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Prevalence and possible psychoactive effects of hair cream use among students

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In the last decade, there have been different mental health challenges among students due to academic stress, especially during examinations. This has led to the need to explore the relationship between psychoactive ingredients, behavioral responses and academic stress in relation to the use of hair creams. The objectives of the study were to identify hair creams containing psychoactive ingredients in use by female students, assess behavioral responses manifested by female students due to use of these hair creams and compare behavioral responses due to the use of these hair creams across the different departments as it relates to academic workload. The study was a cross-sectional survey of four hundred female students (100 to 500 levels) of the Obafemi Awolowo University Ile-Ife, in the Faculties of Pharmacy, Basic Medical Sciences, Administration and Social Sciences. The sample size was determined and randomly obtained from the population. A semi-structured questionnaire which was used as a data collection instrument was pretested. The data was subsequently organized with descriptive statistics like frequencies, percentages and analyzed with inferential statistics like Chi Square, Kruskal-Wallis tests and Mann Whitney test for post-hoc determinations. Twelve percent of the respondents confirmed using hair creams containing psychoactive ingredients. The hair products that contain psychoactive ingredients were Morgan hair cream (4.2%), Dax (2.8%), Mega growth (2.8%), Kuza Indian Hemp (1.4%) and Bergamot (0.8%). The behavioral responses (Anxiety (p=0.217), Mood disorders (p=0.14) and Depression (p=0.234)), were not significantly manifested due to psychoactive ingredients of hair creams. Also, there was no significant relationship existing between academic workload and behavioral responses from the use of hair creams (Anxiety (p=0.079), Mood disorders (p=0.141) and Depression (p=0.169)). The study concluded that only 12% of hair creams contain psychoactive ingredients and these hair creams are Morgan Dax, Mega growth, Kuza Indian Hemp and Bergamont hair creams. Data gathered indicated that there was insufficient evidence linking female students' usage of hair products containing psychoactive chemicals with their behavioral responses, and also, that academic workload did not have a role in the behavioral responses that were being displayed.

Key words: Psychoactive ingredients, behavioral responses, academic stress, hair creams.

INTRODUCTION

In the past, the issue of mental health received less attention than it deserved. In recent years however,

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mental health has been identified as one of the major forces in achieving global development and has further been proven by its inclusion in the Sustainable Development Goals (SDGs) (World Mental Health Report, 2022).

Studies have shown that more females after entering the university are observed to engage more in psychoactive substance use. Since this is no new information, many other studies have shown why this is so (Mendonça Santos et al., 2019; Mokhtari et al., 2013). It is of research interest that academic stress coupled with some hair care products used by female undergraduate students might be responsible for the heightened manifestations of behavioral responses.

The hair that grows on the head is an integral part of our physical appearance and contributes to our self-esteem and self-perception. The global cosmetic industry has thrived on the need of consumers to achieve beauty with a well-made hairstyle (Cruz et al., 2016).

Psychoactive ingredients of hair creams, like hemp are not permanently resident on the hair or the scalp; they must pass through several barriers before they reach the systemic circulation and finally reach the brain (Kothari, 2018). They act on the brain to manifest the speculated behavioral effects from this subtle source of exposure to psychoactive ingredients. Several studies have revealed how these psychoactive ingredients reach the brain without building up in the dermal layer; they first go through the stratum corneum and then the deeper layers of epidermis and dermis. They become available for systemic absorption when it enters the dermal layer through the dermal microcirculation (Johnston and O'Malley, 2001; Kretsos and Kasting, 2007) .

Although some contain ingredients that have no psychoactive ingredients like Hemp seed oil with benefits like preventing too much water from being absorbed by hair, preventing hair breakage by enhancing lubrication of the shaft, some contain highly psychoactive ingredients like cannabis and cannabidiol (CBD) oil which have been said to improve hair growth and scalp health, however, these facts have not been medically proven (Frothingham, 2019; Greene, 2019).

