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Psychodermatologic pathology in adolescents: findings from the Colombian National Mental Health Survey

Abstract

Background: Associations between mental health and dermatology have generated a new branch of study called psychodermatology, which includes relevant conditions to the adolescent population. However, there is limited research focusing on this field and this specific population.
Objective: To estimate the prevalence of dermatological pathologies in the Colombian adolescent population and their possible associations with mental health conditions.
Methods: We performed a secondary analysis of the Colombian National Mental Health Survey results. A representative sample of the adolescent Colombian population answered questions regarding dermatological conditions and mental health disorders. We estimated the prevalence and evaluated associations using the chi squared independence test.
Results: Of 1753 adolescents, 8.3% (CI95%=[6.8–10.1]) had dermatitis or skin allergies and 4.5% (CI95%=[3.3–6.1]) acne. For dermatitis, we found associations with age, education, and family dysfunction (p-Values=0.024; <0.001; 0.046 respectively). Acne was associated with age, sex, educational level, the number of social groups involved in, alcohol consumption, psychoactive substances use and previous violent experiences (respective p-Values=0.007; 0.004; 0.005; 0.036; 0.002; 0.003; 0.044). Regarding mental health, dermatological conditions were associated with depression, affective disorders, suicide attempt and suicide ideation.
Conclusion: Our results are the first to describe the prevalence of these disorders in Colombia. This is an exploratory study; nonetheless, it is of great value since it is the first to describe these associations in adolescents in a middle-income country, which should be considered during clinical examinations. Further longitudinal studies evaluating possible causal relationship between psychiatric and dermatological conditions are fundamental to establish causal links.

Keywords: acne vulgaris; adolescent psychiatry; dermatitis; dermatology; mental health.

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Background

The skin and the nervous system are closely related. Both share a common embryonic origin (the ectoderm) and function under the influence of the same hormones and neurotransmitters. In part, this explains why some conditions present simultaneously neurological and dermatological symptoms (e.g., neurofibromatosis, tuberous sclerosis, etc.) [1] and why some psychiatric and dermatological illnesses are so closely related. This linkage between mental and dermatological health, prompted the development of a new field in medical research called psychodermatology, or psychocutaneous medicine, which holds a great potential impact in clinical practice. The skin works as a main interface of the body with the external environment that, if affected, can impair the normal functioning of an individual in society, increasing the risk of psychological problems [2]. Strikingly, as many as 30–60% of patients with dermatological conditions present some type of psychiatric problem [3]. However, physicians

tend to overlook psychiatric features delaying the early commencement of possible treatments [4].

On the other hand, adolescents go through major social, physical and psychological changes [5] that make them particularly vulnerable to both psychiatric and dermatological illnesses, which often impact their mental health and well-being [6]. The high incidence of certain pathologies in this age group, such as acne [7, 8] relates to depression, anxiety, social phobia, low self-esteem, suicidal ideation and reduced quality of life [1, 9, 10]. Other conditions often accompanied by dermatological manifestations include: eating disorders, post-traumatic stress disorder (PTSD) [11] and anxiety disorders [10]. Likewise, dermatological conditions related to mental disorders, such as suicide or depression, include acne, psoriasis and atopic dermatitis (AD) [12–14].

Worldwide, studies suggest that the psychosocial impact of dermatological diseases depends on several factors: the natural history of the disease, sociodemographic characteristics, personality traits, family background and the culture of patients [15]. These provide an opportunity for early management and prevention and therefore show the importance of research on this field and it's potential. Moreover, the increasing incidence of dermatological and mental conditions such as suicide [12, 16], as well as their co-occurrence [3], compels research groups to evaluate preventive and therapeutic strategies relatively fast.

Considering that there are no studies evaluating the prevalence of these conditions in the Colombian context, our aim is to describe the association between dermatological and mental illnesses in the adolescent population in Colombia.

Methods

Population

We carried out a secondary analysis of the 2015 Colombian National Mental Health Survey (NMHS) in a sample of adolescents aged 12–17. The NMHS was applied to a subsample extracted from a master sample used in public health studies in Colombia. The latter, was elaborated and updated by the Ministry of Health and Social Protection (MHSP) from Colombia [17], and has representativeness at both, national and regional level.

Acne and dermatitis measurement

Adolescents with acne or any kind of dermatitis were identified through the following questions: "Have you ever been told by a doctor or any other health professional that you have very noticeable acne or

that it does not improve with treatment?" and "Have you ever been told by a doctor or any other health professional that you have dermatitis or skin allergies?."

