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Sociocultural influence on body, physical activity and anxiety are related to the symptomatology of muscle dysmorphia in young adults in Temuco: An exploratory analysis

Las actitudes socioculturales hacia la apariencia, niveles de actividad física y ansiedad se encuentran relacionadas con la sintomatología de dismorfia muscular en adultos jóvenes de Temuco: Un análisis exploratorio

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Abstract

Background: Muscle Dysmorphia (MDM) is characterized by an obsession with lean body composition, leading to giving up social and work activities to achieve a muscular body. In Chile, studies are limited regarding the factors associated with this condition. **Objective:** To determine the symptomatology of MDM and related factors in young adults in Temuco, Chile. **Methods:** An exploratory cross-sectional study was conducted in a sample of 101 adults between 20 and 30 years of age, to whom the ACQ, DASS21, and SATAQ4 instruments were applied. **Results:** Most of the volunteers assessed were female (57%), aged 20-25 years (89%), and physically sedentary (52%). Symptomatology of muscle dysmorphia was reported in 45.5% of the subjects, depression in 45%, anxiety in 35%, and stress in one-third of those evaluated. The only variables associated with symptomatology of MDM were active physical activity (p=.001) and anxiety (p=.013). **Conclusions:** Symptomatology of MDM was found in the young adult population of the city of Temuco, which is concretely related to sociocultural influence on the body, levels of physical activity and anxious symptomatology.

Keywords: body dysmorphic disorder, exercise, depression, anxiety, stress.

Resumen:

Antecedentes: La Dismorfia Muscular (MDM; por sus siglas en inglés) constituye un trastorno caracterizado por una obsesión con la composición corporal magra, lo que conlleva a renunciar a actividades sociales y laborales para alcanzar un cuerpo musculoso. En Chile, los estudios son limitados en cuanto a los factores asociados a esta condición. **Objetivo:** Determinar la sintomatología de MDM y los factores asociados en adultos jóvenes de la ciudad de Temuco, Chile. **Método:** Se realizó un estudio de alcance exploratorio de tipo transversal en una muestra de 101 adultos entre los 20 y 30 años, a quienes se les aplicaron los instrumentos de ACQ, DASS21 y SATAQ4. **Resultados:** Voluntarios evaluados pertenecían mayoritariamente al sexo femenino (57%), al grupo etario entre los 20-25 años (89%) y correspondían a personas físicamente sedentarias (51,5%). Se reportó sintomatología asociada a dismorfia muscular en un 46% de los sujetos, depresión en un 45%, ansiedad en un 35% y estrés en un tercio de los evaluados. Las únicas variables asociadas a MDM fueron la actividad física activa (p = ,.001) y ansiedad (p = .013). **Conclusiones:** Se encontró sintomatología asociada a MDM en población adulta joven de la ciudad de Temuco, la cual se relaciona de forma concreta con la influencia sociocultural hacia el cuerpo, los niveles de actividad física y sintomatología ansiosa.

Palabras clave: trastorno dismórfico corporal, actividad física, depresión, ansiedad, estrés

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Introduction

Muscle dysmorphia (MDM) is a disorder of the body's muscular self-perception of the body, characterized by an excessive and even pathological preoccupation with not being "muscular" enough. (Lopez-Cuautle et al., 2016). This corresponds to a subtype of body dysmorphic disorder, and people suffering from this condition tend to present compulsive behaviors about the frequency of exercise performed, extreme dietary modifications, and substance use to achieve the goal of a "neat" body at a muscular level. These behaviors can have consequences on the health of those affected because, due to the obsession with the results of physical training, they are exposed to a greater risk of bodily injury and even consumption of anabolic steroid drugs, where studies indicate a prevalence of consumption close to 50% of the affected population (González-Martí et al., 2018; Pope et al., 1997).

