ORIGINAL ARTICLE

Reuse and Practice of Wearing Masks Among University Students

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Highlights:
(1). The practice of using masks by university students received a good score.
(2). The practice of using masks by university students was greater in the healthcare environment.
(3). Factors related to Covid-19 were associated with the practice of using masks.

ABSTRACT

This study aimed to analyze the use of masks and associated factors among university students in Paraíba during the Covid-19 pandemic. This is a cross-sectional, analytical study, developed in a public education institution in the state of Paraíba with 404 university students. Data were collected using a structured questionnaire and the Face Mask Use Scale, a Brazilian Portuguese version. The data were analyzed using descriptive statistics, normality tests, Mann-Whitney U-tests, and Kruskal-Wallis tests. The overall score for the practice of wearing masks was 23.7 (Standard deviation=4.9). Using masks in healthcare environments obtained the highest score of 9.2 (Standard deviation=1.6). Monthly income, Covid-19 diagnosis, isolation, and illicit drug use were factors associated with the use of masks. It appears that university students practice poor use of masks in public and home environments.

Keywords: Covid-19; masks; security measures; pandemics; Higher Education Institutions.

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INTRODUCTION

The devastating effects of the novel coronavirus disease (Covid-19) pandemic on various aspects of life, especially economic and social ones, persist as a global public health problem. This includes an increase in the incidence of infection among young adults, including university students[1]. Given the mutations of the new coronavirus, the rate of infection and the risk of serious complications and death from the disease affects all age groups, especially young people and children[2].

In Brazil, by September 2023, there were 37,789,040 confirmed cases of Covid-193. With an incidence of cases in the Region of the Americas of 25.9 in males and 26.7 in females per 1,000 inhabitants, respectively, both in the 20-29 age group.[4]

In the early stages of the Covid-19 pandemic, due to the lack of effective drugs and vaccines, many countries considered prevention to be the most effective way of controlling and inhibiting the infection. Currently, even with the advent of the vaccine, there are still impacts from viral mutations, which is why it is important to continue monitoring any changes associated with the epidemiology of the infection[2]. Thus, preventive behaviors, such as wearing masks and washing hands, remain important in controlling the spread of Severe Acute Respiratory Syndrome Coronavirus 2 (Sars-CoV-2)[5-6].

It is therefore important to analyze factors that may interfere with the practice of using or not using masks by university students, to identify opportunities for potential intervention, especially about non-pharmacological preventive measures for Covid-19[7]. There are few peer-reviewed studies on risk factors for this infectious disease among university students, and the literature on this segment of the population suggests that there are problems related to both awareness and knowledge of the main health measures.

Furthermore, the more the Covid-19 virus circulates, the more opportunity it must mutate. Therefore, reducing exposure to the virus must be permanent through vaccination, the practice of wearing masks, and reducing close contact, especially in closed places such as educational institutions[6].

It has been shown that less than 20% of students in the USA can correctly identify all the symptoms of Covid-19[8]. In Brazil, a study of health behaviors showed a cognitive dissonance in the population, in which there is a significant gap between what is known about the virus as a health threat and what is done to prevent its transmission[9].

In this way, assessing the use of masks among university students could allow educational interventions to be planned to provide adequate and efficient use of this Personal Protective Equipment (PPE). Meanwhile, this study aims to analyze the use of masks and associated factors among university students in Paraíba during the Covid-19 pandemic.

METHOD

This is a cross-sectional, analytical study carried out at a public higher education institution in the state of Paraíba, from March 2021 to April 2022. For this study, all university students over the age of 18 who entered the 2019.2 academic period and who compulsorily attended the period corresponding to the year 2020 (the period of the Covid-19 epidemic in Brazil) were considered eligible. Students taking technical or postgraduate courses were excluded.

To obtain the sample, we opted for a stratified sampling plan by institution group (campus). In this study, four campuses were chosen, located in municipalities in the state of Paraíba. The number of admissions per campus totaled 22,625 on Campus I, 1,381 on Campus II, 970 on Campus III, and 2,281 on Campus IV, for a total of 27,257 admissions on the four campuses.