Sociodemographic characteristics

The questionnaire included general variables such as sex, age, schooling, educational level, region of residence and area of residence (rural or urban). To better understand the background of the adolescents we explored their experiences regarding traumatic events, participation in cultural groups, psychoactive substances consumption, feelings of discrimination or rejection and changes of residence due to violence. The presence of family dysfunction and poverty were evaluated using the family APGAR [18] and the multidimensional poverty index (IPM) [19], respectively.

Mental health

To evaluate alcohol consumption, the AUDIT tool created by the World Health Organization (WHO) was used. Initially, we completed the AUDIT-C version, an alcohol abuse screening tool that classifies individuals as risky drinkers, individuals with a probable dependency, individuals with excessive consumption, or none of the aforementioned [20]. If the participant had a positive AUDIT-C, we then completed the full version. This instrument has been validated in the adolescent population in Colombia. With the cutoff points that we used for risky consumption (8–19 for males and 6–19 for females) and for probable alcohol dependency (>20) this tool has shown a sensitivity and a specificity, both above 93% [21, 22]. The presence of any lifetime mental disorder was studied through the electronic version of the Composite International Diagnostic Interview (CIDI-CAPI 3.0). The reliability of this instrument has also been studied in Colombia. Although, the psychometric properties of this tool vary according to the specific disorder evaluated, in general, the specificity of this tool is 90% or higher and the sensitivity is only greater than 90% for the detection of abuse disorders. Given its reliability and usability, researchers recommend its use in national mental health surveys [23]. Among the disorders we included major and minor depressive disorder, dysthymia, mania, hypomania, generalized anxiety disorder, panic, social phobia and lastly, the suicidal ideation dimension, which contained three different tiers. The results of these tools were dichotomized into two groups: anxiety disorders and affective disorders. To evaluate if the individuals presented symptoms of depression and PTSD, the self-administered questionnaire (SQR), also elaborated by the WHO [24], and the Post-Traumatic Stress Disorder Checklist modified for a civil population (PCL-C) were used [25]. Both with a sensitivity and specificity of approximately 80% [26, 27].

Statistical analysis

We estimated the percentage of people with dermatitis, skin allergies or acne, with their corresponding 95% confidence interval, using the linearization method through the Taylor series for variance estimation for complex surveys. The association between dermatological conditions and demographic and mental health characteristics was evaluated using the Pearson's χ^2 test of independence, corrected by the second order method of Rao and Scott [28]. All analyses were performed using STATA 15.

Ethical statement

The Institutional Ethical Committee of the Pontificia Universidad Javeriana and the Hospital San Ignacio approved the NMHS prior to this research according to the Helsinki declaration. The current study is a secondary analysis of the NHMS and therefore did not demand a new ethical approval.

Results

Out of the total individuals surveyed during the 2015 NMHS, 1753 adolescents answered questions about dermatological pathologies. Of these, 8.3% (95% CI=6.8–10.1) had dermatitis or skin allergies and 4.5% (95CI%=3.3–6.1) had very noticeable acne, or acne that did not improve with treatment.

Tables 1 and 2 show the distributions of demographic characteristics and consumptions patterns of adolescents with dermatitis and acne, respectively. We found associations between dermatitis and age, educational level, and family disfunction. Among those with dermatitis, a third were 17 years old, the majority had completed secondary education (schooling did not associate) and presented severe or moderate family disfunction. No differences were found in the consumption of psychoactive substances or alcohol consumption.

For those with acne, most were males aged 15, 16 and 17. They were involved in two or more cultural groups of their communities and similarly to those with dermatitis, a higher proportion of individuals had attended secondary school. Alcohol consumption was an associated factor in this group because a greater number of adolescents were at-risk drinkers or excessive alcohol consumers, also more individuals reported consumption of alcohol and marihuana if acne was present. We observed that changing of residence due to violence was more common in the group of adolescents without acne and that the perception of discrimination or rejection was not higher in individuals with this condition.

In terms of mental health and dermatitis we found a greater proportion of individuals presenting four or more depressive symptoms according to the SRQ and a four-time greater proportion of affective disorders in their lifetime than those without dermatitis. Table 3 shows these results.

Table 4 displays possible associations of acne with other mental health outcomes. We solely evidenced an association between acne and suicide attempt and suicide ideation. However, even if a smaller proportion of individuals with acne reported suicide attempt and suicide ideation, when we observe the absolute frequency, only one individual answered this way. This is a consequence of the statistical weight attributed to this individual.

Discussion

Psychodermatology focuses on the association between two growing conditions: dermatological and mental conditions [3]. This study aimed to estimate the prevalence of dermatological illnesses and describe their association with mental illnesses in the Colombian adolescent population. Overall, we found prevalence of 8% for dermatitis and of 4% for acne in adolescents. Additionally, we observed different associations of both conditions with sociodemographic features and mental health illnesses.

