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Changes in sociocultural attitudes towards appearance, body image, eating attitudes and behaviours, physical activity, and quality of life in students before and during COVID-19 lockdown

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ABSTRACT

Background: The coronavirus pandemic resulted in national lockdowns that are associated with a rise in important macro-stressors for populations worldwide. The aim of the present study was to assess the impact of the COVID-19-related lockdown period on the sociocultural attitudes towards appearance, body image, eating attitudes and behaviours, physical activity, and quality of life of Lithuanian university-aged students of both genders.

Method: A total of 1850 students completed the body image, health-related behaviour and quality of life assessments three months before the first lockdown, of which 959 provided consent and an e-mail to be contacted by for further surveys. Of these 959, 230 completed the same questionnaire during the second lockdown providing the informed consent for the participation in the COVID-19-impact for the lifestyle study and use their first round data for the comparison with the lockdown. The age of the participants was 23.9 ± 5.4 years. Independent comparisons were used to test lifestyle and body image differences between men and women before and during the lockdown. Paired-sample statistics were conducted to evaluate any changes in the male and female groups separately with Cohen's *d* employed to represent effect sizes.

Results: No body image or disordered eating changes were found, however, body appearance evaluation increased in women (effect size 0.15). Significant increases in media pressures (in women, effect size 0.16) and the internalization of thin/low body fat beauty ideals (effect size 1.18–1.46) were observed during the lockdown when compared to baseline. No changes in quality of life were evident for men, however, for women, an increase in general and psychological domain was observed (effect size 0.17). We observed a significant decrease in physical activity (in men, effect size 0.46), an increase in internet browsing time (effect size 0.52–0.8), a decrease in unhealthy eating habits (effect size 0.49–0.60), an increase in sleep duration (in women, effect size 0.40) and lower self-rated health (in men, effect size 0.42) during the lockdown when compared to baseline.

Conclusions: These findings suggest that the majority of students cope with lockdown-related situation well. However, based on the Tripartite influence model, we can speculate that a drastic increase in the internalization of stereotyped thin/low body fat ideals might trigger body image concerns and increase disordered eating after the lockdown. Specific interventions helping students to decrease internalization of stereotyped body ideals, to promote positive body image and physical activity may be beneficial during and after the COVID-19-related lockdown.

1. Introduction

The COVID-19 pandemic has forced governments to impose lockdowns and has drastically changed the lifestyles of people across the globe. Mandatory self-isolation, measures of physical self-distancing and

massive restrictions on public and private life are global macro-stressors that affect mental and physical health, especially in vulnerable groups including those with body image concerns, disordered eating or obesity (Esterwood & Saeed, 2020; Fernández-Aranda et al., 2020; Jimenez et al., 2021; Marchitelli et al., 2020; Phillipou et al., 2020; Robertson

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et al., 2021; Rodgers et al., 2020). In Lithuania, the first COVID-19-related lockdown was declared on March 16th and was extended several times until June 16th, 2020. Lithuania is a country that started lockdown comparatively early (before the onset of the national outbreak), during the first wave of COVID-19 (Gerli et al., 2020; Plumper & Neumayer, 2020). The rapid spread of the contagion in autumn caused a second COVID-19 wave, resulting in a second lockdown in Lithuania starting on the 4th of November 2020.

Students represent a population experiencing enormous psychological distress relating to academic requirements, financial issues, problems associated with social support, body image issues and a health-related lifestyle (Aceijas, Waldhäusl, Lambert, & Knapstad et al., 2019; Neumark-Sztainer et al., 2018; Ribeiro et al., 2018; Whatnall, Patterson, Siew, Kay-Lambkin, & Hutchesson, 2019). Lockdown provides a natural experiment, in which new macro-stressors, such as social isolation, unemployment, fear of contagion, low academic motivation-related depression, stress, anxiety and food insecurity in students may become elevated (Christensen et al., 2021; Copeland et al., 2021), impacting students' eating behaviours, body image and quality of life. Nevertheless, there is some evidence from longitudinal studies suggesting that the mental health status of general populations may be improved during a lockdown as a result of a reduction in micro-stressors, such as decreased commuting, a reduced workload and daily hassles (Ahrens et al., 2021). Thus, the present study aimed to provide more empirical data on changes in quality of life, health-related lifestyle, eating attitudes and behaviours, body image and sociocultural attitudes towards appearance in university-aged students during the COVID-19 – related lockdown compared to the pre-lockdown situation.

The dominant sociocultural framework explaining the origin of negative body image and disordered eating is the Tripartite Influence Model (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). According to TIM, the perceived pressures from media, friends and family are related to disordered eating and the internalization of stereotyped body image, comparison of the appearance with others and body dissatisfaction are mediators in this association. Internalization of the stereotyped beauty standards (thin/low fat or muscular/athletic) refers to the adoption of these standards as the personal standards that may affect attitudes and behaviours (Schaefer, Burke, & Thompson, 2019).

Media consumption and greater daily screen-times have been associated with perceived media pressures, higher thin ideal internalization, body dissatisfaction, and poorer well-being which may lead to disordered eating and body weight increases (Rodgers, Rachel, Chabrol, & Paxton, 2011; Schaefer, Burke, & Thompson, 2019; Stieger, Lewetz, & Swami, 2021; Tylka, 2011). The large-scale studies observed significantly higher use of screen – based activities and social networks during lockdown compared to pre-lockdown situation (Jia et al., 2021; Vall-Roque, Andres, & Saldana, 2020). Based on TIM and previous findings, it is reasonable to assume that the internalization of the stereotyped beauty ideals, body image concerns and disordered eating in university aged students might be elevated during the COVID-19-related lockdown compare to pre-lockdown situation. There is lack of studies analysing changes of sociocultural attitudes towards appearance before and during the COVID-19-related lockdown. Thus, current study was aimed to provide knowledge on this issue.

Cross – sectional studies analysing the impact of lockdown on body image and eating attitudes and behaviours have reported significant associations between lockdown-related stress, body image concerns, a preoccupation with food, binge eating and dietary restriction (Earle, Prusaczyk, Choma, & Calogero, 2021; Flaudias et al., 2020; Phillipou et al., 2020; Robertson et al., 2021; Swami, Horne, & Furnham, 2021). There is some evidence that individuals with greater dysmorphic concerns express higher body image-related distress associated with lockdown outcomes, when compared to the general population (Pikoos, Buzwell, Sharp, & Rossell, 2020). Nevertheless, a longitudinal study observed no increases in disordered eating as a result of the lockdown (Martínez-de-Quel, Su). Thus, in the present study we aimed to provide

more data about the impact of the COVID-19 – related lockdown on body image and disordered eating in emerging adults. The findings of the present study might be important for the development of intervention programmes in university campuses helping students to resist socio-cultural pressures towards appearance and to promote positive body image.

Healthy nutrition habits are important for maintaining healthy body weight and are associated with positive body image (Tylka & Wood-Barcalow, 2015). The existing empirical data on lifestyle changes during lockdown are contradictory, especially in nutrition habits. Some studies demonstrated decreased unhealthy eating and fast-food consumption during lockdowns (Brancaccio et al., 2021; Kriaucioniene, Bagdonaviciene, Rodríguez-Pérez, & Petkeviciene, 2020; Laguna, Fiszman, Puerta, Chaya, & Tárrega, 2020), however, other reported unhealthier eating during confinement (Ammar et al., 2020). Thus, it is important to get more data on this topic.

Health – related physical activity is associated with more positive body image (Sabiston, Pila, Vani, & Thøgersen-Ntoumani, 2019; Souliard, Kauffman, Fitterman-Harris, Perry, & Ross, 2019). Notably, evidence regarding the impact of COVID-19-related lockdowns on physical activity is controversial. Some cross - sectional studies reported decrease in physical activity (Ammar et al., 2020; Barkley et al., 2020; Matsungo & Chopera, 2020; Meiring, Gusso, McCullough, & Bradnam, 2021; Phillipou et al., 2020) while others demonstrated the opposite (Brancaccio et al., 2021; Di Renzo et al., 2020; Robertson et al., 2021). A longitudinal study demonstrated that physical activity in the student-aged population decreased, with the highest decrease observed in the initially physically active group (Martínez-de-Quel et al., 2021). Finally, COVID-19-related lockdowns have drastically increased sitting time activity (Ammar et al., 2020; Barkley et al., 2020). Since physical activity is associated with positive body image and greater mental and physical health, we also aimed to get more knowledge on physical activity changes during the COVID-19 – related lockdown.

