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An international cross-sectional investigation on social media, fitspiration content exposure, and related risks during the COVID-19 self-isolation period

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ABSTRACT

With the global COVID-19 pandemic, governments from many countries in the world implemented various restrictions to prevent the SARS-Cov-2 virus's spread, including social distancing measures, quarantine, in-home lockdown, and the closure of services and public spaces. This led to an in-creased use of social media platforms to make people feel more connected, but also to maintain physical activity while self-isolating. Concerns about physical appearance and the desire to keep or reach a muscular and toned ideal body, might have further reinforced the engagement in fitness-related social media activities, like sharing progresses in training achievements or following more fitness contents on popular profiles. To better understand the underlying relation among these factors, the present study investigates 729 responses to the Exercise Addiction Inventory (EAI), the Appearance Anxiety Inventory (AAI), the Self-Compassion Scale (SCS) and their association to social media usage and compares the results cross-culturally in five countries (Spain, Lithuania, United Kingdom, Japan, and Hungary). Findings highlight significant differences between males and females, espe-cially in regard to the time spent online ($U = 477.5$, $p = 0.036$). Greater levels of appearance anxiety were associated with the exposure to fitness-related contents on social media. These results strongly confirm the previously highlighted association between fitspiration media and body image anxiety predominantly in females. Clinical implications

; AAI, Appearance Anxiety Inventory; EAI, Exercise Addiction Inventory; IPEDs, Image and Performance Enhancing Drugs; SCS, Self-Compassion Scale.

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and future considerations in terms of prevention and treatment in a situation of global emergency are also discussed.

1. Introduction

With the spread of the coronavirus disease associated to the SARS-Cov-2 virus, the World Health Organization (WHO) declared a global pandemic situation in March 2020 due to COVID-19's severe acute respiratory syn-drome. To contain and prevent the contagion of the virus, governments all over the world profiled a set of measures to be adopted by all citizens. This included physical distancing (or "social distancing"), wearing a face mask while out of one's own house, temperature taking and mandatory lockdown. These stringent preventive measures have radically changed people's social behavior, leading to increased interactions mediated by social media sites, which became the main medium for communication during the pandemic. For example, Kantar's global study on media habits in April 2020 revealed a 61% and a 70% increase in social media engage-ment and web browsing respectively from the 14th to the March 23, 2020 (Attitudes Media Habits and Expectations).This included a peak in messaging-platform usage amongst ages 18 to 34, with a 40% increase in the use of WhatsApp, Facebook, and Instagram. These numbers are likely to have increased further as more countries have entered partial or complete lockdown. Such a new phenomenon is not devoid of health risks in terms of both a more active (i.e., sharing pictures of one's own body, interacting with other users' posts) and a passive (i.e., browsing or scrolling feeds) social media usage (Cataldo et al., 2021a). As previously highlighted, the spread of body image con-tents portraying often unrealistic toned and muscular ideal bodies, known as "fitspiration" (Carrotte et al., 2017), might have further reinforced risky behaviors among vulnerable individuals. Fitspiration is a term derived from the combination of the words *fitness* and *inspiration* that arose around 2013 as a positive trend on social media promoting a fit and healthy body image in response to the "thinspiration" or "bonespiration" trends that encouraged users to pursue a thin to extremely thin physical image - sometimes with dangerous and extreme consequences (Talbot et al., 2017; Dignard and Jarry, 2021). Despite being a recent construct, evidence in the literature suggests that fitspiration is associated with a set of dysfunctional and/or potentially harmful issues, such as compulsive exercise, body concerns and objectification, appearance anxiety, negative mood, and usage of enhancing supplements and/or drugs, affecting overall quality of life (for a review, see Cataldo et al., 2021 (Cataldo et al., 2021b), see also Fig. 1). Fitspiration contents support the ideal of a fit body, gained through the combination of physical exercise and a balanced diet. These messages are often accompanied by pictures showing the pre- and post-fitness changes in the body. They do not underline the importance, pleasure and health benefits of exercise, but encourage physical workouts, sometimes surpassing the limits of the body (Simpson and Mazzeo, 2017; Dores et al., 2021). As such, one of the major risks associated to the prolonged and continuous exposure to fitspiration posts is the prim-ing of psychological and physiological mechanisms that might lead one to develop an excessive physical workout routine (Cataldo et al., 2021b) for reasons mainly related to appearance rather than the improvement or maintenance of a healthy body (Dores et al., 2021; Deighton-Smith and Bell, 2018). This explains why other potentially detrimental consequences associated with fitspiration are appearance-related anxiety and body image dissatisfaction. Visual contents representing the whole body, or parts of it, tend to elicit "likes" from other users and comments that are either positive or negative, which act as a sort of symbolic validation and approval or disapproval (Chua and Chang, 2016). The search of such form of feedback seem to be present predominantly among women and adolescent girls, leading to an idealization of how they should look on social media, and activating, as a consequence, self-objectification processes that drive them to expose only selected parts of the body, use filters or edit their photos (Gill, 2021) in order to gain more "likes" (Cataldo et al., 2021b; Seekis et al., 2020; Vandenbosch and Eggermont, 2012). In a report from the University of London's Gender and Sexualities Research Centre, 90% of women reported using filters or editing their photos (Gill, 2021).