CBD modifies neurotransmission, which affects behavior and social interactions, brain activity, and seizures (Calapai et al., 2020). A critical review by Crippa et al. (2009) on cannabis and anxiety suggests there might be a relationship between frequent cannabis use and patients with anxiety disorders (Crippa et al., 2009). However, it is unclear if cannabis use increases the risk of developing long-lasting anxiety disorders as there are individual difference in response to it that are affected by a lot of factors (Stoner, 2017). As a result, further research is required to fully clarify and establish the relationship between cannabis use and anxiety. Neurobiological, environmental and social factors have been implicated as limitations to establish the relationship between cannabis and anxiety (Crippa et al., 2009).

In a study on the effect of stress on the academic performance of students in different geographical locations, it was concluded that stress could lead to psychological problems such as anxiety and depression (Aafreen et al., 2018). This study also established that students with more academic workloads are more stressed than their colleagues with lesser workloads. Therefore, these students are more prone to psychological problems and reduced self-esteem, which may affect the academic achievements of these students than their contemporaries (Aafreen et al., 2018). Variation also exists in the coping capacities from one individual to another. Stress has been defined by Webster dictionary as cited in Siraj et al. (2014) as a physical response, typically characterized by the symptoms of mental and physical tension or strain, as depression or hypertension (Siraj et al., 2014).

The study objectives were to identify hair creams containing psychoactive ingredients in use by female students, assess behavioral responses manifested by female students due to use of these hair creams and compare behavioral responses due to the use of these hair creams across the different departments as it relates to academic workload.

METHODOLOGY

Study area

The study was conducted at Obafemi Awolowo University, Ile-Ife, among female undergraduate students of Faculties of Pharmacy, Basic Medical Sciences, Administration and Social Sciences.

### Study design, study population and sample size distribution

The study was a descriptive cross-sectional survey of female students at the Obafemi Awolowo University. The data employed in this study was obtained directly from 100 level to 500 level female students of Faculties of Pharmacy and Basic Medical Sciences, and 100 level to 400 level female students of Faculties Administration and Social Sciences of Obafemi Awolowo University, Ile-Ife. The faculties were chosen distinctly to accommodate students in the health sciences and those in the social sciences and administration whose courses are not health related.

Sampling and data collection technique

A set of pretested semi-structured questionnaires were employed as a data collection instrument for this study. The sample size was determined using Taro Yamane's formula for sampling finite population. Four hundred female students across the four faculties were randomly selected for the study.