After calculating the overall sample size, the number of entrants for each campus was obtained proportionally to the number of entrants from each campus. The number of entrants considered in the study that generated the sample size calculation is shown in Figure 1.

Campus	Modality	Sample tickets	Total
Campus I	Morning and afternoon	239	302
	Evening	63	
Campus II	Morning and afternoon	28	31
	Evening	3	
Campus III	Morning and afternoon	12	16
	Evening	4	
Campus IV	Morning and afternoon	22	54
	Evening	32	
	Total	403	403

Figure 1 – Sample size of entrants by campus and modality. João Pessoa, PB, Brazil, 2022.

As a result, the minimum sample size obtained by the stratification procedure, with expected losses of around 20%, was 403 students. The final sample consisted of 404 university students.

Os dados foram coletados nas dependências dos campi, dentro de salas de aulas que eram disponibilizadas, em todos os quatro *campus* citados anteriormente. Para recrutamento dos estudantes, a pesquisa foi divulgada por meio de mídias sociais e de convites impressos que foram distribuídos com os estudantes universitários dentro dos próprios *campi* antes da sua realização. Uma equipe composta por pós-graduandos, graduandos e profissionais de saúde recebeu treinamento prévio sobre a operacionalização da coleta de dados e sobre medidas de biossegurança para o contexto da covid-19, conforme protocolo da instituição.

The data was collected on campus, in classrooms that were made available, on all four of the campuses. To recruit students, the survey was publicized through social media and printed invitations that were distributed to university students on the campuses themselves before it was carried out. A team made up of postgraduates, undergraduates and health professionals received prior training on the operationalization of data collection and biosafety measures in the context of Covid-19, according to the institution's protocol.

Students who met the inclusion criteria, after being explained the objectives of the research and operational procedures and signing the Informed Consent Form (ICF), answered the structured questionnaire individually, containing questions about sociodemographic characteristics, diagnosis of Covid-19, physical isolation, questions about the use of illicit drugs and tobacco, and the Face Masks Use Scale (FMUS-PB), in its Brazilian Portuguese version.

The FMUS-PB is a scale that has been translated and validated for Brazil and has satisfactory psychometric properties[10]. It consists of six items that discuss the use of masks to protect against flu-like illnesses in public, healthcare, and home environments. The response options vary on a five-point Likert scale, with "never," "rarely," "sometimes," "often," and "always" representing the frequency of mask use. To measure the practice of wearing masks, an overall score is used, ranging from 6 to 30, with the highest value indicating the best practice of use.

The FMUS-PB includes items on the practice of wearing masks for self-protection (items 1, 2, and 6) and for the protection of others (3, 4, and 5), with scores ranging from 3 to 15. It was also decided to calculate the practice of wearing masks in different environments: public (items 1 and 4), healthcare (items 2 and 5), and home (items 3 and 6), with scores ranging from 3 to 10[10].

The data collected was exported and analyzed using IBM® SPSS software, version 21.0. Descriptive statistics were used to characterize the participants' sociodemographic and to characterize mask reuse, using frequency and dispersion measures (standard deviation – SD). The dependent variables were the overall FMUS score and the use of masks as cautious or negligent practices, as well as the use of masks for self-protection and the protection of others. The independent variables were gender, age group, level of education, family income, marital status, diagnosis of Covid-19, physical isolation, and use of illicit drugs and tobacco. The Mann-Whitney test and the Kruskal-Wallis test were used to compare the scale scores between the independent variables. Data normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Variables with a p-value ≤ 0.05 were considered statistically significant.

This study was approved by the Research Ethics Committee with opinion no. 4.309.767/2021 and CAAE: 36932220.5.0000.5188. All ethical aspects were considered in the development of the study in conformity with Resolution 466/2012.