An increasing amount of literature highlights how the self-objectification and body self-image concerns are very closely tied, claiming that prolonged exposure to fitspiration contents is likely to increase negative mood, lower self-esteem, and discontent with one's body or appearance (Easton et al., 2018; Slater et al., 2017; Tiggemann and Zaccardo, 2015). The use of dietary supplements, medicines and other substances, known as image and performance-enhancing drugs (IPEDs) also have been reported (Corazza et al., 2019; Pilgrim and Bohnet-Joschko, 2019; Dores et al., 2021) sometimes without medical consultation or supervision (De Luca et al., 2017; Corazza et al., 2019; Dores et al., 2021; Mooney et al., 2017; Dores et al., 2021). Although these products are often perceived as safe, and their composition often includes minerals, vitamins, and herbals, evidence indicates that a prolonged usage can be associated with short- and long-term psychiatric

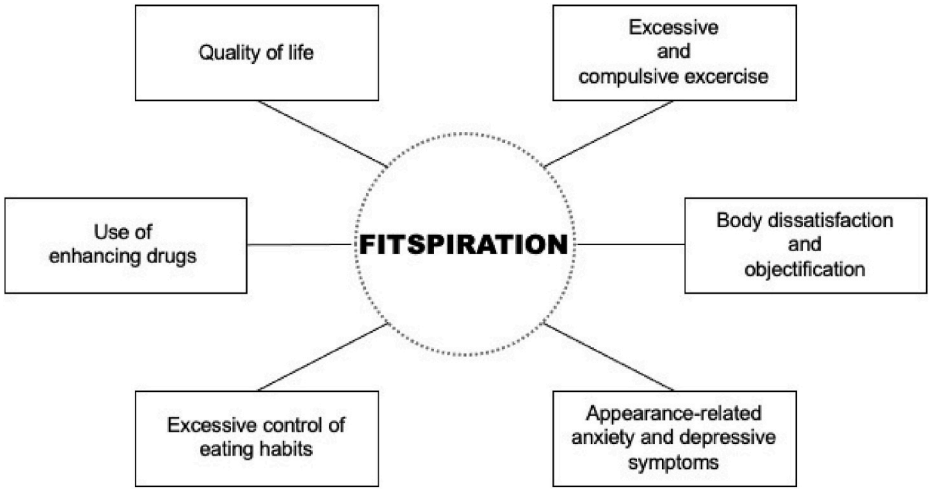

Fig. 1. A model of concurrent factors in the fitspiration phenomenon, as reported by Cataldo et al., 2021 (Cataldo et al., 2021b).

effects (Bersani et al., 2015), including issues attributable to addictive mechanisms (Bersani et al., 2015; Mooney et al., 2017).

In a study by Dores et al. (2021) with a sample of 3161 (65% female) respondents from seven countries during the COVID-19 lockdown, the participants reported the use of a wide range of this kind of substances to improve their image and performance. Some of them maintained the use during the mandatory lockdown (28%), and 6.4% started the use of a new drug during this period. Furthermore, a strong association was found between IPEDs use and physical exercise, and high anxiety about appearance significantly increased the probability of the intake. In a related study, the association between high appearance anxiety and IPEDs consumption was found re-gardless of the sport discipline practiced (Shibata et al., 2021).

Recent research has shown that self-compassion can have a protective role as regards body dissatisfaction (Kelly et al., 2014). Self-compassion has been conceptu-alized and described by Neff as *"an emotionally positive self-attitude that should protect against the negative consequences of self-judgment, isolation, and rumination"* (Neff, 2003a). It has been suggested that a thoughtful and caring attitude towards one's own body and image can have a positive impact on mood (Slater et al., 2017), the perception of self-worth (Daye et al., 2014; Wasylkiw et al., 2012), and the reduction of the perceived pressure from contents promoting idealized body images on social media (Tylka et al., 2015).