Data collection instrument

The questionnaire employed in conducting this study comprised six (6) sections. The first section solicited demographic information from respondents. The second section solicited information on the familiarity of respondents with psychoactive ingredients. The third, fourth and fifth sections solicited information on specific behavioral responses, respectively; anxiety, mood disorders and depression.
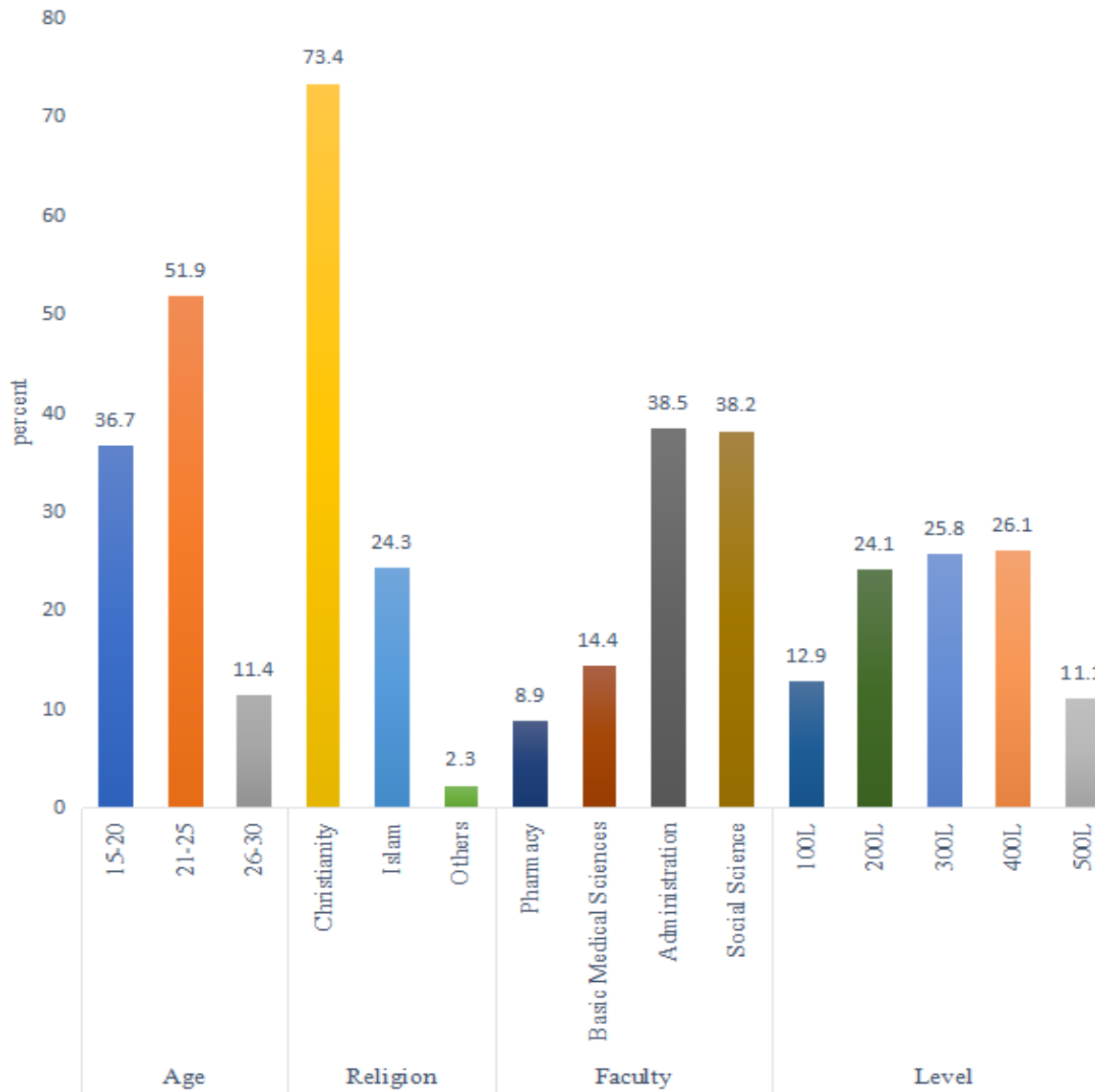
Figure 1. Demography variables of respondents.
Sources: Authors 2022

The sixth section solicited information on other possible sources of behavioral responses.

A pre-test was conducted to ascertain the internal validity and reliability of the instrument using the test-retest method by administering the questionnaire twice to the pre-test sample (students who were not included in the actual data collection). The Cronbach's alpha value was determined to be 0.74, which shows a good level of reliability of the test instrument. Identified errors were employed in making necessary adjustments in the final template of the instrument for data collection.

Data management and analysis procedure

The questionnaires were retrieved using online Google forms. The data were coded and loaded into the computer with the aid of Statistical Package for the Social Sciences (SPSS) Software (Version 23). The data was subsequently organized with descriptive statistics like frequencies, percentages and analyzed with inferential statistics like Chi Square, Kruskal-Wallis Tests and Mann Whitney test for post-hoc determinations.

Ethical considerations

Ethical clearance was obtained from the Institute of Public Health, College of Health Sciences, Obafemi Awolowo University, Ile-Ife, with the certificate number being IPH/OAU/12/1392.

RESULTS

Figure 1 shows the distribution of respondents by demographic variables. Respondents varied in age, religion, faculty and level, and these demographic

Table 1. Manifestation of behavioral responses.