Both acne and atopic dermatitis are among the most common dermatological diseases in the world, the first one mainly affects adolescent population whilst the second accounts for one in three visits to dermatological primary care services [29, 30]. In our results the proportion of adolescents with dermatitis and acne was lower than the ones described by other local and international studies. A study made in three Colombian cities estimated a prevalence of atopic dermatitis in patients aged 13 and 14 of 14.5%, which is significantly higher than the one found in our study -especially considering that the question we asked included other dermatological conditions-. International findings have shown a growing prevalence of atopic dermatitis both in low and high income countries and estimate its distribution as follows: 20–30% in children, 3–10% in adults [31] and up to 40% in adolescents [32–34]. However, data on its prevalence in adolescents is scarce maybe because this condition tends to fade in late childhood [35] and it's complicated to study given the heterogeneity of the diagnosis criteria and clinical manifestations [36].

Age-wise, our findings revealed a higher prevalence of dermatitis and other dermatological conditions in older adolescents, mainly 17-year-old. This has also been described in studies completed in China, where a higher prevalence of both dermatitis and urticaria was observed in 18-year-old adolescents [37]. Age may also explain the differences we found in educational levels, in which, most of those with dermatitis had completed secondary education because older adolescents are more likely to have reached this educational stage. Regarding family dysfunction, we observed a higher proportion of adolescents with dermatitis in the group of severe or moderate family dysfunction this has also been observed in other studies. These reports consider that family dysfunction is mainly due to conditions of the caregiver such as sleep

Table 1: Demographic and consumption characteristics in adolescents with dermatitis or skin allergies.