Research on body image, eating attitudes and behaviours and other health-related lifestyles relating to COVID-19 lockdowns is of urgent global public health need (Sallis, Adlakhia, Oyeyemi, & Salvo, 2020; Swami et al., 2021). A significant portion of the previously mentioned studies apply cross-sectional designs and methodology with retrospective recall of pre-lockdown attitudes and behaviours, which may be quite transient rather than long-lasting (Ahrens et al., 2021). Therefore, it is important for more studies to be conducted regarding assessments of important variables before and during the lockdown; the present study aims to provide more data on this issue.

The main aim of the present study was to assess the impact of COVID-19-related lockdown period on sociocultural attitudes towards appearance, body image, eating-related attitudes and behaviours, physical activity and quality of life in university-aged Lithuanian students of both genders. We also assessed self-esteem, body mass index (BMI), self-rated health, binge drinking and sleep duration since these variables are associated with body image, eating behaviours and quality of life (Agh et al., 2016; Dormal et al., 2018; Marques, Meia-Via, da Silva, & Gomes, 2017). Based on the previous findings, in the present study, we hypothesised that students demonstrate higher internalization of stereotyped beauty ideals, body image concerns, disordered eating, lower physical activity, deterioration in psychological and general quality of life during a lockdown when compared to their pre-lockdown situation.

2. Methods

2.1. Design

We implemented a pre- and post-lockdown observational study design following the STROBE guidelines for cohort studies (von Elm et al., 2014).

2.2. Participants and procedure

For the first set of testing, we used data from a previous, large study of body image, lifestyle and quality of life in Lithuanian students (Baceviciene, Jankauskiene, & Balciuniene, 2020a, 2020b) that was implemented in October 2019. Of the 1850 students who participated in this study, 959 students provided their e-mail and gave their permission to contact them regarding future studies. The answers given by these students were used in the present study as the pre-lockdown data. The students were contacted with the invitation to fill in the questionnaires during the lockdown on the 9th of February 2021. In the invitation letter, including link to the survey, students were introduced to the study aim. Students were informed that their first-round data will be used for comparison with the lockdown data. The average time of filling the survey was also indicated. Before completing the survey students were asked to give their informed consent to participate and use their first-round data for comparison by choosing an option “I agree” or “I disagree”. Over the following two weeks, non-responders received two reminders. In total, 232 students filled in the second round of questionnaires, including 184 women and 48 men. The average age of the sample was 23.9 ± 5.4 years (age range 19–39). No differences in BMI, disordered eating or lifestyle were observed between students who participated in the second point of the study and students who did not respond to the invitations.

The students completed two sets of anonymous, self-reported online surveys involving a battery of questionnaires. The surveys were realised through Google Forms web survey platform. During the lockdown, 232 questionnaires were received while 5 people refused to participate in the survey. E-mails were used to link the first and the second sets of survey answers. Two people provided different e-mails during the first and second studies and were thus removed. The final study sample of 230 participants (182 women and 48 men) who provided their answers at two measurement points was approved for statistical analysis.

2.3. Ethical considerations

The Committee for Social Sciences Research Ethics of the Lithuanian Sports University (protocol No. SMTEK-7) gave permission to implement the study. The study was conducted in accordance with the Declaration of Helsinki.

2.4. Measures

2.4.1. Sociodemographic characteristics

The participants provided information regarding their gender, age, place of residence, whether or not they were a student of a university or college and, if so, the name of their university or college.

2.4.2. BMI

BMI was calculated from the students' self-reported height and weight. BMI was calculated as body mass (kg) divided by height squared (m^2) (World Health Organization, 1997). Mean BMI of the study sample at the second round of the survey was 24.7 ± 3.9 kg/m^2 in men (range 18.4–35.1 kg/m^2) and 22.1 ± 3.2 kg/m^2 in women (range 14.7–34.1 kg/m^2).

2.4.3. Sociocultural attitudes towards appearance

The validated Lithuanian version of the Sociocultural Attitudes Towards Appearance Questionnaire-4 (SATAQ-4; Schaefer et al., 2015; Baceviciene, Migle, Jankauskiene, & Balciuniene, 2020) was used to assess the internalization of stereotyped beauty ideals. The SATAQ-4 is a 22-item self-reported instrument assessing sociocultural attitudes towards appearance, measuring: (1) media, family, and peers' pressure to attain socially stereotyped beauty ideals; (2) internalization of thin/low body fat ideals and (3) internalization of the muscular/athletic body image. The SATAQ-4 comprises five subscales, each of which is

composed of items rated on a 5-point Likert scale (1 meaning definite disagreement and 5 meaning definite agreement). The higher the score, the greater the acceptance or internalization of the dominant sociocultural standards for appearance. In the present study, the Cronbach's alpha values for general internalization; thin/low body fat internalization; muscular/athletic body internalization and pressures (family, peers, media) were 0.91, 0.89, 0.89, 0.93, 0.92 and 0.96, respectively.

2.4.4. Body image

The Lithuanian version of the Multidimensional Body–Self Relations Questionnaire–Appearance Scales (MBSRQ-AS; Brown, Cash, & Mikulka, 1990; Miskinyte & Bagdonas, 2010) was used to assess body image. The MBSRQ-AS scale comprises five subscales, with responses captured on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). The appearance evaluation scale assesses the self-perceptions of physical attractiveness (higher scores reflect greater evaluation of personal attractiveness). The appearance orientation subscale shows the level of personal investment in one's appearance (higher scores indicate greater investment). The overweight preoccupation subscale evaluates weight vigilance, dieting, fat anxiety and eating restraint (higher scores reflect greater preoccupation). The body area satisfaction subscale assesses satisfaction with particular areas of the body (higher scores indicate greater satisfaction). In the present study, Cronbach's alpha was 0.86, 0.76, 0.73, 0.83 and 0.82 for the appearance evaluation, appearance orientation, overweight preoccupation, body area satisfaction and self-classified weight subscales, respectively.

2.4.5. Disordered eating

The validated Lithuanian version of the Eating Disorder Examination Questionnaire 6.0 (EDE-Q 6.0; Fairburn & Beglin, 1994; Baceviciene, Migle, Balciuniene, & Jankauskiene, 2020) was used. The EDE-Q 6.0 is a 28-item self-reported questionnaire designed to assess behavioural and attitudinal characteristics of disordered eating. The six open-ended questions yield frequency data on the essential behavioural characteristics of eating disorders. Second, 22 attitudinal questions across four subscales produce subscale scores that reflect the severity of the eating disorder characteristics. The responses are recorded on a 7-point Likert scale from 0 (no days) to 6 (every day). Higher scores reflect greater disordered eating. In the present study, Cronbach's alpha for the general score of the scale was good, namely 0.93.

2.4.6. Dietary habits

Dietary habits were evaluated using a food frequency questionnaire containing 19 different groups of foods from the national survey of Health Behavior among Lithuanian Adult Population, 2014 (Klumbiene et al., 2015). Study participants were asked to indicate consumption frequency of each food during the past week. Response options were as follows: 0 – never; 1 – one to two times a week; 2 – three to five times a week and 3 – six to seven days a week. Additionally, a 5-item scale was used to evaluate unhealthy nutrition habits, such as eating while watching TV, eating in a rush, overeating, having unhealthy snacks and eating late at night, i.e., less than 2 h before sleep. The provided response options were from “never” up to “always”. The average of each study participant's answers was defined as their unhealthy nutrition score, which was employed for further analyses as a continuous variable; higher scores indicate a higher frequency of unhealthy eating behaviours.

2.4.7. Leisure time physical activity

Leisure time physical activity was assessed using the Leisure Time Exercise Questionnaire (LTEQ; Godin & Shephard, 1985). The LTEQ measures three different levels (mild, moderate and strenuous) of physical activity over one week. The number of bouts of mild exercise are multiplied by three, while moderate exercise bouts are multiplied by five and strenuous exercise bouts by 9, the result of which is a final

physical activity score that provides a total metabolic equivalent by each intensity level. A higher score indicates greater physical activity.