These situations pose an even more significant problem in the young adult population, as they present a natural barrier to healthcare devices and healthcare professionals, as they do not understand that their condition requires professional help due to normalizing the situation they face. Additionally, they are unaware that there may be suitable healthcare platforms to address their condition (Leone et al., 2005). This can become even more serious, especially since people with MDM are at risk of developing anorexia nervosa, a psychiatric disorder with the highest mortality rate of all mental health conditions (Murray et al., 2012; Van Eeden et al., 2021)

Regarding the most affected population groups, evidence points to men and athletes who actively train to improve their physical appearance exclusively, as is the case of bodybuilders. However, this assertion is under discussion as the prevalences detected vary considerably (3.4%-53.6%) (Behar Rosa & Molinari Daniela, 2010), and there are even reports that indicate that functional training athletes present a concern for body image similar to competitive bodybuilders (Pickett et al., 2005). In the same vein, there are also publications that question whether this is a condition exclusively of male subjects since the demands of sociocultural appearance, the frequency of aerobic exercise, and bodybuilding have been identified as factors associated with dysmorphic symptomatology in women as in men (Hale et al., 2013; Mitchison et al., 2022; Readdy et al., 2011). The cross-cutting nature of this phenomenon is of concern, as reports indicate that people with MDM have worse metrics of introspection, anxiety, and social and affective regulation than people with obsessive-compulsive disorder (Malcolm et al., 2018). In turn, some studies have indicated a higher risk of eating disorders (r = .47

p<.001) (Castro et al., 2013), orthorexia nervosa, and emotional dependence in subjects with MDM (Cerea et al., 2022).

In this line and considering that the prevention of MDM in population groups at risk is the best strategy for action against the phenomenon in question, it is essential to identify the variables associated with its prevalence and thus establish possible candidates for risk factors that may help in the future to reduce MDM in the national population. In Chile, the prevalence has been evaluated in university medical students who do not attend gyms (Behar Rosa & Molinari Daniela, 2010), obtaining lower prevalence than bodybuilders (10-13% vs. 20%), to other international populations. Also, university gym users in Temuco obtained higher prevalence(45%)(Valdés Badill et al., 2013) but with a different instrument than Behar & Molinari's study. However, evidence remains somewhat limited as no studies have been conducted on age groups other than the university population and those who do not regularly attend gyms. Furthermore, other variables of interest other than the risk of ED have not been explored, such as the influence of sociocultural stereotypes, levels of physical activity, and mood disorders, all of which are critical elements in the levels of body dissatisfaction in the population, according to international evidence. Contrasting the levels of MDM against these variables could not only contribute to a better understanding of the present phenomenon. However, it could also address the multiple needs of those affected. (Cortez et al., 2016; Martínez-Líbano et al., 2023; Olave et al., 2021).

Furthermore, it is necessary to point out that there is a significant concern about the lack of published data on body appearance disorders and eating disorders in the past five years in the Latin American population. Various articles highlight that from 2020 onwards, the number of studies conducted is minimal, and they are even concentrated only on populations from Brazil and Mexico (Andres et al., 2023; Kolar & Mebarak, 2022). In addition to this lack of information and the numerous reports indicating that ethnicity, acculturation process, and social relationships influence the alteration of body perception, it is necessary to collect data on the current situation in each South American country (Cordero et al., 2022; Quiñones et al., 2022). Against this background, the present study aimed to determine the symptomatology of muscle dysmorphia and associated factors in a sample of young adults in South Macrozone, Chile.

Methods

An exploratory cross-sectional study was carried out on the young adult population of Temuco, the capital of the Araucanía Region, part of the southern macro-zone of Chile. The sample was determined from the total adult population between 20 and 30 years of age in the locality in question according to the latest Census results (N = 51,638). The size was calculated with SurveyMonkey® software with 95% confidence and a maximum of 5% error, obtaining the sample of n = 382.

Procedure

The recruitment was conducted in person by researchers with a university education background in nutrition and dietetics. They visited two strategic points in the city of Temuco, which represent the medium-high and medium-low sectors of the locality according to the socio-demographic distribution exposed by the national socio-economic characterization survey (Ministerio de Desarrollo Social y Familia, 2023). Surveys were administered in GoogleForms® format with mobile devices between October and December 2022. Inclusion criteria were considered to be young adults of both sexes between 20 and 30 years of age living in Temuco. Regarding the exclusion criteria, we did not consider people who, despite being exclusively residents in Temuco, had work and social activities outside the city. Forms were applied to query general variables such as sex, age, and physical activity, as well as containing the instruments Adonis Complex Questionnaire (ACQ) for Muscular Dysmorphia, Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-4) for influence on beauty stereotypes and the Depression, Anxiety and Stress Scales (DASS21) to measure mood alterations.