RESULTS

A total of 404 (100%) university students took part in the study. The majority were female, 234 (57.9%), aged between 18 and 22 years, 183 (45.3%), brown, 174 (43.1%). In terms of marital status, the majority said they were single, 352 (87.1%), had no children, 387 (95.8%), had no defined religion, 185 (45.8%) and had a monthly individual income of < 1 minimum wage, 233 (57.7%), and a monthly family income of one to two minimum wages, 161 (39.9%). The majority received a scholarship or benefit from the educational institution, 271 (67.1%), and did not work, 317 (78.5%) (Table 1).

Table 1 – Sociodemographic characteristics of university students (n=404). João Pessoa, PB, Brazil, 2022

Variable	n (%)
Gender	
Male	170 (42.1)
Female	234 (57.9)
Age group (years)	
18 to 22	183 (45.3)
23 to 27	167 (41.3)
28 to 32	33 (8.2)
≥ 33	21 (5.2)
Color or race	
Brown	174 (43.1)
White	149 (36.9)
Black	73 (18.0)
Yellow	4 (1.0)
Indigenous	4 (1.0)
Marital status	
Single	352 (87.1)
Married	14 (3.5)
Currently living with partner	35 (8.7)
Widowed	3 (0.7)

Religion	
Catholic	144 (35.6)
Evangelical	39 (9.7)
Spirit	9 (2.2)
Atheist	3 (0.7)
Other*	24 (6.0)
None	185 (45.8)
Monthly family income (minimum wage)	
Up to 1	79 (19.6)
1 to 2	161 (39.9)
2 to 3	98 (24.3)
>4	65 (16.1)
Do not know	1 (0.2)
Lives in university residence	
Yes	110 (27.2)
No	294 (72.8)
Stayed at the university residence during the pandemic †	
Yes	103 (93.6)
No	7 (6.4)
The person you live with	
Family	180 (44.6)
Friends	84 (20.8)
Alone	30 (7.4)
University residence	110 (27.2)
A broad area of knowledge	
Health	111 (27.5)
Humanities	95 (23.5)
Agricultural sciences	81 (20.0)
Applied social sciences	49 (12.1)
Exact sciences	31 (7.7)
Engineering	24 (6.0)
Linguistics, literature, and arts	11 (2.7)
Biology	2 (0.5)
Total	**404 (100.0)**

*Other (Christian, Candomblé, Spirit, Deism, Witch, Umbanda, Agnostic, Discordian, Afro-Brazilian); †Those who answered that they live in the university residence.

As for the type of mask used by university students, the most common was the cloth mask, 295 (73.0%), followed by the surgical mask, 180 (44.6%), and the N95 mask, 101 (25.0%). About the reuse of masks, 77 (26.1%) of the students who reported using cloth masks in public places said that they always reused them. Those who used surgical masks rarely, once or twice, reused them, 63 (35.0%). While of those who use the N95, the majority reported that they always reuse and often/5 to 6 times, 26 (25.7%).

Many university students answered that they always wear masks in the health service to protect themselves against flu-like illnesses, 326 (80.7%), and when they have symptoms of flu-like illnesses, 325 (80.4%). When asked whether they wear masks in public places to protect themselves and when they have symptoms of flu-like illnesses, 256 (63.4%) and 306 (75.7%) said they always do, respectively. However, 142 (35.1%) and 122 (30.2%) never wear masks at home when they have symptoms of flu-like illnesses or when family members suffer from flu-like illnesses, respectively (Table 2).