2.4.8. Quality of life

The validated Lithuanian version of The World Health Organization Quality of Life-BREF Questionnaire (WHOQOL-BREF; The Whoqol Group, 1998; Skevington, Lotfy, & O'Connell, 2004; Ducinskiene, Kalediene, Petrauskiene, & Sumskas, 2002) was used to assess quality of life in students. The instrument is an abbreviated version of the World Health Organization Quality of Life-100 (WHOQOL-100) questionnaire. The WHOQOL-BREF contains 26 items. Two questions on the overall quality of life perception and the overall understanding of health were evaluated separately. The remaining 24 items of the questionnaire comprise four domains (physical, psychological, social and environmental domains). The responses range from 1 (very dissatisfied) to 5 (very satisfied). The scores are transformed onto a scale between 0 and 100, with 0 being very poor and 100 being very good. The internal consistencies of the physical, psychological, social and the environmental domains were 0.72, 0.81, 0.78 and 0.81, respectively. Cronbach's alpha was 0.91 for the general scale.

2.4.9. Sleep duration

Sleep duration was assessed using a single question regarding a participant's sleep duration in hours per day.

2.4.10. Time browsing the internet

Time browsing the internet was assessed using a single question specifically: "On average, during your typical day, how many hours do you spend browsing the internet on your smartphone or computer for non-academic purposes and communicating in social networks?" with possibility to provide the hours.

2.4.11. Binge drinking

Binge drinking was assessed using items taken from the national survey of Health Behavior among Lithuanian Adult Population 2014 (Klumbiene et al., 2015). A single question assessing binge drinking was used: "How often do you consume six standard alcohol units per one occasion?", with the following examples of the most popular alcoholic drinks standard units. Response options were as follows: 1 – never; 2 – less than once a month; 3 – once a month and 4 – once a week or more often.

2.4.12. Self-rated health

Self-rated health was evaluated using a single question: "How would you describe your general health during the last 12 months?" There was a 4-point response scale: 1 = "poor"; 2 = "average"; 3 = "good" and 4 = "excellent".

2.4.13. Self-esteem

The Lithuanian version of Rosenberg's Self-Esteem Scale (RSES; Rosenberg, 1979) was used to assess general self-esteem in students. The RSES is composed of 10 items scored on a 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). Higher scores show greater self-esteem and general self-worth. The Cronbach's alpha was 0.90.

2.5. Statistical analysis

The independent sample *t*-test or, in the case of non-normal data distributions, the Mann Whitney *U* test were used to test lifestyle and body image differences between men and women before and during the lockdown. Paired-sample statistics (paired-sample *t*-test or non-parametric Wilcoxon test) was conducted to evaluate changes in the male and female groups separately, with the Cohen's *d* to represent effect sizes. Data are presented as means (*M*) and standard deviations (*SD*) alongside Cohen's *d* effect sizes, which were classified as small

(0.2–0.4), medium (0.5–0.6) or large (≥ 0.7). For effect size calculation, an online calculator was used https://memory.psych.mun.ca/models/stats/effect_size.shtml (last accessed on 26-02-2021).

3. Results

3.1. Sample characteristics at baseline

At baseline, the differences in lifestyle and body image between the men and women were of the expected direction (Tables 1 and 2). Women demonstrated higher thin body and general appearance internalization and more expressed perceived pressures from media when compared to men. Additionally, appearance orientation and concerns of being overweight were higher in women. Women scored better in the social domain of quality of life, whereas men scored better in self-rated health. In the male group, a higher score of leisure-time exercise was observed, whereas in the female group, the score of disordered eating behaviours was higher. There was no difference between genders in

Table 1

Comparison of the study variables between gender groups before the lockdown (*n* = 230).

Study variables	Men (<i>n</i> = 48)	Women (<i>n</i> = 182)	<i>p</i>	<i>d</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
SATAQ-4				
Total	2.09 (0.47)	2.45 (0.73)	<0.001	0.53
Thin/low body fat internalization	2.19 (0.80)	3.00 (1.08)	<0.001	0.79
Muscular/athletic body internalization	2.98 (1.00)	2.82 (0.95)	0.296	–
Pressures: family	1.65 (0.79)	1.84 (1.14)	0.172	–
Pressures: peers	1.46 (0.69)	1.58 (0.94)	0.309	–
Pressures: media	1.95 (1.24)	2.82 (1.40)	<0.001	0.64
MBSRQ-AS				
Appearance evaluation	3.37 (0.72)	3.29 (0.79)	0.504	–
Appearance orientation	3.27 (0.53)	3.54 (0.54)	0.002	0.50
Body area satisfaction	3.48 (0.69)	3.34 (0.70)	0.205	–
Overweight preoccupation	2.02 (0.78)	2.35 (0.94)	0.015	0.36
Self-classified weight	3.07 (0.69)	3.13 (0.68)	0.597	–
Quality of life (WHOQOL-BREF)				
Total	67.07 (18.02)	66.95 (11.85)	0.966	–
Physical domain	74.03 (15.95)	70.64 (13.43)	0.137	–
Psychological domain	61.81 (21.02)	61.72 (15.56)	0.979	–
Social domain	57.12 (24.13)	64.38 (20.51)	0.037	0.34
Environmental domain	67.32 (20.71)	68.53 (14.11)	0.704	–
Body mass index, lifestyle and self-esteem				
Body mass index, kg/m ²	24.20 (3.45)	21.83 (3.04)	<0.001	0.76
Leisure-time exercise score	78.77 (46.01)	62.41 (43.05)	0.022	0.38
Sleep duration, hours/day	7.33 (0.86)	7.29 (1.14)	0.787	–
Time browsing internet, hours/day	3.17 (1.73)	2.84 (1.60)	0.222	–
Self-rated health	3.13 (0.91)	2.75 (0.75)	0.004	0.48
Binge drinking	1.96 (0.92)	1.74 (0.77)	0.098	–
Unhealthy nutrition habits	2.85 (0.61)	2.84 (0.61)	0.943	–
Fast food consumption	0.88 (0.64)	0.57 (0.63)	0.004	0.49
Disordered eating (EDEQ-6)	0.85 (0.66)	1.43 (1.19)	0.008	0.53
Self-esteem	30.10 (6.26)	30.10 (5.38)	1.000	–

M = mean; *SD* = standard deviation; *p* = statistical significance; *d* = Cohen's *d* effect size; SATAQ-4 = Sociocultural Attitudes Towards Appearance Questionnaire-4; MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire–Appearance Scales; WHOQOL = World Health Organization Quality of Life Questionnaire, short version; EDEQ-6 = Eating Disorder Examination Questionnaire-6.

Table 2
Comparison of the study variables between gender groups during the lockdown (n = 230).

Study variables	Men (n = 48)	Women (n = 182)	p	d
	M (SD)	M (SD)		
SATAQ-4				
Total	2.12 (0.68)	2.47 (0.75)	0.004	0.48
Thin/low body fat internalization	3.43 (0.73)	4.02 (0.88)	<0.001	0.69
Muscular/athletic body internalization	2.82 (1.17)	2.77 (1.00)	0.798	–
Pressures: family	1.58 (0.96)	1.83 (1.12)	0.169	–
Pressures: peers	1.53 (0.75)	1.58 (0.91)	0.727	–
Pressures: media	2.27 (1.27)	3.03 (1.45)	0.001	0.54
MBSRQ-AS				
Appearance evaluation	3.28 (0.73)	3.38 (0.81)	0.446	–
Appearance orientation	3.21 (0.48)	3.49 (0.53)	0.001	0.54
Body area satisfaction	3.50 (0.63)	3.30 (0.70)	0.064	–
Overweight preoccupation	1.91 (0.70)	2.25 (0.85)	0.013	0.41
Self-classified weight	3.07 (0.74)	3.13 (0.65)	0.622	–
Quality of life (WHOQOL-BREF)				
Total	68.68 (15.96)	68.98 (12.67)	0.907	–
Physical domain	74.18 (14.96)	72.31 (13.57)	0.407	–
Psychological domain	63.28 (19.08)	64.15 (15.81)	0.747	–
Social domain	54.86 (27.28)	66.35 (22.63)	0.009	0.49
Environmental domain	71.68 (19.50)	70.36 (14.76)	0.665	–
Body mass index, lifestyle and self-esteem				
Body mass index, kg/m ²	24.66 (3.89)	22.05 (3.15)	<0.001	0.80
Leisure-time exercise score	58.77 (47.76)	56.40 (38.92)	0.721	–
Sleep duration, hours/day	7.56 (1.18)	7.76 (1.17)	0.304	–
Time browsing internet, hours/day	5.95 (3.48)	3.91 (2.10)	<0.001	0.83
Self-rated health	2.85 (0.77)	2.71 (0.76)	0.247	–
Binge drinking	2.00 (0.83)	1.82 (0.78)	0.181	–
Unhealthy nutrition habits	2.56 (0.48)	2.49 (0.59)	0.419	–
Fast food consumption	0.63 (0.64)	0.46 (0.57)	0.077	–
Disordered eating (EDEQ-6)	1.05 (0.79)	1.38 (1.14)	0.148	–
Self-esteem	30.06 (6.12)	30.14 (5.63)	0.931	–