									Dermatitis or skin allergies	
			Yes			No			Total	p-Value
	%	n	IC95%	%	n	IC95%	%	n	IC95%	
Age										
12	16.4	27	[10.4, 24.9]	16.8	246	[14.3, 19.5]	16.8	273	[14.4, 19.4]	0.024
13	15.8	24	[9.2, 25.7]	17.1	294	[14.4, 19.9]	17.0	318	[14.4, 19.7]	
14	13.3	18	[7.4, 22.6]	15.8	261	[13.5, 18.3]	15.6	279	[13.4, 18.0]	
15	16.0	31	[9.7, 24.9]	16.9	268	[14.3, 19.8]	16.8	299	[14.3, 19.5]	
16	8.1	18	[4.6, 13.7]	16.7	257	[14.2, 19.4]	16.0	275	[13.7, 18.4]	
17	30.3	39	[21.7, 40.5]	16.8	270	[14.3, 19.4]	17.9	309	[15.5, 20.5]	
Sex										
Male	42.3	62	[32.5, 52.6]	50.1	785	[46.6, 53.6]	49.5	847	[46.1, 52.8]	0.155
Female	57.7	95	[47.3, 67.4]	49.9	811	[46.3, 53.3]	50.5	906	[47.2, 53.8]	
Region										
Central	29.4	40	[20.9, 39.6]	23.5	290	[20.5, 26.7]	24.0	330	[21.1, 27.1]	0.500
Atlantic	17.4	27	[10.9, 26.4]	24.3	385	[21.5, 27.2]	23.7	412	[21.1, 26.5]	
Bogota	13.0	29	[8.04, 20.3]	14.6	271	[12, 17.5]	14.4	300	[12.0, 17.2]	
Oriental	23.4	40	[15.7, 33.3]	20.6	370	[17.9, 23.5]	20.8	410	[18.2, 23.6]	
Pacific	16.8	21	[10.1, 26.5]	17.1	280	[14.8, 19.5]	17.1	301	[14.9, 19.4]	
Area										
Urban	78.1	132	[67.7, 85.8]	73.6	1229	[70.3, 76.6]	74.0	1361	[70.8, 76.8]	0.380
Rural	21.9	25	[14.2, 32.2]	26.4	367	[23.3, 29.6]	26.0	392	[23.1, 29.1]	
Educational level										
None/Primary	53.4	86	[43.1, 63.3]	63.7	1029	[60.2, 67.1]	62.9	1115	[59.6, 66.0]	<0.001
Secondary	44.8	68	[34.8, 55.0]	36.2	566	[32.9, 39.6]	36.9	634	[33.7, 40.2]	
Technical	1.9	3	[0.41, 8.0]	0.0	1	[0.004, 0.23]	0.2	4	[0.05, 0.68]	
Schooling										
Yes	87.4	141	[78.7, 92.8]	86.2	1362	[83.7, 88.3]	86.3	1503	[83.9, 88.3]	0.762
No	12.6	16	[7.19, 21.23]	13.8	234	[11.6, 16.2]	13.7	250	[11.6, 16.0]	
Family dysfunction										
None	80.7	123	[71.2, 87.6]	84.5	1323	[81.9, 86.6]	84.2	1446	[81.7, 86.2]	0.046
Mild	7.7	19	[4.4, 12.9]	10.1	172	[8.3, 12.2]	9.9	191	[8.2, 11.8]	
Moderate	5.4	9	[2.4, 11.4]	3.6	65	[2.5, 5.0]	3.8	74	[2.7, 5.1]	
Severe	6.2	6	[2.0, 17.1]	1.8	36	[1.1, 2.8]	2.2	42	[1.4, 3.3]	
Have you suffered at least one traumatic event										
No	64.7	95	[54.7, 73.6]	72.6	1131	[69.5, 75.4]	71.9	1226	[69.0, 74.6]	0.105
Yes	35.3	62	[26.3, 45.2]	27.4	465	[24.5, 30.4]	28.1	527	[25.3, 30.9]	
Number of groups in which you participate										
None	52.5	81	[42.3, 62.5]	53.9	881	[50.3, 57.3]	53.7	962	[50.4, 57.0]	0.405
One group	35.3	55	[26.1, 45.6]	38.5	586	[35.1, 41.9]	38.2	641	[35.0, 41.5]	
Two groups	8.7	15	[4.7, 15.3]	5.8	95	[4.4, 7.5]	6.1	110	[4.7, 7.7]	
Three or more groups	3.5	6	[1.3, 8.8]	1.8	31	[1.1, 2.8]	2.0	37	[1.3, 2.9]	
Alcohol problems										
Excess consumption	4.5	5	[1.7, 11.1]	2.4	37	[1.5, 3.6]	2.6	42	[1.7, 3.8]	0.123
At-risk drinker	4.8	7	[1.8, 12.1]	2.0	42	[1.3, 2.9]	2.2	49	[1.5, 3.2]	
Probable alcohol dependency	0.3	1	[0.03, 1.8]	0.2	2	[0.04, 0.76]	0.2	3	[0.05, 0.68]	
None of the above	90.4	144	[82.3, 94.9]	95.4	1515	[93.9, 96.5]	95.0	1659	[93.5, 96.1]	
Lifetimes psychoactive substance consumption										
None	69.6	114	[59.5, 78.0]	76.5	1232	[73.2, 79.5]	75.9	1346	[72.8, 78.7]	0.178
Cigarette	0.5	1	[0.07, 3.7]	1.6	21	[0.93, 2.6]	1.5	22	[0.88, 2.4]	
Alcohol	23.6	34	[16.1, 33.2]	18.5	286	[15.7, 21.6]	19.0	320	[16.3, 21.9]	
Marihuana	5.5	6	[2.2, 12.9]	2.6	40	[1.6, 3.8]	2.8	46	[1.9, 4.09]	
Others	0.7	2	[0.16, 3.2]	0.8	17	[0.44, 1.4]	0.8	19	[0.45, 1.4]	
12-Month psychoactive substance consumptions										
None	2.0	1	[0.27, 13.1]	6.0	15	[3.2, 10.8]	5.6	16	[3.1, 9.9]	0.679
Cigarette	–	0	–	3.9	11	[1.8, 7.9]	3.5	11	[1.6, 7.1]	

Table 1: (continued)

									Dermatitis or skin allergies	
		Yes			No			Total	p-Value
	%	n	IC95%	%	n	IC95%	%	n	IC95%	
Alcohol	86.8	33	[68.9, 95.1]	80.2	253	[73.2, 85.7]	80.9	286	[74.5, 86.0]	
Marihuana	9.3	3	[2.5, 28.4]	8.1	25	[4.5, 13.7]	8.2	28	[4.8, 13.4]	
Others	1.9	1	[0.25, 12.5]	1.8	6	[0.65, 4.5]	1.8	7	[0.72, 4.2]	
Poverty										
No poverty	76.5	129	[66.4, 84.2]	75.5	1238	[72.3, 78.3]	75.6	1367	[72.5, 78.3]	0.833
Poverty	23.5	28	[15.7, 33.6]	24.5	358	[21.6, 27.6]	24.4	386	[21.6, 27.4]	
Have you ever felt discriminated or rejected										
Yes	12.9	32	[8.5, 18.8]	12.1	200	[9.9, 14.5]	12.1	232	[10.1, 14.4]	0.779
No	87.2	125	[81.1, 91.4]	87.9	1396	[85.4, 90.0]	87.9	1521	[85.5, 89.8]	
Change of residency due to violence										
Yes	7.8	7	[3.0, 18.7]	17.9	95	[13.9, 22.7]	16.9	102	[13.2, 21.3]	0.066
No	92.2	48	[81.2, 96.9]	82.1	410	[77.2, 86.0]	83.1	458	[78.6, 86.7]	

