associated with the consistent use of contraceptives by 842 university students found that self-esteem, confidence, independence, and satisfaction with life were positively associated with the consistent use of contraceptives [27].

It was elucidated that educated young individuals still have inconsistencies in their use of contraception and in their prevention of STIs and have little knowledge of and a low prevalence of using long-term reversible contraceptives, which are safe and highly effective for their age group. Because this was a cross-sectional study of a population restricted to a particular university, it is not representative of all female university students in Brazil. There were also limitations to determining all factors involved in decisions regarding contraceptive use by female university students, and limitations to evaluating situations involving contraindications to contraceptive methods, adverse effects of contraceptive, and adequate adherence to contraception throughout the reproductive life. However, because of the sample size and methodological rigor, these results reflect trends that indicate that it is necessary to expand interventions aimed at reproductive guidance and reproductive planning for students in Brazil.

Conclusion

There is little diversity in the contraceptive methods used by university students studying health-related fields, and their contraceptive choices are related to sociocultural and religious reasons. These results do not differ from those of other females in different age groups or even females of the same age but with less education and greater difficulty accessing information and different contraceptive methods.

Acknowledgement

Stahnke received a scholarship from Brazilian Federal Agency for Support and Evaluation of Graduated Education (CAPES-PROSUC).

Contributors

Dias-da-Costa JS, Patussi MP, contributed to the conception and design of the study, review of the analysis, critical review and final approval of the manuscript. Stahnke DN contributed to the data analysis and interpretation. All the authors have approved the final version and are responsible for all aspects of this work, including guaranteeing its accuracy and integrity.

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DOI: [10.19080/JGWH.2021.21.556089](https://doi.org/10.19080/JGWH.2021.21.556089)

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