ACQ

One of the main questionnaires that measure specific symptoms of body dysmorphia is the ACQ (Pope et al., 1997). It consists of a 13-item instrument that assesses people's dissatisfaction with their physical appearance. Responses range from 0-39 points, where response "a" corresponds to 0 points, response "b" corresponds to 1 point, and response "c" corresponds to 3 points. The scores obtained are classified according to the numerical value of the sum of the responses made, as Mild Concern (0-9 points), Moderate Concern (10-19 points), Severe Concern (20-29 points), and Possibly Pathological Concern (30-39 points). Regarding the metrics of this instrument, it has shown reliability in Spanish-speaking populations with a Cronbach's alpha of 0.880, test-retest reliability with an ICC (intraclass correlation coefficient) of 0.707 (95% confidence interval = 0.336-0.871),

and significant convergent validity with EAT-26 and EDS-R instruments (Latorre-Román et al., 2015)

SATAQ-4

It is a new adaptation of the SATAQ-3, translated into Spanish and validated by Llorente et al., 2013, at a Spanish university. It consists of a 22-item instrument with a scale from 1 (Strongly disagree) to 5 (Strongly agree). It is divided into five domains: Internalisation of the thin ideal, Internalisation of the athletic ideal, Parental pressure, Peer pressure, and Media pressure. This instrument indicates that the higher the score, the greater the sociocultural pressure toward the respondent's appearance. In evaluating this instrument within the South American population, reports highlight an intraclass correlation of 0.83 and a robust internal consistency with a Cronbach's alpha of 0.90. The confirmatory factor analysis has upheld the original five-factor structure, and the analysis of convergent validity (Pearson's r) in comparison with BSQ revealed a correlation of 0.70 (Zevallos-Delzo et al., 2020)

DASS - 21

This instrument aims to determine symptoms of depression, anxiety, and stress and has been validated in Chilean university students (Antúnez & Vinet, 2012). It is a self-administered scale with 21 items, with four response alternatives in Likert format, ranging from 0 ("does not describe anything that happened to me or that I felt during the week") to 3 ("Yes, this happened to me a lot, or almost always"), referring to the frequency of occurrence in the last week. It has three subscales (Depression, Anxiety, and Stress) that include seven items each, which must be summed and classified according to specific cut-off points (Lovibond & Lovibond, 1995)

Finally, it is essential to mention that all participants volunteered and signed informed consent before being included in the present study. Also, this work was conducted following the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of the Universidad Mayor campus in Temuco, Chile (Folio 0334).

Statistical analysis

All data obtained were processed in Microsoft Excel©, then exported and analyzed in GraphPad Prism v9.3.1 for Windows (San Diego, California, USA). To establish differences in scores according to the presence of MDM, a Student's t-test was applied for unpaired samples. The Kolmogorov-Smirnov test was used to establish significant differences ($p < .05$). To determine the association between

variables, each condition was dichotomized against the presence or absence of MDM, calculating odds ratios (OR), 95% confidence intervals (CI), and Fisher's test for estimating statistical significance ($p < .05$). In addition, a Spearman correlation was determined between the scores of each of the scales of the main variables that presented a continuous quantitative character.

Results

One hundred one-volunteers were interviewed, and the instruments above were applied using a digital device. The majority of them were female (57%), aged between 20-25 years (89%), and physically sedentary (52%) (Table 1). About the instruments applied, symptomatology of muscle dysmorphia was reported in 46% of the subjects, depression in 45%, anxiety in 35%, and stress in a third of those evaluated (30%). Concerning symptomatology of MDM, there are no significant differences between the mean scores obtained when compared by gender ($p = .817$), age ($p = .503$), levels of depression ($p = .094$), and stress ($p = .051$) of the volunteers, where the variability of scores is minimal. However, when contrasting subjects with and without anxiety (22.4 +/- 5.4 vs. 19.3 +/- 3.3: $p = .023$), as well as when comparing active versus sedentary (21.6 +/- 4.5 vs. 19.2 +/- 4.0: $p = .005$), significant differences are reported in both cases, being more concrete for the physical activity variable (Table 2).