*Bivariate analysis with chi-square test to compare adolescent with and without dermatitis, significant at p<0.05 (italics).

deprivation, excess of dedication to the patient's care and to the related costs of the disease [36]. With this in mind, we can infer that a relationship between dysfunction and dermatitis exist. However, we are not able to specify the causal direction. The stress produced by the dysfunction could generate cutaneous manifestations, which in turn may cause more stress and dysfunction [3]. We did not find differences between poverty or not, although differences have been found between socioeconomic levels in other contexts [37].

In the case of acne, the prevalence we found was low, perhaps because our question inquired only about severe cases. Despite this, other international reports agree with our findings. Other possible cause of this heterogeneity is that the prevalence may vary according to age ranges used to define adolescence, which in our case was 12–17 years old [29]. Most of our population was males aged between 15 and 17, which is coherent with the natural history of acne, since its incidence tends to rise after the age of 16 and affects men in particular. This, however, is controversial and is supported by a certain number of studies but contradicted by others. The latter suggest that this gender tendency varies according to age [29, 38].

We did not find regional differences for any of the two pathologies and unlike dermatitis, we did not observe differences according to family dysfunction nor its severity categories in the acne group. The numbers of cultural groups in which the individual participated was an association exclusive to the acne population. This greater participation might be a compensating mechanism related to social difficulties experienced by patients with acne, as suggested in several studies [8, 39, 40]. However, when we

evaluated the perception of discrimination or rejection, no statistically significant differences between groups were found. This may have to do with the social norms established in our environment, in which psychological affections due to dermatological illnesses, are often criticized and judged strongly by other peers, especially in males [41, 42].

When we observed associations between mental health and other dermatological pathologies, a larger number of depressive symptoms and any lifetime affective disorders were found - findings that coincide with international research-. Atopic dermatitis, for example, has been associated with depression (as in our case) but also with anxiety disorders and alcohol consumption, nonetheless, the latter has been contradicted by a meta-analysis [43]. We did not find a direct association between anxiety disorders and dermatitis; this could be due to an insufficient sample with low cases of dermatitis. However, we did encounter a greater proportion of adolescents with dermatological conditions that also presented at least one mental health disorder in their lifetime. Regarding alcohol consumption, the evidence suggests that an association with dermatitis in adolescents and adults does not exist, although consumption of alcohol by the mother during pregnancy is associated with the presence of atopic dermatitis in the progeny [43]. Given that there is a biological plausibility, described in several studies, it is possible that studies with rigorous methods may establish a specific relationship of psychiatric pathologies and dermatological conditions like atopic dermatitis [3, 43]. Acne on the other hand, is the one dermatological pathology that may have the most information of its

Table 2: Demographic and consumption characteristics in adolescents with acne.