M = mean; SD = standard deviation; p = statistical significance; d = Cohen's d effect size; SATAQ-4 = Sociocultural Attitudes Towards Appearance Questionnaire-4; MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire-Appearance Scales; WHOQOL = World Health Organization Quality of Life Questionnaire, short version; EDEQ-6 = Eating Disorder Examination Questionnaire-6.

terms of time spent browsing the internet. Before the lockdown, men consumed fast foods more frequently. During the lockdown, differences in body image and the social domain of quality of life remained the same. Men demonstrated significantly prolonged times browsing the internet and also a higher BMI, while the remaining differences in lifestyle did not reach significance.

3.2. COVID-19 impact on body image, health-related lifestyle and quality of life

During the lockdown, a dramatic increase in the internalization of thin or low body fat ideals was observed in both genders, with effect sizes of 1.46 in men and 1.18 in women (p < 0.001, Tables 3 and 4). Additionally, increased perceived media pressures were observed in women, along with an elevated mean BMI in both genders that reached significance in the female group. Moreover, there was a significant decline in the males leisure-time physical activity alongside an increased duration of time spent browsing the internet, which almost doubled with

Table 3
Comparison of study variables before and during lockdown in men (n = 48).

Study variables	Before	During lockdown	p	d
	M (SD)	M (SD)		
SATAQ-4				
Total	2.09 (0.47)	2.12 (0.68)	0.784	–
Thin/low body fat internalization	2.19 (0.80)	3.43 (0.73)	<0.001	1.46
Muscular/athletic body internalization	2.98 (1.00)	2.82 (1.17)	0.263	–
Pressures: family	1.65 (0.79)	1.58 (0.96)	0.588	–
Pressures: peers	1.46 (0.69)	1.53 (0.75)	0.539	–
Pressures: media	1.95 (1.24)	2.27 (1.27)	0.126	–
MBSRQ-AS				
Appearance evaluation	3.37 (0.72)	3.28 (0.73)	0.315	–
Appearance orientation	3.27 (0.53)	3.21 (0.48)	0.261	–
Body area satisfaction	3.48 (0.69)	3.50 (0.63)	0.798	–
Overweight preoccupation	2.02 (0.78)	1.91 (0.70)	0.365	–
Self-classified weight	3.07 (0.69)	3.07 (0.74)	1.000	–
Quality of life (WHOQOL-BREF)				
Total	67.07 (18.02)	68.68 (15.96)	0.483	–
Physical domain	74.03 (15.95)	74.18 (14.96)	0.945	–
Psychological domain	61.81 (21.02)	63.28 (19.08)	0.580	–
Social domain	57.12 (24.13)	54.86 (27.28)	0.537	–
Environmental domain	67.32 (20.71)	71.68 (19.50)	0.166	–
Body mass index, lifestyle and self-esteem				
Body mass index, kg/m ²	24.20 (3.45)	24.66 (3.89)	0.220	–
Leisure-time exercise score	78.77 (46.01)	58.77 (47.76)	0.003	0.46
Sleep duration, hours/day	7.33 (0.86)	7.56 (1.18)	0.175	–
Time browsing internet, hours/day	3.17 (1.73)	5.95 (3.48)	<0.001	0.80
Self-rated health	3.13 (0.91)	2.85 (0.77)	0.008	0.42
Binge drinking	1.96 (0.92)	2.00 (0.83)	0.710	–
Unhealthy nutrition habits	2.85 (0.61)	2.56 (0.48)	0.002	0.49
Fast food consumption	0.88 (0.64)	0.63 (0.64)	0.044	0.30
Disordered eating (EDEQ-6)	0.85 (0.66)	1.05 (0.79)	0.074	–
Self-esteem	30.10 (6.26)	30.06 (6.12)	0.964	–

M = mean; SD = standard deviation; p = statistical significance; d = Cohen's d effect size; SATAQ-4 = Sociocultural Attitudes Towards Appearance Questionnaire-4; MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire-Appearance Scales; WHOQOL = World Health Organization Quality of Life Questionnaire, short version; EDEQ-6 = Eating Disorder Examination Questionnaire-6.

an effect size of 0.80. A deterioration in men's self-rated health was also observed, likely as an effect of the lifestyle changes. Women demonstrated longer sleep durations and longer times browsing the internet during lockdown, the latter increasing, on average, by 1 h with an effect size of 0.40. Both genders demonstrated decreased frequencies of unhealthy nutritional habits during the lockdown, whereas men also reported less frequent fast-food consumption. No other changes in students' dietary habits were observed before and during the lockdown. Additionally, there were slight changes in the positive direction in females' overall quality of life, psychological domain and appearance evaluation, all with the small effect sizes.

4. Discussion

The aim of the present study was to assess the impact of the COVID-19-related lockdown period on the sociocultural attitudes towards appearance, body image, eating attitudes and behaviours, physical activity and quality of life of Lithuanian university-aged students of both

Table 4
Comparison of study variables before and during lockdown in women (n = 182).

Study variables	Before	During lockdown	p	d
	M (SD)	M (SD)		
SATAQ-4				
Total	2.45 (0.73)	2.47 (0.75)	0.800	–
Thin/low body fat internalization	3.00 (1.08)	4.02 (0.88)	<0.001	1.18
Muscular/athletic body internalization	2.82 (0.95)	2.77 (1.00)	0.475	–
Pressures: family	1.84 (1.14)	1.83 (1.12)	0.840	–
Pressures: peers	1.58 (0.94)	1.58 (0.91)	0.985	–
Pressures: media	2.82 (1.40)	3.03 (1.45)	0.031	0.16
MBSRQ-AS				
Appearance evaluation	3.29 (0.79)	3.38 (0.81)	0.037	0.15
Appearance orientation	3.54 (0.54)	3.49 (0.53)	0.134	–
Body area satisfaction	3.34 (0.70)	3.30 (0.70)	0.390	–
Overweight preoccupation	2.35 (0.94)	2.25 (0.85)	0.074	–
Self-classified weight	3.13 (0.68)	3.13 (0.65)	0.861	–
Quality of life (WHOQOL-BREF)				
Total	66.95 (11.85)	68.98 (12.67)	0.024	0.17
Physical domain	70.64 (13.43)	72.31 (13.57)	0.121	–
Psychological domain	61.72 (15.56)	64.15 (15.81)	0.022	0.17
Social domain	64.38 (20.51)	66.35 (22.63)	0.262	–
Environmental domain	68.53 (14.11)	70.36 (14.76)	0.107	–
Body mass index, lifestyle and self-esteem				
Body mass index, kg/m ²	21.83 (3.04)	22.02 (3.15)	0.009	0.12
Leisure-time exercise score	62.41 (43.05)	56.40 (38.92)	0.096	–
Sleep duration, hours/day	7.29 (1.14)	7.76 (1.17)	<0.001	0.40
Time browsing internet, hours/day	2.84 (1.60)	3.91 (2.10)	<0.001	0.52
Self-rated health	2.75 (0.75)	2.71 (0.76)	0.425	–
Binge drinking	1.74 (0.77)	1.82 (0.78)	0.179	–
Unhealthy nutrition habits	2.84 (0.61)	2.49 (0.59)	<0.001	0.60
Fast food consumption	0.57 (0.63)	0.46 (0.57)	0.050	–
Disordered eating (EDEQ-6)	1.43 (1.19)	1.38 (1.14)	0.594	–
Self-esteem	30.10 (5.38)	30.14 (5.63)	0.919	–

M = mean; SD = standard deviation; p = statistical significance; d = Cohen's d effect size; SATAQ-4 = Sociocultural Attitudes Towards Appearance Questionnaire-4; MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire–Appearance Scales; WHOQOL = World Health Organization Quality of Life Questionnaire, short version; EDEQ-6 = Eating Disorder Examination Questionnaire-6.

genders. We hypothesised that students demonstrate higher internalization of stereotyped beauty ideals, body image concerns, disordered eating, lower physical activity, deterioration in psychological and general quality of life during a lockdown when compared to their pre-lockdown situation. This assumption was partially confirmed. In this study, we observed important changes in the internalization of socio-cultural attitudes towards appearance, body image, nutrition habits, physical activity and quality of life of the students that are discussed further.