Variable		Value	df	Asymptotic Significance (2-sided)
Anxiety	Pearson chi-square	8.302	6	0.217
	Likelihood ratio	9.618	6	0.142
	Linear-by-linear association	0.702	1	0.402
Mood disorders	Pearson chi-square	5.470	3	0.140
	Likelihood ratio	5.467	3	0.141
	Linear-by-linear association	1.942	1	0.163
Depression	Pearson chi-square	11.651	9	0.234
	Likelihood ratio	13.159	9	0.156
	Linear-by-linear association	0.759	1	0.384

Sources: Authors 2022

characteristics were organized using descriptive statistics. Ages 21 to 25 (51.9%) of the study population represented the majority while ages 26 to 30 had the least proportion (11.4%) of the population. Most of the respondents were Christians (73.4%) and were from the faculties of Administration (38.5%) and Social sciences (38.2%). The larger proportion of the respondents were in 200 (24.1%), 300 (25.8%) and 400 (26.1%) levels.

Figure 2 shows hair creams in use by respondents containing psychoactive ingredients. The percentage of hair creams in circulation containing psychoactive ingredients sum up to 12% distilled into bars shown in the chart. Morgan hair cream (4.2%) is the most popular in circulation containing psychoactive ingredients followed by DAX (2.8%) and Mega growth (2.8%) hair creams.

Table 1 shows the behavioral responses of psychoactive ingredients of hair creams used by female students (anxiety, mood disorders and depression) were not manifested significantly, with a P value greater than 0.05

Table 2 gives information about Kruskal-Wallis test on the behavioral responses of psychoactive ingredients of hair creams used by female students and academic workload across faculties. It can be seen that the behavioral responses have no relationship with the academic workload, with a P value greater than 0.05.

Table 3 shows the result of how varying academic workload by faculties is related to behavioral responses.

DISCUSSION

Consequent to one of the objectives of this study, it is true that certain percentages of hair cream (HC) in circulation contained psychoactive ingredients (PI). They accounted for 12% of the total HC in circulation according to this study. In the event that there is no PI, some female students go the extra mile to add *Cannabis sativa* to their HC. The majority of the respondents use HC. However, respondents displayed limited knowledge about the ingredients of HC they use.

Most of the respondents were not aware of the ingredients of their HC. This may be due to the respondents' lack of interest or ignorance of the behavioral responses these PI may elicit. Therefore, the majority of the respondents were not aware some ingredients in their HC were psychoactive and can affect behavioral responses. From the data of HC in circulation, Soul Mate had the highest prevalence. This is followed by El Glittas HC. However, 12% of the HC used by respondents contains PI; some of those hair creams include Dax, Kuza Indian hemp, Bergamot, and Mega growth. Soul Mate, the most commonly used HC, does not contain PI

The Pearson Chi square inferential analysis result shows that for anxiety, mood disorders and depression (significance set at p<0.05), behavioral responses due to HC were not significantly manifested across the different faculties. This result is not unexpected because 12% of the respondents use HC containing PI. Of the relatively small number of respondents that use HC containing PI, it is a possibility that such ingredients are not present in an amount enough to elicit behavioral responses. This is consistent with the study of Cappelletti et al. (2015), which state that the effects of PI are dose dependent (Cappelletti et al., 2015). The amount present is also faced with various barriers (membrane barriers, blood-brain barrier) that prevent them from gaining entry into their action site. The PI present may also exist in forms that cannot be absorbed into their site of action. This excludes some of the PI whose absorption is not limited by any barrier. Such ingredients are absorbed through the scalp skin or intranasally during the use of HC. The physical and biochemical factors responsible for these barriers have been discussed exhaustively by Nina et al. (2008) and Ogiso et al. (2002), which is further validated by this study (Nina et al., 2008; Ogiso et al., 2002).