		Yes			No			Total		p-Value
	%	n	IC95%	%	n	IC95%	%	n	IC95%	
Age										
12	4.9	1	[0.70, 27.3]	17.3	272	[14.9, 20.0]	16.8	273	[14.4, 19.4]	0.007
13	1.4	4	[0.42, 4.2]	17.7	314	[15.1, 20.5]	17.0	318	[14.4, 19.73]	
14	13.4	11	[6.5, 25.2]	15.7	268	[13.5, 18.1]	15.6	279	[13.4, 18]	
15	21.2	11	[10.0, 39.2]	16.6	288	[14.1, 19.4]	16.8	299	[14.3, 19.5]	
16	26.4	18	[14.7, 42.5]	15.5	257	[13.2, 18.0]	16.0	275	[13.7, 18.4]	
17	32.8	24	[20.7, 47.6]	17.2	285	[14.8, 19.8]	17.9	309	[15.5, 20.5]	
Sex										
Male	70.6	45	[55.7, 82.0]	48.5	802	[45.1, 51.8]	49.5	847	[46.1, 52.8]	0.004
Female	29.4	24	[17.9, 44.2]	51.5	882	[48.1, 54.8]	50.5	906	[47.2, 53.8]	
Region										
Central	32.9	24	[20.1, 48.8]	23.6	306	[20.6, 26.7]	24.0	330	[21.1, 27.0]	0.345
Atlantic	15.5	11	[7.2, 30.0]	24.1	401	[21.4, 26.9]	23.7	412	[21.1, 26.5]	
Bogotá	15.8	9	[6.6, 33.0]	14.4	291	[11.9, 17.2]	14.4	300	[12.0, 17.2]	
Oriental	26.2	19	[14.8, 41.9]	20.6	391	[17.9, 23.4]	20.8	410	[18.2, 23.6]	
Pacific	9.6	6	[3.8, 21.7]	17.4	295	[15.2, 19.8]	17.1	301	[14.9, 19.4]	
Area										
Urban	82.8	58	[68.6, 91.3]	73.6	1303	[70.3, 76.5]	74.0	1361	[70.8, 76.8]	0.177
Rural	17.2	11	[8.6, 31.3]	26.5	381	[23.4, 29.6]	26.0	392	[23.1, 29.1]	
Educational level										
None/primary	39.8	28	[25.6, 55.8]	64.0	1087	[60.6, 67.1]	62.9	1115	[59.5, 66.0]	0.005
Secondary	60.2	41	[44.2, 74.3]	35.8	593	[32.6, 39.1]	36.9	634	[33.7, 40.2]	
Technical	–	0	–	0.2	4	[0.05, 0.71]	0.2	4	[0.05, 0.68]	
Schooling										
Yes	80.3	55	[63.9, 90.4]	86.6	1448	[84.2, 88.6]	86.3	1503	[83.9, 88.3]	0.290
No	19.7	14	[9.6, 36.0]	13.4	236	[11.3, 15.7]	13.7	250	[11.6, 16.0]	
Family dysfunction										
None	84.2	60	[66.6, 93.3]	84.2	1386	[81.7, 86.3]	84.2	1446	[81.7, 86.2]	0.536
Mild	6.7	6	[2.2, 18.0]	10.1	185	[8.3, 12.0]	9.9	191	[8.2, 11.8]	
Moderate	7.7	2	[1.5, 29.8]	3.6	72	[2.6, 4.8]	3.8	74	[2.7, 5.1]	
Severe	1.5	1	[0.20, 10.0]	2.2	41	[1.4, 3.3]	2.2	42	[1.4, 3.3]	
Have you suffered at least one traumatic event										
No	61.0	41	[44.9, 74.9]	72.5	1185	[69.4, 75.2]	71.9	1226	[69.0, 74.6]	0.120
Yes	39.0	28	[25.1, 55.0]	27.6	499	[24.7, 30.5]	28.1	527	[25.3, 30.9]	
Number of groups in which you participate										
None	47.6	31	[32.5, 63.0]	54.0	931	[50.6, 57.3]	53.7	962	[50.4, 57.0]	0.036
One group	32.5	26	[19.7, 48.5]	38.5	615	[35.2, 41.8]	38.2	641	[35.0, 41.5]	
Two groups	13.5	9	[6.1, 27.0]	5.7	101	[4.4, 7.3]	6.1	110	[4.7, 7.7]	
Three or more groups	6.4	3	[1.7, 20.7]	1.8	34	[1.1, 2.6]	2.0	37	[1.3, 2.9]	
Alcohol problems										
Excess consumption	10.2	5	[3.6, 25.4]	2.2	37	[1.4, 3.3]	2.6	42	[1.7, 3.8]	0.002
At-risk drinker	6.0	6	[2.2, 15.0]	2.0	43	[1.3, 3.04]	2.2	49	[1.5, 3.2]	
Probable alcohol dependency	–	0	–	0.2	3	[0.05, 0.71]	0.2	3	[0.05, 0.68]	
None of the above	83.8	58	[69.3, 92.1]	95.5	1601	[94.0, 96.6]	95.0	1659	[93.5, 96.1]	
Lifetimes psychoactive substance consumption										
None	55.1	39	[39.4, 69.8]	76.9	1307	[73.7, 79.8]	75.9	1346	[72.8, 78.7]	0.003
Cigarette	0.4	1	[0.05, 2.8]	1.5	21	[0.91, 2.5]	1.5	22	[0.88, 2.4]	
Alcohol	34.1	24	[21.3, 49.6]	18.3	296	[15.5, 21.2]	19.0	320	[16.3, 21.9]	
Marihuana	9.7	4	[2.6, 29.5]	2.5	42	[1.6, 3.6]	2.8	46	[1.9, 4.0]	
Others	0.7	1	[0.09, 4.6]	0.8	18	[0.45, 1.4]	0.8	19	[0.45, 1.4]	
12-Month psychoactive substance consumptions										
None	–	0	–	6.1	16	[3.3, 10.7]	5.6	16	[3.1, 9.9]	0.261
Cigarette	1.1	1	[0.14, 8.0]	3.7	10	[1.7, 7.6]	3.5	11	[1.6, 7.1]	

Table 2: (continued)