Table 1. *Sample Characterization*

	n (%)		n (%)
Sex		**DASS-21**	
Male	44 (43.4%)	*Depression*	45 (44.6%)
Female	57 (56.6%)	*Non Depression*	56 (55.4%)
Age		*Anxiety*	35 (34.7%)
20-25	90 (89.1%)	*Non Anxiety*	66 (65.3%)
26-30	11 (10.9%)		
		Stress	30 (29.7%)
Physical activity		*Non Stress*	71 (70.3%)
Active	49 (48.5%)		
Sedentary	52 (51.5%)		
ACQ			
Muscular dysmorphia	46 (45.5%)		
Non-muscular dysmorphia	55 (54.5%)		

Table 2. Comparison of ACQ Scores across Gender, Age Groups, Physical Activity Levels, and DASS-21 Subscales

	Mean	SD	CI 95%	p-value
Sex				
Male	20.7	4.8	19.3 to 22.2	.817
Female	20.1	4.1	18.9 to 21.2	ns
Age				
20-25	20.1	4.2	19.3 to 21.0	.503
26-30	22.1	5.8	18.2 to 25.9	ns
Physical activity				
Active	21.6	4.5	20.3 to 22.9	.005
Sedentary	19.2	4.0	18.1 to 20.3	**
DASS-21				
Depression	21.2	4.5	19.9 to 22.6	.094
Non Depression	19.6	4.2	18.5 to 20.8	ns
Anxiety	22.4	5.4	20.6 to 24.3	.023
Non Anxiety	19.3	3.3	18.5 to 20.1	*
Stress	21.9	5.3	20.4 to 23.5	.051
Non Stress	19.1	3.0	18.2 to 19.9	ns

** p < 0.05, ** p < 0.01, *** p < 0.001, ns: no significant.*

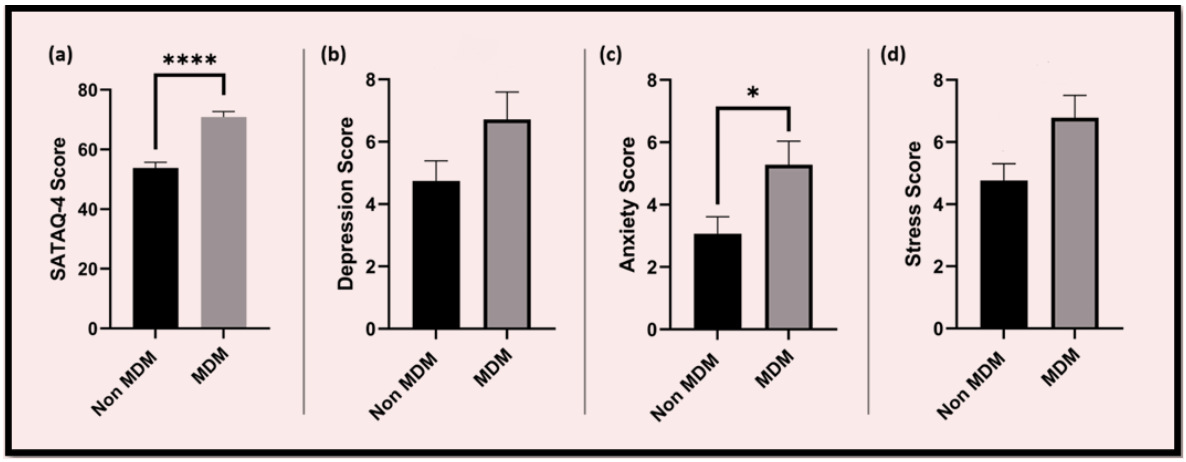
Regarding the relationship between muscle dysmorphia and the other variables evaluated (Table 3), symptomatology of MDM is higher in women than in men (52% vs. 40%), in people over 25 years of age than in younger people (55% vs. 44%) and in people with depression compared to their counterpart (53% vs. 39%), however, in none of the cases did they present significant differences (p = .314, p = .542 and p = .167, respectively). Concerning the associations with statistical significance, active physical activity was again the variable with the strongest association with MDM (OR 4.25: 95% CI 1.80 to 9.45: p=.001), followed by stress (OR 3.46: 95% CI 1.41 to 8.89: p = .008) and then anxious symptoms (OR 2.96: 95% CI 1.31 to 6.53: p = .013).