The non-parametric Kruskal-Wallis inferential analysis was used to examine the possible relationship between behavioral responses due to PI of HC and academic
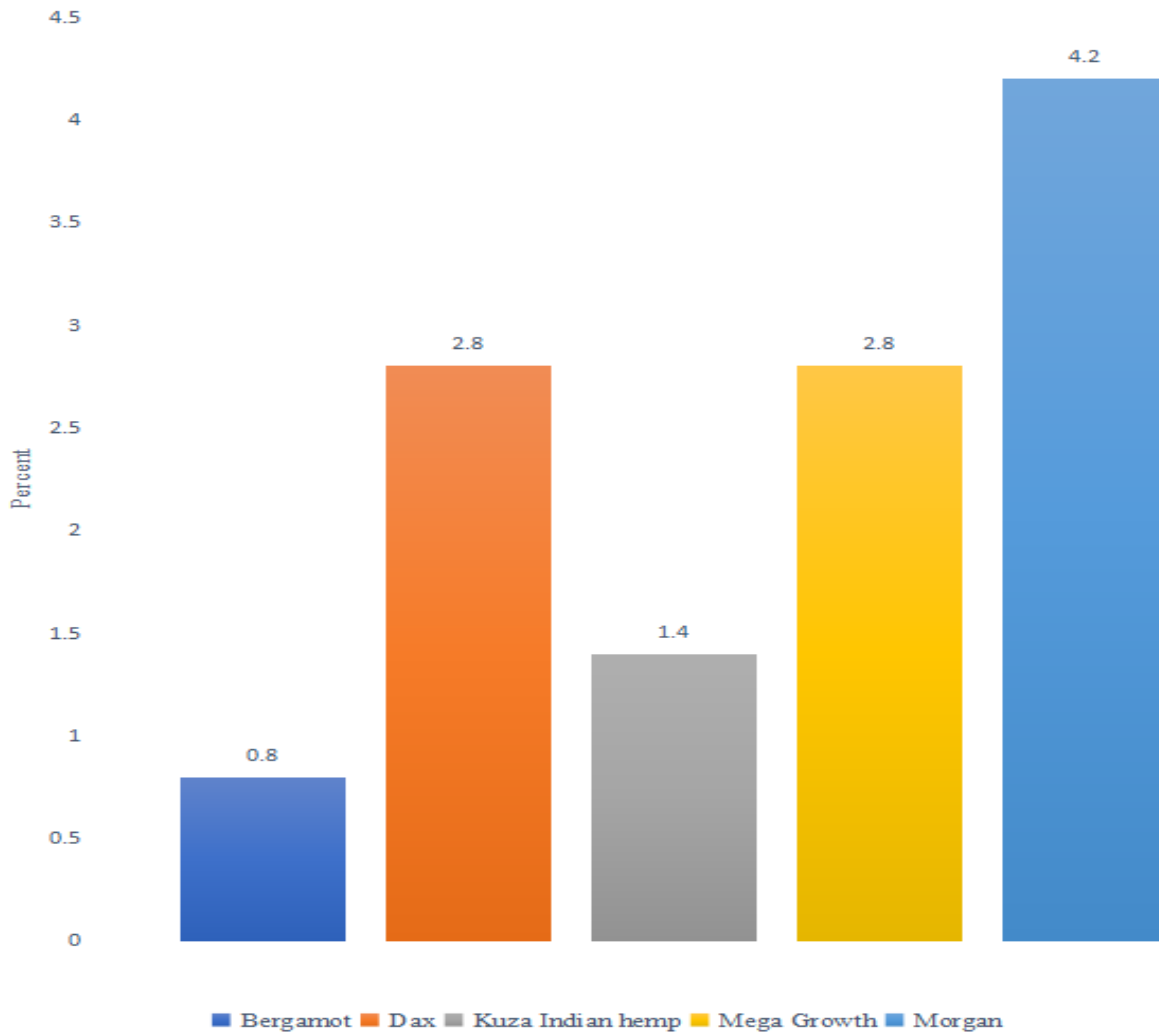
Figure 2. Hair creams containing psychoactive ingredients.
Sources: Authors 2022

Table 2. Relationship between behavioral responses and academic workload.

Variable	Anxiety	Mood disorders	Depression
Chi-Square	6.791	5.456	5.043
Df	3	3	3
Asymp. Sig.	0.079	0.141	0.169

Sources: Authors 2022

workload (stress) across the selected faculties. The analysis showed no significant relationship. To further confirm if any difference existent between any two faculty, Mann-Whitney test was carried out to determine specifically where possible relationship exist (P=0.05). The Mann Whitney test between the Faculty of Pharmacy and Faculty of Administration show a significant relationship between the manifestation of anxiety (p=0.022) and academic workload (stress). The test did not show any relationship between behavioral responses (anxiety- 0.123, mood disorders- 0.324 and depression- 0.42) and academic workload between faculties of pharmacy and social sciences. There exists a significant relationship between Faculties of Basic Medical Sciences and Administration on the basis of the academic workload (stress) in the manifestations of mood disorders (p=0.039). A significant relationship also exists between Faculties of Basic Medical Sciences and Social Sciences

Table 3. Behavioral responses with respect to academic workload comparing faculties.