				Acne that shows a lot or that does not improve with the treatment							
	Yes			No			Total			p-Value
	%	n	IC95%	%	n	IC95%	%	n	IC95%	
Alcohol	76.3	19	[41.0, 93.7]	81.3	267	[74.9, 86.3]	80.9	286	[74.5, 86.0]	
Marihuana	20.7	3	[4.5, 59.0]	7.1	25	[4.2, 11.7]	8.2	28	[4.8, 13.4]	
Others	1.8	1	[0.23, 12.5]	1.8	6	[0.67, 4.5]	1.8	7	[0.72, 4.2]	
Poverty										
No poverty	75.0	54	[58.3, 86.5]	75.6	1313	[72.5, 78.3]	75.6	1367	[72.5, 78.3]	0.941
Poverty	25.0	15	[13.4, 41.6]	24.4	371	[21.6, 27.4]	24.4	386	[21.6, 27.4]	
Have you ever felt discriminated or rejected										
Yes	14.0	11	[5.6, 30.6]	12.1	221	[10.0, 14.4]	12.1	232	[10.1, 14.4]	0.737
No	86.0	58	[69.3, 94.3]	88.0	1463	[85.6, 89.9]	87.9	1521	[85.5, 89.8]	
Change of residency due to violence										
Yes	6.3	4	[2.1, 17.3]	17.5	98	[13.6, 22.1]	16.9	102	[13.2, 21.3]	0.044
No	93.7	26	[82.6, 97.8]	82.6	432	[77.8, 86.4]	83.1	458	[78.6, 86.7]	

*Bivariate analysis with chi-square test to compare adolescent with and without acne, significant at p<0.05 (italics).

Table 3: Mental health in adolescents with dermatitis or skin allergies.

				Dermatitis or skin allergies							
	Yes			No			Total			p-Value
	%	n	IC95%	%	n	IC95%	%	n	IC95%	
SRQ depression										
Low (1–3)	67.6	112	[56.9, 76.7]	81.0	1291	[78.2, 83.5]	79.9	1403	[77.1, 82.3]	0.0044
Medium (4–6)	27.8	35	[18.9, 38.6]	15.1	244	[12.9, 17.5]	16.2	279	[14, 18.6]	
High (7 or more)	4.6	10	[2.2, 9.1]	3.9	61	[2.6, 5.6]	3.9	71	[2.7, 5.5]	
Lifetime prevalence of any disorder										
Yes	11.6	22	[6.8, 18.9]	6.8	115	[5.3, 8.5]	7.2	137	[5.8, 8.8]	0.0663
No	88.5	135	[81.0, 93.1]	93.2	1481	[91.4, 94.6]	92.8	1616	[91.1, 94.1]	
Lifetime affective disorder										
Yes	8.8	12	[4.6, 16.0]	2.3	43	[1.6, 3.4]	2.9	55	[2.0, 3.9]	0.0002
No	91.2	145	[83.9, 95.3]	97.7	1553	[96.5, 98.4]	97.1	1698	[96.0, 97.9]	
Lifetime anxiety disorder										
Yes	6.1	14	[3.0, 11.9]	4.9	82	[3.7, 6.4]	5.0	96	[3.9, 6.4]	0.5669
No	93.9	143	[88.0, 96.9]	95.1	1514	[93.5, 96.2]	95.0	1657	[93.5, 96.0]	
Suicide attempt										
Yes	0.5	1	[0.07, 3.6]	2.6	30	[1.5, 4.4]	2.5	31	[1.48, 4.0]	0.0788
No	99.5	123	[96.3, 99.9]	97.4	1241	[95.5, 98.4]	97.5	1364	[95.9, 98.5]	
Suicide plan										
Yes	1.7	2	[0.37, 7.0]	1.8	21	[0.95, 3.2]	1.8	23	[0.98, 3.1]	0.9472
No	98.3	122	[92.9, 99.6]	98.2	1250	[96.7, 99.0]	98.2	1372	[96.8, 99.0]	
Suicide ideation										
Yes	6.9	8	[2.9, 15.2]	6.6	80	[4.9, 8.6]	6.6	88	[5.03, 8.5]	0.9027
No	93.1	116	[84.7, 97.0]	93.4	1191	[91.3, 95.0]	93.4	1307	[91.4, 94.9]	

*Bivariate analysis with chi-square test to compare adolescent with and without dermatitis and mental health conditions, significant at p<0.05 (italics).

relationship with mental health conditions, perhaps due to the great psychosocial burden that it implies [5, 39]. In patients with acne it is common to find associations with anxiety, depression, frustration, diminished self-confidence, communication difficulties, social phobia and even suicide ideation. All of these are often underestimated [8, 39, 44]. In our study we found a positive association between cannabis and alcohol consumption and the presence of acne. These results can be reliable since we used two distinct tools to evaluate alcohol

Table 4: Mental health in adolescents with acne.