Table 2 – Responses of university students, according to the items of the FMUS-PB Scale, during the Covid-19 pandemic (n=404). João Pessoa, PB, Brazil, 2022

Items	Never n (%)	Rarely n (%)	Sometimes n (%)	Often n (%)	Always n (%)
1. I wear a mask in public places to protect myself against flu-like illnesses.	6 (1.5)	15 (3.7)	39 (9.7)	88 (21.8)	256 (63.4)
2. I wear a mask in the health service to protect myself against flu-like illnesses.	9 (2.2)	7 (1.7)	18 (4.5)	44 (10.9)	326 (80.7)
3. I wear a mask at home when I have symptoms of flu-like illnesses.	142 (35.1)	68 (16.8)	56 (13.9)	43 (10.6)	95 (23.5)
4. I wear a mask in public places when I have symptoms of illnesses such as the flu.	19 (4.7)	10 (2.5)	21 (5.2)	48 (11.9)	306 (75.7)
5. I wear a mask in the health service when I have symptoms of illnesses such as the flu.	21 (5.2)	10 (2.5)	16 (4.0)	32 (7.9)	325 (80.4)
6. I wear a mask at home when family members suffer from flu-like illnesses.	122 (30.2)	64 (15.8)	67 (16.6)	44 (10.9)	107 (26.5)

The overall score for the practice of wearing masks among university students was 23.7 (SD=4.9), ranging from 6 to 30. Regarding the perception of wearing masks for self-protection, the score was 11.9 (SD = 2.5), while the score for the perception of wearing masks to protect others was 11.7 (SD = 2.83). The score for mask use in the public environment was 8.9 (SD = 1.6), in the healthcare environment 9.2 (SD = 1.6), and at home 5.5 (SD = 2.9).

Table 3 shows the domain scores according to sociodemographic variables, including those related to Covid-19 and drug use. University students who were not diagnosed with Covid-19 had higher scores for the use of masks for self-protection (p=0.011). Those who said they lived with someone diagnosed with Covid-19 had higher scores for the general practice of wearing masks (p=0.002), for self-protection (p=0.008), and for protecting others (p = 0.001). However, they had higher scores for negligent mask use practices (p<0.001).

University students who reported not using illicit drugs at any time in their lives had higher scores for general mask-wearing practice (p = 0.044), cautious practice (p = 0.003), and self-protection (p = 0.028).

Table 3 – Mean scores on the FMUS scale according to sociodemographic variables, Covid-19-related variables, and the use of alcohol and other drugs. Paraíba, Brazil, 2022