4.1. Changes in sociocultural attitudes towards appearance, body image, and disordered eating

In the current study, significant increases in thin/low body image internalization were observed with highly significant effects in students of both genders. In women, a significant increase in media pressures to attain thin/low fat ideals also emerged. The increase in internalization of thin/low fat ideals observed in both genders might be associated with the significant increase in hours spent browsing the internet that was

also reported in both genders. Specifically, we asked participants to report their time spent on screen-based activities for self-pleasure purposes, excluding time spent for work or academic studying. Thus, it is possible that this time is related to students' use of social networking, media, etc. The findings of our study are in accordance with other studies reporting that greater daily screen-time activities and social media use have been associated with greater internalization of thin body ideals, negative body image, poorer well-being and increased disordered eating (Hinojo-Lucena, Aznar-Díaz, ; Holland & Tiggemann, 2016; Mingoia, Hutchinson, Wilson, & Gleaves, 2017; Stieger et al., 2021). Internalization of thin/low body fat ideals, together with comparison of appearance with others and body dissatisfaction, is a mediators between the sociocultural pressures and disordered eating according to the previously discussed TIM (Rodgers, Rachel, McLean, & Paxton, 2015; Tylka, 2011).

However, no negative body image or disordered eating increases were observed in the students during lockdown. Contrary to our expectations, appearance evaluation increased in female students, however, the effect size was small. Notably, the BMI of female students increased slightly. These results contradict the findings that COVID-19 – related lockdown might negatively influence body image (Robertson et al., 2021). Findings of previous cross-sectional studies suggest that there are associations between lockdown-related stress and body image concerns and body image concerns are more prevalent in already body concerned women (Robertson et al., 2021; Swami et al., 2021). It should be mentioned that participants of our study were healthy young students and we did not test perceived stress in the present study. Therefore, the comparison of the present findings with the previous studies is limited.

The findings of the present study suggest that stay at home policies and remote education may reduce body image-related stress, especially in women, since micro-stressors such as going out in public and being an object of public gaze are eliminated during lockdown. Importantly, studies in Muslim women have demonstrated that women who veil their bodies appreciate their body more, report lower body dissatisfaction and a lower drive for thinness and show less body checking behavior when compared to Muslim women that do not veil their bodies and non-Muslim women (Kertechian & Swami, 2016; Swami, Miah, Noorani, & Taylor, 2014; Wilhelm et al., 2019). Thus, it seems that the forced avoidance of physical social contacts and possible modesty of clothing enabled by staying home are beneficial for women in a short perspective. However, based on the TIM, we speculate that significantly increased media pressures (in women) and internalization of the thin ideals might be associated with the development of negative body image and disordered eating behaviours after the lockdown. According to TIM, internalization of stereotyped thin body ideals and possible comparison of own appearance with others, directly possible after the lockdown, together with higher BMI (in women) might trigger body dissatisfaction and disordered eating. Therefore, it is important to develop and implement specific interventions that help to decrease internalization of stereotyped beauty ideals and aim to promote positive body image and physical activity in students of universities during and after the lockdown. Since this study is one of the first trials exploring the impact of COVID-19-related lockdown on sociocultural attitudes towards appearance, future studies will be needed to test these findings.

4.2. Changes in nutrition habits, physical activity, self-rated health and sleep duration

We observed a significant decrease in unhealthy eating habits and fast-food consumption in students of both genders, displaying low to medium effect sizes. These findings are in accordance with prior studies that have demonstrated decreased unhealthy eating and fast-food consumption during lockdowns (Braccaccio et al., 2021; Laguna et al., 2020), however, they also contradict a prior study reporting unhealthier eating during confinement (Ammar et al., 2020). Previous studies have demonstrated that students' nutritional habits are problematic, since the

transition from secondary school to university leads to increased independence and students are continuously challenged to make healthful choices (Deliens, Clarys, De Bourdeaudhuij, &). The lack of time, discipline and social support, along with a limited budget and access to healthy food options have been reported as important determinants of unhealthy nutrition (Deliens et al., 2014; Wilson, Matthews, Seabrook, & Dworatzek, 2017). Thus, the lockdown and stay at home policies have possibly decreased the availability of fast-food to students. The findings of our study suggest that remote education, the lockdown and the return to home have had positive influences on students' unhealthy nutritional habits. The present findings have important implications for practice. The nutritional education and food skills of students should be increased by providing more related education and increasing the availability of healthy foods on university campuses (Wilson et al., 2017).

Our study demonstrated that physical activity significantly decreased in men during lockdown; this change had medium effect size. For women, no significant physical activity decrease was observed. Since men were significantly more physically active compared to women in pre-lockdown, the differences between genders decreased during lockdown. Thus, our findings overlap with the findings of a previous longitudinal study, which reported that physical activity decreased in adults that were previously more physically active when compared to less physically active adults (Martínez-de-Quel et al., 2021). Significant decreases in physical activity have also been observed in other studies employing large samples (Kriaucioniene et al., 2020; Phillipou et al., 2020). Further, the conclusions of the present study contradict findings of other studies demonstrating an increase in physical activity during the lockdown (Braccaccio et al., 2021; Di Renzo et al., 2020; Robertson et al., 2021).

Greater time spent browsing the internet and lower physical activity levels may help to explain the significantly lower evaluation of self-rated health in men that was observed in the present study. In young people that were previously physically active, maintaining physical activity during a lockdown situation is of great importance to preventing the detrimental effects on mental and physical health of forced sedentary behaviour (Sallis et al., 2020). Universities are encouraged to develop remote physical activity programs for their students during the lockdown.

Sleep duration increased significantly in female students, displaying a medium effect size. Sleep duration is an important marker of good health that has been associated with greater cognitive functioning, mood and general well-being and lower body dissatisfaction (Kato et al., 2018; Konjarski, Murray, Lee, & Jackson, 2018; Leite et al., 2019; Marques et al., 2017). As previously discussed, lockdown-related reductions in micro-stressors such as commuting, workload and daily hassles might be related to a greater possibility for rest, especially in female students. This is important evidence supporting the benefits of remote education.

4.3. Changes in quality of life

Notably, no differences in quality of life were observed in men during the lockdown compared to the pre-lockdown situation. However, we did observe significant increases in the total quality of life and psychological quality of life domains in women. These results might be explained by the fact that young female students usually experience more daily hassles compared to men. Stay at home situations may also be beneficial for young women due to the possibility of avoiding the appearance-related pressures that are usually experienced when going out (Schaefer, Burke, & Thompson, 2019). The significantly greater sleeping time in women, which was increased from insufficient amounts, may also be associated with the greater psychological and general quality of life in women. These findings are in accordance with prior longitudinal studies suggesting that lockdowns may be beneficial for the mental health of initially healthy individuals (Ahrens et al., 2021). In contrast, we did not observe any changes in the quality of life of men; possible explanations

for this may be the greater shifts observed in the lifestyle of young men, specifically the decreases in physical activity, increases in sedentary time spent browsing the internet and lower self-rated health. Previous studies have also demonstrated that, in previously physically active men, the decreases in physical activity perceived during lockdown are associated with lower general well-being (Martínez-de-Quel et al., 2021).