Variable		Anxiety	Mood disorders	Depression
Pharmacy VS. Administration	Mann-Whitney U	2191.000	2283.500	2578.500
	Wilcoxon W	2821.000	13911.500	14206.500
	Z	-2.298	-1.522	-0.325
	Asymp. Sig. (2-tailed)	0.022	0.128	0.745
Pharmacy VS. Social sciences	Mann-Whitney U	2372.000	2398.000	2624.000
	Wilcoxon W	3002.000	13874.000	14100.000
	Z	-1.541	-0.986	-0.073
	Asymp. Sig. (2-tailed)	0.123	0.324	0.942
Basic Medical VS. Administration	Mann-Whitney U	4049.000	3638.500	3683.500
	Wilcoxon W	5702.000	15266.500	5336.500
	Z	-1.000	-2.069	-1.917
	Asymp. Sig. (2-tailed)	0.317	0.039	0.055
Basic medical VS. Social science	Mann-Whitney U	4049.000	3638.500	3683.500
	Wilcoxon W	5702.000	15266.500	5336.500
	Z	-1.000	-2.069	-1.917
	Asymp. Sig. (2-tailed)	0.317	0.039	0.055

Sources: Authors 2022

on the basis of academic workload (stress) in the manifestations of mood disorders (p=0.039). It is possible that the non-significance in the relationship between behavioral responses and academic workload (stress) of the Faculty of Pharmacy and Administration may be due to the development of adaptive stress management mechanisms by female students of Faculty of Pharmacy due to the type of academic calendar. These adaptive stress management mechanisms may be lacking or overstretched in female students of the Faculty of Basic Medical Sciences who run a unique academic calendar that run into the holidays for a clinical clerkship. This is in agreement with Shadi et al. (2017), who discussed the adaptive stress management mechanisms.

The results also showed that a direct relationship between academic workload and manifestations of behavioral responses due to PI of HC does not exist. Data from this study gives information about possible predisposing factors to manifestations of behavioral responses other than PI of HC such as the addition of powdered Indian Hemp to HC as claimed by 18.2% of the respondents, 39.7% of the respondents take energy drinks, 40% of the respondents take Nescafe, 61.3% of the respondents take caffeinated drinks and 70.4% of the respondents claim to be under pressure (academics, family, financial and others). These predisposing factors are beyond the scope of this study. Some of these predisposing factors (neurobiological, environmental and social factors) have been mentioned by Crippa et al. (2009).

However, it is noteworthy that limited studies exist on behavioral responses due to psychoactive ingredients administered via routes (transdermal/transfollicular) of psychoactive ingredients of hair creams. Therefore, the similarity and consistency of this study with other studies on behavioral responses due to psychoactive ingredients via other routes are not straightforward.

Conclusion

Of the hair cream products in circulation, those free of psychoactive ingredients account for around 88% while those containing psychoactive ingredients account for only 12%. Bergamot (0.8%), Dax (2.8%), Kuza Indian Hemp (1.4%), Mega growth (2.8%) and Morgan hair cream (4.2%) are the most popular amongst users. The results also revealed that there was insufficient evidence to conclusively link the usage of hair treatments containing psychoactive substances by female students with their behavioral responses, as shown by a P value greater than 0.05. Furthermore, there was no proof that heavy academic load contributed to mood problems, anxiety, or sadness across the different faculties. Though several female students went above and beyond to include Cannabis sativa in their HC, some also showed a lack of expertise regarding the HC components they employ. This can be as a result of the respondents' disinterest or lack of knowledge of the behavioral responses these PI may induce.

CONFLICT OF INTERESTS

The authors declare that there was no conflict of interest.

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