				Acne that shows a lot or that does not improve with the treatment						
		Yes			**No**			**Total**		**p-Value**
	%	n	IC95%	%	n	IC95%	%	n	IC95%	
SRQ depression										
Low (1–3)	77.1	49	[63.2, 86.8]	80.0	1354	[77.2, 82.5]	79.9	1403	[77.1, 82.3]	0.6092
Medium (4–6)	16.5	13	[8.2, 30.3]	16.2	266	[13.9, 18.6]	16.2	279	[14, 18.6]	
High (7 or more)	6.4	7	[2.7, 14.3]	3.8	64	[2.6, 5.5]	3.9	71	[2.7, 5.5]	
Lifetime prevalence of any disorder										
Yes	3.7	4	[1.2, 10.4]	7.4	133	[5.9, 9.0]	7.2	137	[5.8, 8.8]	0.2006
No	96.3	65	[89.5, 98.7]	92.6	1551	[90.9, 94.0]	92.8	1616	[91.1, 94.1]	
Lifetime affective disorder										
Yes	1.2	2	[0.24, 5.3]	3.0	53	[2.1, 4.1]	2.9	55	[2.07, 3.9]	0.2278
No	98.8	67	[94.6, 99.7]	97.0	1631	[95.8, 97.8]	97.1	1698	[96.0, 97.9]	
Lifetime anxiety disorder										
Yes	3.4	3	[1.04, 10.4]	5.1	93	[3.9, 6.6]	5.0	96	[3.9, 6.4]	0.4859
No	96.6	66	[89.6, 98.9]	94.9	1591	[93.3, 96.0]	95.0	1657	[93.5, 96.0]	
Suicide attempt										
Yes	0.4	1	[0.05, 2.7]	2.6	30	[1.54, 4.2]	2.5	31	[1.48, 4.0]	0.0351
No	99.6	50	[97.2, 99.9]	97.4	1314	[95.7, 98.4]	97.5	1364	[95.9, 98.5]	
Suicide plan										
Yes	0.4	1	[0.05, 2.7]	1.8	22	[1.0, 3.2]	1.8	23	[0.98, 3.1]	0.1048
No	99.6	50	[97.2, 99.9]	98.2	1322	[96.7, 98.9]	98.2	1372	[96.8, 99.0]	
Suicide ideation										
Yes	0.4	1	[0.05, 2.7]	6.9	87	[5.2, 8.9]	6.6	88	[5.03, 8.5]	0.0001
No	99.6	50	[97.2, 99.9]	93.1	1257	[91.0, 94.7]	93.4	1307	[91.4, 94.9]	

*Bivariate analysis with chi-square test to compare adolescent with and without acne and mental health conditions, significant at p<0.05 (italics).

consumption and use of psychoactive substances, and with both instruments we found a greater proportion of pathological consumption among individuals with acne. This finding is coherent with other studies, however it has also been associated with anxiety disorder and depression, which we did not evidence in our study [45].

Despite multiple mental health pathologies being related with acne, most literature has information on its association with suicide ideation. This, at a community level, is worrying due to the increasing trend of suicides and related conditions among children and adolescents [46]. In our study we found statistically significant differences; however, our finding is contradictory with medical literature because our results suggest that having acne protects against suicide ideation or suicide attempt [31, 35, 36]. The association that we found in our study, may be spurious or might be due to a unique individual case that had an important statistical weight, as seen in the results. Studies with a larger sample and a greater number of individuals with suicide ideation, suicide planning and previous suicide attempts may reveal the true relationship between these two conditions.

Limitations

Our study was a cross-sectional study; therefore, it could not evaluate temporality. We found associations, but not causal directions of the pathologies. Additionally, the tools used could have led to biases. This is mainly because they depend on the recollection of the individuals, as well as the diagnoses of doctors in a context with important underdiagnoses.

Conclusions

This study exposes the first results of its kind in Colombia. These are roughly coherent with previous international studies and have some discrepancies, which must be evaluated by future studies with different methodologies. This is an exploratory study with great value because it is the first describing this association and presenting the prevalence of these pathologies in a representative Colombian sample. The results confirm the importance of the relationship between dermatological conditions and mental health in our environment, for which clinical

actions could be adopted by health professionals. This includes a thorough examination of the mental aspects of the patients when a dermatologic condition is present and vice-versa. Future longitudinal studies, evaluating the possible causal relationship between psychiatric and dermatological conditions are fundamental.

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