Table 3. *Comparison of MDM status across Gender, Age Groups, Physical Activity Levels, and DASS-21 subscales*

	MDM	Non-MDM	OR	CI 95%	*p-value*
Sex					
Male	23 (39.7%)	34 (60.3%)	0.62	0.29 to 1.39	.314
Female	23 (52.3%)	21 (47.7%)	1.62	0.72 to 3.43	ns
Age					
20-25	40 (44.4%)	50 (55.6%)	0.67	0.21 to 2.54	.542
26-30	6 (54.5%)	5 (45.5%)	1.50	0.39 to 4.76	ns
Physical activity					
Active	31 (63.3%)	18 (36.7%)	4.25	1.80 to 9.45	.001
Sedentary	15 (28.8%)	37 (71.2%)	0.24	0.11 to 0.56	***
DASS-21					
Depression	24 (53.3%)	21 (46.7%)	1.77	0.79 to 3.76	.167
Non Depression	22 (39.3%)	34 (60.7%)	0.57	0.27 to 1.27	ns
Anxiety	22 (62.9%)	13 (37.1%)	2.96	1.31 to 6.53	.013
Non Anxiety	24 (36.4%)	42 (63.6%)	0.34	0.15 to 0.76	*
Stress	20 (66.7%)	10 (33.3%)	3.46	1.41 to 8.89	.008
Non Stress	26 (36.6%)	45 (63.4%)	0.29	0.11 to 0.71	**

** p < 0.05, ** p < 0.01, *** p < 0.001, ns: no significant.*

When comparing the scores of the instruments applied according to the presence of symptomatology MDM, higher scores were found in all dimensions measured by both SATAQ-4 and DASS-21 for the group with severe/pathological dysmorphia (Figure 1). While for anxiety and stress symptomatology, the differences between means were not statistically significant, they were significant for anxiety and sociocultural influence by body aesthetic models (p<.05 and p<.0001, respectively).



*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Figure 1. *Sociocultural influences of body, depression, anxiety and stress across MDM symptomatology*

Finally, when analyzing whether there is a correlation between the instruments applied according to the presence of MDM (Table 4), it is reported that in the population without symptomatology of MDM, there is only a positive correlation between all the internal categories of DASS21, being moderate between anxiety and the other variables (ρ = .62: CI 95% 0.42 to 0.77: p = .000 for stress; and ρ = .69: 95% CI 0.52 to 0.81: p = .000 for depression), and strong between depression and stress (ρ = .82: 95% CI 0.70 to 0.89: p = .000). When contrasting these results with the subjects who did present MDM, correlations were also evident between each of the dimensions of the DASS21, being greater in magnitude since, in all cases, the correlations were strong with coefficients above 0.80 and statistically significant (all with p = .000). Another perceived difference is that the SATAQ-4 instrument scores correlated positively with depression and anxiety/stress, weakly and moderately, respectively.

Table 4. *Correlation between SATAQ-4 scores and DASS21 subscales according to MDM status*

Non-MDM group	SATAQ-4 Score	Depressión Score	Anxiety Score	Stress Score
SATAQ-4 Score	1.00			
Depressión Score	0.16 (-0.11 to 0.42)	1.00		
Anxiety Score	0.21 (-0.07 to 0.46)	0.69 (0.52 to 0.81)[c]	1.00	
Stress Score	0.24 (-0.03 to 0.48)	0.82 (0.70 to 0.89)[c]	0.62 (0.42 to 0.77)[c]	1.00
MDM Group	**SATAQ-4 Score**	**Depressión Score**	**Anxiety Score**	**Stress Score**
SATAQ-4 Score	1.00			
Depressión Score	0.30 (0.00 to 0.54)[a]	1.00		
Anxiety Score	0.52 (0.26 to 0.71)[c]	0.82 (0.69 to 0.90)[c]	1.00	
Stress Score	0.56 (0.32 to 0.74)[c]	0.83 (0.70 to 0.90)[c]	0.84 (0.72 to 0.91)[c]	1.00

[a] $p < 0.01$, [b] $p < 0.001$, [c] $p = 0.000$

Discussion

The present study is the first initiative to assess the symptomatology of muscle dysmorphia and its association with body stereotype influence, depression, anxiety, and stress symptoms in the general population nationally. The primary results found are worrying, as the symptomatology of MDM reported (~46%) corresponds to a similar figure to that reported for the Latin American bodybuilding population (44%) (Ruiz et al., 2012). These data posit that MDM does not exclusively affect bodybuilders but is a transversal condition of active people who attend gyms, as reported by Chilean university students (45%). This could be due to the concrete deterioration of mental health faced by the young adult population in Chile, which has worsened over the years (Alamo, 2020), and which also coincides with the levels of body dissatisfaction of the population group, with figures ranging between 35-45% according to previously published reports (Inzunza Rosales et al., 2023; Oda-Montecinos et al., 2018).