In this context, we hypothesized that social distancing experienced during the pandemic, together with the limited possibility to entertain face-to-face interactions, might have intensified the usage of social media platforms, increasing the risk for both active and passive exposure to fitspiration contents. This, in turn, might affect people's mood and the percep-tion of their own bodies, triggering insecurities related to self-appearance, especially among those less keen on self-compassion, and intensifying self-regulated working out at home and consumption of IPEDs. The fact that local policies limiting the outdoor movement (e.g., through closure of gyms and domestic self-isolation) might have itself triggered a sort of compensation mechanism for the lack of regular physical exercise — compromising image and performance — which could increase indoor working out and IPEDs consumption.

Building on our previous work, the aim of the present study is to analyze how the limitations imposed to prevent the spread of the COVID-19 disease have influenced social media usage in terms of physical appearance, and how these two latter aspects, in turn, affected patterns of physical exercise and IPEDs consumption. The investigation includes the exploration of additional individual factors, namely self-compassion as a possible buffer for appearance anxiety. Comparisons are conducted for (1) responses according to the biological sex; (2) factors differentiating IPEDs users and non-users. Although it is not a main focus of the present work, we also explored the differences across participants in Spain, Lithuania, United Kingdom, Japan, and Hungary that might have influenced fitspiration-related risks.

2. Methods and materials

The study was reviewed and approved by the Human Sciences Ethics Committee at the University of Hertfordshire (HSK/SF/UH/00104) and by the Ethics Committees of the countries taking part in the project. It is in compliance with the Declaration of Helsinki and with the European General Data Protection Regulation. All participants provided their written informed consent prior to participation in this study. The study is per-formed using an international cross-sectional and observational approach, and data were collected during the most critical stage of the COVID-19 contagion (April and May 2020), during which the most restrictive policies, such as indoor lockdown, were implemented by local governments. All the countries involved in the study were in a national lockdown regime during the data collection. As such, restrictions adopted by the national governments included domestic self-isolation, closure of the public services, and social distancing. Participants were recruited with the support of a network of collaborators, in the participating countries through popular social media platform, like Facebook, LinkedIn, WhatsApp, Twitter, and Instagram using a snowball sampling technique. Additionally, invitation to take part in the study was posted on social media sites. The presentation of the project included a detailed description of the study, aims, and the informed consent form. After agreement to participate, the respondents received a link to the survey, which had been translated and back-translated from English into the languages of the participating countries (Spanish, Japanese, Hungarian, and Lithuanian). Data collection was implemented using the web-based survey platform Qualtrics [Qualtrics, Provo, UT, 2020], and data were stored in secured platform at the University of Hertfordshire, UK.

2.1. Participants

The total sample consisted of 729 participants from five countries: Spain (n = 262; 35.9%), Lithuania (n = 223; 30.6%), the United Kingdom (n = 127; 17.41%), Japan (n = 70; 9.6%), and Hungary (n = 47; 6.4%). The age of the participants ranged from 17 to 70 years (M_{Age} = 37.75; SD = 11.68), with a prevalence of women (n = 527; 72.3%). With regards to occupation, most of the participants reported to be working as employees (n = 483; 66.3%) or freelancers (n = 93; 12.8%), followed by students (n = 100; 13.7%), unemployed (n = 41, 5.6%), and retired respondents (n = 12; 1.6%). As for the type of fitness activities, 116 participants (15.9%) reported not to be engaged in physical exercise. A small number of participants reported to belong to a professional category of athletes and, in order to not invalidate or alter the results, especially those regarding physical exercise, they were excluded from the analysis. Table 1 shows the detailed composition of the sample in the present study. For the detailed composition regarding sports and exercise, please see Dores et al., 2021 (Dores et al., 2021) and Shibata et al., 2021 (Shibata et al., 2021).

2.2. Questionnaires

The survey comprehended a collection of socio-demographic information, targeted questions on social media usage and fitspiration-related contents, specific inquiries on IPEDs consumption, the brief version of the Exercise Addiction Inventory (EAI), the Appearance Anxiety Inventory (AAI), and the Self-Compassion Scale (SCS). For a description of the questionnaires on IPEDs usage and exercise routine, please see Dores et al., 2021 and Shibata et al., 2021 (Dores et al., 2021; Shibata et al., 2021).