Variables	Overall score		Cautious practices		Negligent practices		Self-protection		Protecting others	
	Mean (SD)	p-value	Mean (SD)	p-value	Mean (SD)	p-value	Mean (SD)	p-value	Mean (SD)	p-value
Gender(1)		0.975		0.163		0.758		0.986		0.360
Male	23.5 (5.41)		13.5 (2.88)		10.0 (3.40)		11.9 (2.64)		11.6 (3.13)	
Female	23.8 (4.57)		13.8 (2.32)		9.96 (3.17)		11.9 (2.41)		11.8 (2.58)	
Age group(2)		0.997		0.195		0.493		0.892		0.930
18 to 22 years old	23.7 (4.56)		14.0 (2.30)		9.7 (3.16)		11.8 (2.46)		11.8 (2.49)	
23 to 27 years	23.7 (5.16)		13.5 (2.73)		10.2 (3.29)		12.0 (2.52)		11.6 (3.07)	
28 to 32 years old	23.6 (5.98)		13.2 (3.27)		10.4 (3.47)		11.8 (2.77)		11.8 (3.44)	
Over 33	23.9 (4.87)		13.8 (2.28)		10.1 (3.67)		12.1 (2.46)		11.7 (2.68)	
Marital status(1)		0.805		0.636		1.000		0.770		0.863
Single/Separated	23.7 (4.88)		13.7 (2.55)		10.0 (3.24)		11.9 (2.49)		11.7 (2.79)	
Married/United	23.5 (5.37)		13.5 (2.77)		10.0 (3.44)		11.8 (2.63)		11.7 (3.11)	
Monthly income(1)		0.094		0.058		0.337		0.149		0.150
≤ 2 salaries	23.4 (5.22)		13.5 (2.75)		9.8 (3.37)		11.7 (2.63)		11.6 (3.01)	
> 2 salaries	24.2 (4.46)		14.0 (2.27)		10.1 (3.10)		12.2 (2.29)		12.0 (2.53)	
Lives in university residence(1)		0.422		0.141		0.412		0.131		0.935
Yes	23.6 (5.86)		13.3 (3.13)		10.3 (3.53)		12.1 (2.83)		11.5 (3.44)	
No	23.7 (4.55)		13.8 (2.33)		9.8 (3.16)		11.8 (2.37)		11.8 (2.56)	
Diagnosis of Covid-19(1)		0.213		0.084		0.513		0.011*		0.815
Yes	23.3 (4.89)		13.4 (2.63)		9.8 (3.30)		11.4 (2.47)		11.8 (2.78)	
No	23.8 (4.95)		13.8 (2.56)		10.0 (3.26)		12.1 (2.50)		11.7 (2.84)	
Isolation(1)		0.257		0.932		0.095		0.201		0.391
Yes	24.1 (4.54)		13.8 (2.24)		10.2 (3.26)		12.1 (2.42)		11.9 (2.55)	
No	23.3 (5.34)		13.5 (2.91)		9.7 (3.26)		11.7 (2.60)		11.5 (3.11)	
Living with someone who has contracted Covid-19(1)		0.002*		0.054		<0.001*		0.008*		0.001*
Yes	24.6 (4.53)		13.9 (2.28)		10.6 (3.16)		12.2 (2.45)		12.3 (2.45)	
No	23.1 (5.12)		13.5 (2.76)		9.5 (3.27)		11.7 (2.52)		11.3 (3.01)	
Tobacco use(1)		0.861		0.094		0.397		0.566		0.777
Yes	23.8 (5.00)		13.5 (2.45)		10.3 (3.40)		12.1 (2.46)		11.7 (2.92)	
No	23.7 (4.93)		13.7 (2.61)		9.9 (3.23)		11.9 (2.52)		11.7 (2.81)	
Use of illicit drugs(1)		0.044*		0.003*		0.159		0.028*		0.125
Yes	23.1 (5.41)		13.3 (2.91)		9.7 (3.43)		11.6 (2.67)		11.4 (3.20)	
No	24.3 (4.35)		14.0 (2.13)		10.2 (3.07)		12.2 (2.30)		12.0 (2.36)	

(1)Mann-Whitney test; (2) Kruskal-Wallis test; *p-value ≤0.05.

DISCUSSION

This study assessed the use of masks and associated factors among university students, considering practices in public, healthcare, and home environments. It also assessed the use of masks for self-protection, to protect others and the reuse of masks.

Regarding the sociodemographic characteristics of the university students investigated, the population was largely made up of women, young adults, singles, and those with no defined religion. Most of them receive a grant or assistance from an educational institution and do not live with family members. These results are like a study carried out in Brazil with 703 university students on quality of life and other aspects during the pandemic, in which a predominance of young, single women was found among the participants9. Thus, the use of masks is associated with demographic characteristics such as age, gender, schooling, ethnic origin, and place of residence[11–12].

The use of masks by university students obtained a good result when compared to the use of masks in other populations using the same scale[13]. This result is corroborated by the research carried out with the population of Paraíba on the use of masks, which indicated that young adults had lower scores for negligent practices when compared to older adults13. In addition, studies conducted during the Covid-19 pandemic showed that the level of education affects people's behavior regarding the use of masks[11–12]. Perhaps this is due to a better understanding of the phenomenon and the consequent awareness of students with increasing age and schooling, as well as the emphasis on hygiene and the effectiveness of guidance on its use[14].

Regarding university students' perceptions of the use of masks for self-protection and the protection of others, they had high scores when compared to other populations[15]. It was also observed that students who had not been diagnosed with Covid-19 had higher scores for the use of masks for self-protection. This may be associated with the risk perception of the disease among students, who believe that they are susceptible to infection and that adopting preventive measures makes them less likely to get sick[16]. In addition, a study of 9,355 university students in Saint Louis showed that those who did not wear masks when exposed to people with Covid-19 were significantly more likely to test positive for Sars-CoV-2 than those who were exposed but wore masks[17].