4.4. Differences between genders

Generally, we observed less body image and lifestyle-related differences in men and women during lockdown when compared to the pre-lockdown situation. The differences observed between genders in the pre-lockdown period were: greater internalization of general, thin/low fat ideals, media pressures, greater overweight preoccupation, appearance orientation and disordered eating and greater quality of life in the social domain in women and greater physical activity, self-rated health and fast-food consumption in men. During the lockdown, the differences in body image, internalization of beauty ideals and social quality of life domain remained significantly different between genders, however, lifestyle-related factors became more similar, with the exception of a drastically increased time spent browsing the internet in men. These findings suggest that the lockdown had a great impact on the students' lifestyle, yet body image remained relatively stable in the period between the two assessments. However, as discussed previously, according TIM, body image concerns and disordered eating might increase after the lockdown, as a consequence of the drastic increase in internalization of thin/low body fat beauty ideals observed in both women and men.

4.5. Limitations and strengths

There are some important limitations of the present study that should be discussed. First, the sample is not representative of the entire population of Lithuania students. The majority of the sample were women, thus the conclusions for men should not be overstated. Second, the first testing of the sample was implemented several months before the first wave of COVID-19-related lockdowns, while the second assessment was implemented three months after the second lockdown, thus resulting in a time interval between baseline and second assessments of almost a year. Therefore, the time between the pre- and post-measures may impact the observed changes.

The main strength of the present study is its design. The majority of previously published studies have analysed data that was collected by asking participants to recall previous attitudes or behaviours. In the present study, we used previously measured baseline data and had a possibility to collect answers at the second point of assessment. The next strength of the present study is that the sample, both at baseline and at the second point of measurement, represents a pool of students from various study areas of Lithuanian higher education institutions (Baceviciene et al., 2020a, 2020b). Finally, we used sound and national language validated instruments to measure all study variables.

5. Conclusions

Overall, our findings demonstrate that COVID-19-related lockdowns have had a unique impact on the sociocultural attitudes towards appearance, health-related lifestyles and quality of life of students of either gender. In men, stay at home situations have significantly increased the internalization of thin/low fat beauty ideals and time spent browsing the internet for self-pleasure, decreased physical activity levels, lowered self-rated health and decreased unhealthy nutritional habits. No changes were observed in the BMI, body image, self-esteem or quality of life of males. In women, the lockdown increased the time spent browsing the internet for self-pleasure, the internalization of thin/low fat beauty ideals, BMI, while also decreasing unhealthy nutritional

habits and increasing sleep duration. No changes were observed in the physical activity levels of females. For women, the lockdown significantly increased satisfaction with body appearance, as well as general and psychological quality of life. These findings suggest that the majority of students cope with lockdown-related situation well. However, according to the TIM drastic increases in the internalization of stereotyped thin/low body fat ideals might trigger body image concerns and increase disordered eating after the lockdown. Helping both male and female students cope with the outcomes of lockdown-specific interventions may be beneficial. Specific interventions that help to decrease internalization of stereotyped beauty ideals and aim to promote positive body image and physical activity in students of universities during and after the lockdown might be beneficial.

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Ethical statement

The article originates from research of the Lithuanian Sports University. The study followed the research standards required by the Lithuanian Sports University. The Committee for Social Sciences Research Ethics of the Lithuanian Sports University (protocol No. SMTEK-7, 13-03-2019) gave permission to implement the study. Informed consent was obtained from the study participants and confidentiality was guaranteed. The study was conducted in accordance to the Declaration of Helsinki.

Author contributions

MB and RJ were involved in the conceptualisation and methodology of the research. MB supervised the scientific project. MB collected the data. MB was involved in the formal statistical analyses of data. RJ and MB worked on the original draft preparation and writing the manuscript. RJ and MB were involved in the review and editing of the final version of the manuscript.

Data availability statement

The dataset generated and analysed during the current study is not publicly available but is available from the corresponding author upon reasonable request.

Declaration of the competing interest

The authors declare no conflict of interest.

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References

- Aceijas, C., Waldhäusl, S., Lambert, N., Cassar, S., & Bello-Corassa, R. (2017). Determinants of health-related lifestyles among university students. *Perspect Public Health*, 137(4), 227–236. <https://doi.org/10.1177/1757913916666875>
- Agh, T., Kovacs, G., Supina, D., Pawaskar, M., Herman, B. K., Voko, Z., et al. (2016). A systematic review of the health-related quality of life and economic burdens of anorexia nervosa, bulimia nervosa, and binge eating disorder. *Eating and Weight Disorders : EWD*, 21(3), 353–364. <https://doi.org/10.1007/s40519-016-0264-x>
- Ahrens, K. F., Neumann, R. J., Kollmann, B., Plichta, M. M., Lieb, K., Tüscher, O., et al. (2021). Differential impact of COVID-related lockdown on mental health in Germany. *World Psychiatry : Official Journal of the World Psychiatric Association (WPA)*, 20(1), 140–141. <https://doi.org/10.1002/wps.20830>
- Ammar, A., Brach, M., Trabelsi, K., Chtourou, H., Boukhris, O., Masmoudi, L., et al. (2020). Effects of COVID-19 home confinement on eating behaviour and physical activity: Results of the ECLB-COVID19 international online survey. *Nutrients*, 12(6). <https://doi.org/10.3390/nu12061583>