Regarding the metrics related to mood disturbances, they range between 30-45% of respondents, data that are lower than those recently published for the Chilean university population (57-70%) (Martínez-Líbano et al., 2023). Differences could be because close to 50% of respondents in the present sample constitute a physically active population, a figure well above the reality in the country (Matus-Castillo et al., 2021). The relationship between physical activity and lower levels of anxiety, depression, and stress is strongly supported by international evidence (Schuch & Vancampfort, 2021). It could explain the figures obtained in the present study.

Regarding the possible association between the variables assessed and the symptomatology of MDM, a concrete link is identified with anxiety on the part of those affected, who obtain significantly higher scores, in line with what has been described in Saudi Arabian university students (OR 2.2 – CI 95 % 1.6 to 3.2) (Hakim et al., 2021). Along the same lines, physical and social anxiety is enjoyable, which could better explain the relationship between anxious symptomatology directed at a specific dimension related to MDM. A study of university students with and without MDM established that social-physical anxiety scores, frequency of body control, and weight-bearing exercise behavior were always significantly higher for those with muscle dysmorphia (Zheng et al., 2021). It has even been proposed that social-physical anxiety acts as a concrete mediator between MDM symptomatology and body control, thus requiring further investigation of the concept, with the understanding that it plays a fundamental role in preventing and treating MDM.

In this same line, the level of physical activity was also a determinant in the ACQ scores in the present sample, as indicated by international evidence. However, it is necessary to specify that the physically active participants were gym users, a factor that the evidence positions as an element directly associated with MDM (Olave et al., 2021). This situation calls for an in-depth analysis of the role of physical activity in gyms and the limits that mark its pathological influence in conditions with MDM. Interestingly, variables such as exposure to comparison in social networks (Schneider et al., 2017) or the number of photos in worship of the physical condition exposed as interesting predictors of the risk of MDM in the context of gyms (Cuadrado et al., 2023) emerge. Both of these elements are directly related to the influence of sociocultural attitudes towards appearance determined by society, a variable assessed in the present research, which yielded higher scores for the group with MDM and a mild-moderate correlation with mood disorders than the population without MDM. This is in line with a study in young Iranian adults (Ahmadpanah et al., 2019), where higher body dysmorphia scores correlated with higher SATAQ-3 scores, confirming previous findings from a systematic review that considered 20 studies of mainly US and European populations (Holland & Tiggemann, 2016).

The set of results found situates and confirms the relationship between some of the variables evaluated and MDM, positioning the need to continue increasing the understanding of the different dimensions covered by this problem, understanding that it is not a condition exclusive to bodybuilders as was believed in previous decades. In this sense, various initiatives have arisen to mediate this situation, from local participatory diagnoses to peer-mediated interventions based on the experience of suffering MDM (Pérez-Corrales et al., 2021).

About the potential of this study, the sample considered was representative of the geographical and socio-economic heterogeneity of the population of Temuco. At the same time, it is essential to mention that nutrition and dietetics graduates applied each of the surveys, thus avoiding the possible limitations of self-reported answers. It is also necessary to indicate that the instruments used have been validated in Spanish, SATAQ4, and ACQ in the Latin American population (Castro et al., 2013; Zevallos-Delzo et al., 2020) and DASS21 in the national population (Antúnez & Vinet, 2012). Regarding the limitations, the recruitment did not reach the calculated sample size, so it is necessary to take the extrapolation of the results with caution. The failure in recruitment may stem from the absence of critical institutional stakeholders that would enable a proper approach to the target population. In this regard, the proposed on-site interview strategy was unsuitable, especially considering the number of questions and instruments involved, in addition to the

fact that the evaluation of variables such as exposure to social networks, which have strongly indicated a mediating role in both the sociocultural attitude towards body models, as well as body dissatisfaction characteristic of MDM (Holland & Tiggemann, 2016), was not considered. Given this, it would be necessary to emulate the present study by considering the use of social networks, thus obtaining less biased results by understanding the context in which young adults currently develop connectivity and mental health.

Conclusiones

The present study found a high symptomatology of MDM in the young adult population of the city of Temuco, which is concretely related to sociocultural influence on the body, levels of physical activity and anxious symptomatology. Interestingly, sociocultural attitudes towards appearance influence the relationship between symptomatology of MDM and mood disorders, establishing it as an element to be considered in treating MDM. It is necessary to confirm this relationship with studies that consider variables such as use and exposure to social networks and longitudinal designs that can confirm its role as a mediating factor in this phenomenon.

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