Covid-19 is known to have a high transmissibility rate, due to its forms of transmission, such as close contact with people diagnosed with the disease through respiratory droplets. As a result, the use of masks in the home, especially when someone in the household tests positive for the infection, has been highly recommended[18].

In this study, the results strongly suggested that students living with someone diagnosed with the disease had higher scores for the general use of masks, for self-protection, and for protecting others, which corroborates the recommendations for preventive measures in the home context.

It is imperative to note that the impacts of Covid-19 around the world are not restricted to the physical damage caused to individuals' health. But rather a series of social, economic, and psychological factors that have impacted the population[19]. Increased consumption of alcohol and other drugs is also among the changes in behavior related to the pandemic, including among university students[20-21]. The research showed that students who do not use illicit drugs have higher scores for the general practice of wearing masks and for self-protection. While students who use illicit drugs had lower scores for the use of masks for self-protection.

As for the environment in which masks are used, the study indicated that students had low scores for use in the home environment. The family environment is seen as safe, even in the face of the risk of infection in the home[22]. When it comes to contamination by Covid-19, the home environment is the main scenario for contamination[23].

Although the use of masks has increased over time, other health protection behaviors, such as the type and reuse of masks, remain inadequate[24]. The masks most used in this study by university students were cloth masks and surgical masks. The available evidence shows that cloth masks do not provide adequate protection when compared to surgical masks, which indicates an increased risk of infection because of humidity and the retention of the virus in the mask[25].

It should be noted that at the beginning of the pandemic, cloth masks were recommended due to the scarcity of surgical masks, but during the collection period of this research, the problem of scarcity had been resolved. One justification for the continued use of cloth masks refers to the different approaches between governments with different regulations on preventive practices, including the proper use of masks[24]. There are also the socio-economic conditions of the students, as it is known that cloth masks are more affordable than recommended masks, which may be one of the reasons for their choice[26]. Furthermore, it is believed that the media and health authorities no longer discuss the correct use of masks to prevent Covid-19, as they did at the beginning of the pandemic.

As for the reuse of masks, this study found that approximately 35% of university students reused masks. Individuals who are more knowledgeable about wearing masks or have a high supply of masks are less likely to reuse masks during the Covid-19 pandemic. The prevalence of reuse in this study was lower than the prevalence reported in Taiwan, 82.0%[27], and among Brazilian citizens, 71.1%[28].

It is understood that during the period in which this study was carried out, the supply of masks and the spread of the Covid-19 virus were under control, a fact that could justify the low prevalence of mask reuse when compared to other studies that were carried out during peaks in the transmission of the infection.

Thus, considering that the practice of wearing masks is recommended among the non-phar-macological prevention measures adopted by health organizations to control infectious diseases of respiratory transmission, such as Covid-19, and given the findings of this study, it is necessary to look for interfering factors and reasons for the non-adoption of this practice by the population, particularly in the home environment, in all age groups, so that educational, influencing and clarifying measures can be implemented more consistently with the population.

As for the limitations of this research, the cross-sectional study design does not allow cause and effect relationships to be established, allowing only associations to be explored and hypotheses to be raised for future research. Another limitation would be the fact that this study looked at the reality of a single Brazilian state, which limits the generalization of the results for the whole country, given that there are states with different social, cultural, and economic contexts.

CONCLUSION

The results of this study strongly suggested that the practice of wearing masks by university students was higher in the healthcare environment and in the public environment among those who reported having an income above two minimum wages, who did not use illicit drugs, when they were not diagnosed with Covid-19 and when they lived with someone diagnosed with the infection. This practice was perceived by the participants as a measure of self-protection, of protecting others.

In the home environment, the practice of wearing masks was more frequent among those who practiced physical isolation or who lived with someone who had been diagnosed with Covid-19, with a lower frequency of use for those students who had flu-like symptoms or someone in the household had a disease with similar symptoms, highlighting a negligent practice in this scenario.

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