- Baceviciene, M., Balciuniene, V., & Jankauskiene, R. (2020). Validation of the Lithuanian version of the eating disorder examination questionnaire 6.0 in a student sample. *Brain and Behavior*. <https://doi.org/10.1002/brb3.1555>. n/a, e01555.
- Baceviciene, M., Jankauskiene, R., & Balciuniene, V. (2020). The role of body image, disordered eating and lifestyle on the quality of life in Lithuanian university students. *International Journal of Environmental Research and Public Health*, 17(5). <https://doi.org/10.3390/ijerph17051593>. doi:E1593 [pii].
- Baceviciene, M., Jankauskiene, R., & Balciuniene, V. (2020). Validation of the Lithuanian version of the sociocultural attitudes towards appearance questionnaire-4 (SATAQ-4) in a student sample. *International Journal of Environmental Research and Public Health*, 17(3). <https://doi.org/10.3390/ijerph17030932>
- Barkley, J. E., Lepp, A., Glickman, E., Farnell, G., Beiting, J., Wiet, R., et al. (2020). The acute effects of the COVID-19 pandemic on physical activity and sedentary behavior in university students and employees. *International Journal of Exercise Science*, 13(5), 1326–1339. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=cmedm&AN=33042377&site=ehost-live>.
- Branaccio, M., Mennitti, C., Gentile, A., Corrales, L., Buzzachera, C. F., Ferraris, C., et al. (2021). Effects of the COVID-19 pandemic on job activity, dietary behaviours and physical activity habits of university population of naples, federico II-Italy. *International Journal of Environmental Research and Public Health*, 18(4). <https://doi.org/10.3390/ijerph18041502>
- Brown, T. A., Cash, T. F., & Mikulka, P. J. (1990). Attitudinal body-image assessment: Factor analysis of the body-self relations questionnaire. *Journal of Personality Assessment*, 55(1–2), 135–144. <https://doi.org/10.1080/00223891.1990.9674053>
- Christensen, K. A., Forbush, K. T., Richson, B. N., Thomeczek, M. L., Perko, V. L., Bjorlie, K., et al. (2021). Food insecurity associated with elevated eating disorder symptoms, impairment, and eating disorder diagnoses in an american university student sample before and during the beginning of the COVID-19 pandemic. *International Journal of Eating Disorders*. <https://doi.org/10.1002/eat.23517>. n/a doi.
- Copeland, W. E., McGinnis, E., Bai, Y., Adams, Z., Nardone, H., Devadanam, V., et al. (2021). Impact of COVID-19 pandemic on college student mental health and wellness. *Journal of the American Academy of Child & Adolescent Psychiatry*, 60(1), 134–141. <https://doi.org/10.1016/j.jaac.2020.08.466>. e2.
- Deliens, T., Clarys, P., De Bourdeaudhuij, I., & Deforche, B. (2014). Determinants of eating behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, 14, 53. <https://doi.org/10.1186/1471-2458-14-53>
- Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., et al. (2020). Eating habits and lifestyle changes during COVID-19 lockdown: An Italian survey. *Journal of Translational Medicine*, 18(1), 229. <https://doi.org/10.1186/s12967-020-02399-5>
- Dormal, V., Bremhorst, V., Lannoy, S., Lorant, V., Luquiens, A., & Maurage, P. (2018). Binge drinking is associated with reduced quality of life in young students: A pan-european study. <https://doi.org/10.1016/j.drugaldep.2018.08.033>.
- Ducinskiene, D., Kalediene, R., Petrauskiene, J., & Sumskas, L. (2002). Pasaulio sveikatos organizacijos klausimyno tinkamumo įvertinimas studentų gyvenimo kokybei tirti (the assessment of the world health organization's quality of life questionnaire validity in the student sample). *Sveikatos Mokslai (Health Sciences)*, 3(19), 53–58.
- Earle, M., Prusaczyk, E., Choma, B., & Calogero, R. (2021). Compliance with COVID-19 safety measures: A test of an objectification theory model. *Body Image*, 37, 6–13. <https://doi.org/10.1016/j.bodyim.2021.01.004>
- von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2014). The strengthening of reporting of observational studies in epidemiology (STROBE) statement: Guidelines for reporting observational studies. *International Journal of Surgery*, 12(12), 1495–1499. <https://doi.org/10.1016/j.ijsu.2014.07.013>
- Esterwood, E., & Saeed, S. A. (2020). Past epidemics, natural disasters, COVID19, and mental health: Learning from history as we deal with the present and prepare for the future. *Psychiatric Quarterly*, 91(4), 1121–1133. <https://doi.org/10.1007/s11126-020-09808-4>
- Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders*, 16(4), 363–370.
- Fernández-Aranda, F., Casas, M., Claes, L., Bryan, D. C., Favaro, A., Granero, R., et al. (2020). COVID-19 and implications for eating disorders. *European Eating Disorders Review*, 28(3), 239–245. <https://doi.org/10.1002/erv.2738>
- Flaudias, V., Iceta, S., Zerhouni, O., Rodgers, R. F., Billieux, J., Llorca, P., et al. (2020). COVID-19 pandemic lockdown and problematic eating behaviors in a student population. *Journal of Behavioral Addictions*, 9(3), 826–835. <https://doi.org/10.1556/2006.2020.00053>
- Gerli, A. G., Centanni, S., Miozzo, M. R., Virchow, J. C., Sotgiu, G., Canonica, G. W., et al. (2020). COVID-19 mortality rates in the European Union, Switzerland, and the UK: Effect of timeliness, lockdown rigidity, and population density. *Minerva Medica*, 111(4), 308–314. <https://doi.org/10.23736/S0026-4806.20.06702-6>
- Godin, S., & Shephard, J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences*, 10, 141–146.
- Hinojo-Lucena, F., Aznar-Díaz, I., Cáceres-Reche, M., Trujillo-Torres, J., & Romero-Rodríguez, J. (2019). Problematic internet use as a predictor of eating disorders in students: A systematic review and meta-analysis study. *Nutrients*, 11(9). <https://doi.org/10.3390/nu11092151>
- Holland, G., & Tiggemann, M. (2016). A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. <https://doi.org/10.1016/j.bodyim.2016.02.008>.
- Jia, P., Zhang, L., Yu, W., Yu, B., Liu, M., Zhang, D., et al. (2021). Impact of COVID-19 lockdown on activity patterns and weight status among youths in China: The COVID-19 impact on lifestyle change survey (COINLICS). *International Journal of Obesity*, 45(3), 695–699. <https://doi.org/10.1038/s41366-020-00710-4>, 2005.

- Jimenez, A., de Hollanda, A., Palou, E., Ortega, E., Andreu, A., Molero, J., et al. (2021). Psychosocial, lifestyle, and body weight impact of COVID-19-related lockdown in a sample of participants with current or past history of obesity in Spain. *Obesity Surgery*. <https://doi.org/10.1007/s11695-021-05225-z>
- Kato, K., Iwamoto, K., Kawano, N., Noda, Y., Ozaki, N., & Noda, A. (2018). Differential effects of physical activity and sleep duration on cognitive function in young adults. *Journal of Sport and Health Science*, 7(2), 227–236. <https://doi.org/10.1016/j.jshs.2017.01.005>
- Kertechian, S. K., & Swami, V. (2016). The hijab as a protective factor for body image and disordered eating: A replication in French muslim women. *Null*, 19(10), 1056–1068. <https://doi.org/10.1080/13674676.2017.1312322>
- Klumbiene, J., Veryga, A., Sakyte, E., Petkeviciene, J., Grabauskas, V. J., & Kriaucioniene, V. (2015). *Health behavior among Lithuanian adult population*. Kaunas: Lithuanian University of Health Sciences, 2014.
- Knapstad, M., Sivertsen, B., Knudsen, A. K., Smith, O. R. F., Aarø, L. E., Lønning, K. J., et al. (2019). *Trends in self-reported psychological distress among college and university students from 2010 to 2018*. England: Cambridge University Press. <https://doi.org/10.1017/S0033291719003350>
- Konjarski, M., Murray, G., Lee, V. V., & Jackson, M. L. (2018). Reciprocal relationships between daily sleep and mood: A systematic review of naturalistic prospective studies. *Sleep Medicine Reviews*, 42, 47–58. <https://doi.org/10.1016/j.smrv.2018.05.005>
- Kriaucioniene, V., Bagdonaviciene, L., Rodríguez-Pérez, C., & Petkeviciene, J. (2020). Associations between changes in health behaviours and body weight during the COVID-19 quarantine in Lithuania: The Lithuanian COVIDiet study. *Nutrients*, 12(10). <https://doi.org/10.3390/nu12103119>
- Laguna, L., Fiszman, S., Puerta, P., Chaya, C., & Tárrega, A. (2020). The impact of COVID-19 lockdown on food priorities. results from a preliminary study using social media and an online survey with Spanish consumers. *Food Quality and Preference*, 86, 104028. <https://doi.org/10.1016/j.foodqual.2020.104028>
- Leite, H. M., Garcez, A., Nunes, M. A. A., Pattussi, M. P., Canuto, R., Paniz, V. M. V., et al. (2019). Shift work, sleep duration, and body image dissatisfaction among female workers in southern Brazil. *Archives of Women's Mental Health*, 22(5), 583–592. <https://doi.org/10.1007/s00737-018-0927-x>
- Marchitelli, S., Mazza, C., Lenzi, A., Ricci, E., Gnessi, L., & Roma, P. (2020). Weight gain in a sample of patients affected by overweight/obesity with and without a psychiatric diagnosis during the covid-19 lockdown. *Nutrients*, 12(11). <https://doi.org/10.3390/nu12113525>
- Marques, D. R., Meia-Via, A. M. S., da Silva, C. F., & Gomes, A. A. (2017). Associations between sleep quality and domains of quality of life in a non-clinical sample: Results from higher education students. *Sleep Health*, 3(5), 348–356. <https://doi.org/10.1016/j.sleh.2017.07.004>
- Martínez-de-Quel, Ó., Suárez-Iglesias, D., López-Flores, M., & Pérez, C. A. (2021). Physical activity, dietary habits and sleep quality before and during COVID-19 lockdown: A longitudinal study. *Appetite*, 158, 105019. <https://doi.org/10.1016/j.appet.2020.105019>
- Matsungu, T. M., & Chopera, P. (2020). Effect of the COVID-19-induced lockdown on nutrition, health and lifestyle patterns among adults in Zimbabwe. *BMJ Nutrition, Prevention & Health*, 3(2), 205–212. <https://doi.org/10.1136/bmjnph-2020-000124>
- Meiring, R. M., Gusso, S., McCullough, E., & Bradnam, L. (2021). The effect of the COVID-19 pandemic movement restrictions on self-reported physical activity and health in New Zealand: A cross-sectional survey. *International Journal of Environmental Research and Public Health*, 18(4). <https://doi.org/10.3390/ijerph18041719>
- Mingoa, J., Hutchinson, A. D., Wilson, C., & Gleaves, D. H. (2017). The relationship between social networking site use and the internalization of a thin ideal in females: A meta-analytic review. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.01351>
- Miskinyte, A., & Bagdonas, A. (2010). Jaunųjų suaugusiųjų požiūrio į savo kūną sąsajos su demografiniais rodikliais (associations between body image and demographics variables in young adults). *Psichologija*, 42, 85–101.
- Neumark-Sztainer, D., Wall, M. M., Chen, C., Larson, N. I., Christoph, M. J., & Sherwood, N. E. (2018). Eating, activity, and weight-related problems from adolescence to adulthood. *American Journal of Preventive Medicine*, 55(2), 133–141. <https://doi.org/10.1016/j.amepre.2018.04.032>
- Phillipou, A., Meyer, D., Neill, E., Tan, E. J., Toh, W. L., Van Rheenen, T. E., et al. (2020). Eating and exercise behaviors in eating disorders and the general population during the COVID-19 pandemic in Australia: Initial results from the COLLATE project. *International Journal of Eating Disorders*, 53(7), 1158–1165. <https://doi.org/10.1002/eat.23317>
- Pikoos, T. D., Buzwell, S., Sharp, G., & Rossell, S. L. (2020). The COVID-19 pandemic: Psychological and behavioral responses to the shutdown of the beauty industry. *International Journal of Eating Disorders*, 53(12), 1993–2002. <https://doi.org/10.1002/eat.23385>
- Plumper, T., & Neumayer, E. (2020). Lockdown policies and the dynamics of the first wave of the sars-CoV-2 pandemic in europe. *Journal of European Public Policy*, 1–21. <https://doi.org/10.1080/13501763.2020.1847170>
- Ribeiro, Í. J. S., Pereira, R., Freire, I. V., de Oliveira, B. G., Casotti, C. A., & Boery, E. N. (2018). Stress and quality of life among university students: A systematic literature review. <https://doi.org/10.1016/j.hpe.2017.03.002>
- Robertson, M., Duffy, F., Newman, E., Prieto Bravo, C., Ates, H. H., & Sharpe, H. (2021). Exploring changes in body image, eating and exercise during the COVID-19 lockdown: A UK survey. *Appetite*, 159, 105062. <https://doi.org/10.1016/j.appet.2020.105062>
- Rodgers, R., Chabrol, H., & Paxton, S. J. (2011). An exploration of the tripartite influence model of body dissatisfaction and disordered eating among Australian and French college women. <https://doi.org/10.1016/j.bodyim.2011.04.009>
- Rodgers, R. F., Lombardo, C., Cerolini, S., Franko, D. L., Omori, M., Fuller-Tyszkiewicz, M., et al. (2020). The impact of the COVID-19 pandemic on eating disorder risk and symptoms. *International Journal of Eating Disorders*. <https://doi.org/10.1002/eat.23318>
- Rodgers, R. F., McLean, S. A., & Paxton, S. J. (2015). Longitudinal relationships among internalization of the media ideal, peer social comparison, and body dissatisfaction: Implications for the tripartite influence model. *Developmental Psychology*, 51(5), 706–713. <https://doi.org/10.1037/dev0000013>
- Rosenberg, M. (1979). *Conceiving the self*. New York: Basic Books.
- Sabiston, C. M., Pila, E., Vani, M., & Thøgersen-Ntoumani, C. (2019). Body image, physical activity, and sport: A scoping review. <https://doi.org/10.1016/j.psychsport.2018.12.010>
- Sallis, J. F., Adlakh, D., Oyeyemi, A., & Salvo, D. (2020). An international physical activity and public health research agenda to inform coronavirus disease-2019 policies and practices. *Journal of Sport and Health Science*, 9(4), 328–334. <https://doi.org/10.1016/j.jshs.2020.05.005>
- Schaefer, L. M., Burke, N. L., Anderson, L. M., Thompson, J. K., Heinberg, L. J., Bardone-Cone, A., et al. (2019). Comparing internalization of appearance ideals and appearance-related pressures among women from the United States, Italy, England, and Australia. *Eating and Weight Disorders: EWD*, 24(5), 947–951. <https://doi.org/10.1007/s40519-018-0544-8>
- Schaefer, L. M., Burke, N. L., & Thompson, J. K. (2019). Thin-ideal internalization: How much is too much? *Eating and Weight Disorders: EWD*, 24(5), 933–937. <https://doi.org/10.1007/s40519-018-0498-x>
- Schaefer, L. M., Burke, N. L., Thompson, J. K., Dedrick, R. F., Heinberg, L. J., Calogero, R. M., et al. (2015). Development and validation of the sociocultural attitudes towards appearance questionnaire-4 (SATAQ-4). *Psychological Assessment*, 27(1), 54–67. <https://doi.org/10.1037/a0037917>
- Skewington, S. M., Lotfy, M., & O'Connell, K. A. (2004). *The world health organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A report from the WHOQOL group*. Netherlands: Springer Netherlands.
- Soulliard, Z. A., Kauffman, A. A., Fitterman-Harris, H., Perry, J. E., & Ross, M. J. (2019). Examining positive body image, sport confidence, flow state, and subjective performance among student athletes and non-athletes. *Body Image*, 28, 93–100. <https://doi.org/10.1016/j.bodyim.2018.12.009>
- Stieger, S., Lewetz, D., & Swami, V. (2021). Emotional well-being under conditions of lockdown: An experience sampling study in Austria during the COVID-19 pandemic. *Journal of Happiness Studies*, 1–18. <https://doi.org/10.1007/s10902-020-00337-2>
- Swami, V., Horne, G., & Furnham, A. (2021). COVID-19-related stress and anxiety are associated with negative body image in adults from the United Kingdom. *Personality and Individual Differences*, 170, 110426. <https://doi.org/10.1016/j.paid.2020.110426>
- Swami, V., Miah, J., Noorani, N., & Taylor, D. (2014). Is the hijab protective? An investigation of body image and related constructs among British muslim women. *British Journal of Psychology*, 105(3), 352–363. <https://doi.org/10.1111/bjop.12045>
- The Whoqol Group. (1998). *The world health organization quality of life assessment (WHOQOL): Development and general psychometric properties*. [https://doi.org/10.1016/S0277-9536\(98\)00009-4](https://doi.org/10.1016/S0277-9536(98)00009-4)
- Thompson, J. K., Heinberg, L. J., Altam, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington, DC, US: American Psychological Association. <https://doi.org/10.1037/10312-000>
- Tylka, T. L. (2011). Refinement of the tripartite influence model for men: Dual body image pathways to body change behaviors. *Body Image*, 8(3), 199–207. <https://doi.org/10.1016/j.bodyim.2011.04.008>
- Tylka, T. L., & Wood-Barcalow, N. L. (2015). What is and what is not positive body image? *Conceptual Foundations and Construct Definition*. <https://doi.org/10.1016/j.bodyim.2015.04.001>
- Vall Roque, H., Andres, A., & Saldana, C. (2020). The impact of COVID-19 lockdown on social network sites use, body image disturbances and self-esteem among adolescents and young women. *Research Square*, 1–16. <https://doi.org/10.21203/rs.3.rs-71386/v1>
- Whatnall, M. C., Patterson, A. J., Siew, Y. Y., Kay-Lambkin, F., & Hutchesson, M. J. (2019). *Are psychological distress and resilience associated with dietary intake among Australian university students?* Switzerland: MDPI. <https://doi.org/10.3390/ijerph16214099>
- Wilhelm, L., Hartmann, A. S., Becker, J. C., Kisi, M., Waldorf, M., & Vocks, S. (2019). Thin media images decrease women's body satisfaction: Comparisons between veiled muslim women, christian women and atheist women regarding trait and state body image. *Frontiers in Psychology*, 10, 1074. <https://doi.org/10.3389/fpsyg.2019.01074>
- Wilson, C. K., Matthews, J. I., Seabrook, J. A., & Dworatzek, P. D. N. (2017). Self-reported food skills of university students. *Appetite*, 108, 270–276. <https://doi.org/10.1016/j.appet.2016.10.011>
- World Health Organization. (1997). *Obesity: Preventing and managing the global epidemic: Report of a WHO consultation on obesity, geneva, 3-5 june 1997 (no. WHO/NUT/NCD/98.1)*. <https://apps.who.int/iris/handle/10665/63854>