2.2.1. Fitspiration-related inquiries and online activities

A set of targeted items was built to explore attitudes towards and behaviors linked to fitspiration, for the purpose of this study. The investi-gation consists of 6 questions on the perceived or noted changes in IPEDs consumption, engagement in social media activities, pressure to physical exercise due to social media exposure, and download of additional applications for fitness. The questions were created based on the key themes emerged by a recent review on fitspiration and the latest trends in social media, such as the role played by influencers (Cataldo et al., 2021b). To assess the validity of the single items and the questions as a whole, the Chronbach's α was com-puted for each country and the total sample (see **Supplementary Results** in the Supplementary Material section). Three questions aimed specifically at the influence perceived from popular social media profiles linked to fitness ("*1. I feel that the influencers I follow affect my look more than before*", "*2. I feel more prone to use products/supplements recommended by influencers or seen on the Internet*", "*3. I started to follow more influencers on social media in relation to fitness/sport activity*"). One item investigated the association between social media exposure and urge to exercise ("*4. I feel more pressurized to exercise because of the constant exposure to exercise on social media*"). A fifth question was related to the download of workout/sport application ("*5. I downloaded any new fitness apps during this period of*

Table 1
Socio-demographic characteristics of the observed sample.

	Spain $N = 262$	Lithuania $N = 223$	UK $N = 127$	Japan $N = 70$	Hungary $N = 47$	$X2$	*p-value*
Age	38.00 (13.49)	36.59 (9.66)	36.95 (11.12)	39.54 (10.86)	41.34 (11.61)	$F = 2.263$	0.061
Occupation						**78.286**	**<0.001**
Employed	136 (51.9%)	178 (79.8%)	77 (60.6%)	60 (85.7%)	32 (68.1%)		
Student	52 (19.8%)	23 (10.3%)	17 (13.4%)	6 (8.6%)	2 (4.3%)		
Unemployed	27 (10.3%)	5 (2.2%)	4 (3.1%)	2 (2.9%)	3 (6.4%)		
Retired	8 (3.1%)	0 (0.0%)	2 (1.6%)	0 (0.0%)	2 (4.3%)		
Freelance or running an individual activity	39 (14.9%)	17 (7.6%)	27 (21.3%)	2 (2.9%)	8 (17.0%)		

Results in bold are statistically significant. X^2 = chi-square test; F = one-way ANOVA.

physical distancing"), and the last item assessed the variation in time spent for social network-related activities ("*6. Since physical distancing I have spent time on non-work or study-related online activities such as Social networking*"), including browsing social media and messaging or communicating over online social platforms. Moreover, two additional inquiries measured the time spent online before ("*How many hours per day did you normally spend online before self-isolating?*") and after the beginning of the social isolation period ("*How many hours per day do you spend online while self-isolating?*").

2.2.2. Exercise Addiction Inventory (EAI)

The EAI was developed by Griffith and colleagues to measure the engagement in physical exercise (Griffiths et al., 2005). The cut off for problematic exercise with the risk of addiction is set at 24; higher scoring corresponds to the presence of more issues related to addiction. The EAI is presented in detail in Dores and colleagues' work (Dores et al., 2021).

2.2.3. Appearance Anxiety Inventory (AAI)

The AAI is a 10-item self-report questionnaire created and validated by Veale and colleagues (Veale et al., 2014) to assess both the behavioral and cognitive factors associated to body image anxiety and symptoms related to body dysmorphic disorder. The questions investigate the frequency of behaviors typically associated with a distorted body image, with scoring greater than 21 suggesting the presence of appearance anxiety. For more detailed information on the AAI, please see Dores and colleagues (Dores et al., 2021).

2.2.4. Self-Compassion Scale (SCS)

The short form of the SCS, theorized and created by Neff (2003b), focuses on the concept of compassion towards oneself and the emotional self-regulation characteristics associated to it. In the current study, the cut-off was set at 27, below which are represented the 15% of the participants who were the least self-compassionate. For more detailed information on the SCS, please consult the "Instrument" section of Dores and colleagues' work (Dores et al., 2021).

2.3. Statistical analyses

Data were analyzed with SPSS for Windows, version 17.0 (SPSS Inc., Chicago, Illinois). Descriptive analyses (frequency, central tendency, and dispersion measures) were used for the following variables: socio-demographic characteristics (age, gender, occupation), the EAI, the AAI, the SCS, and the questions on fitspiration exposure and IPEDs consumption. Student's *t*-tests were computed to compare means of the EAI, AAI, and SCS between male and female participants. Chi-square tests were applied for categorical variables, to compare scores (e.g., above/below the cutoff point for each questionnaire) between male and female participants, and by country. With regards to the comparison between male and female groups, statistically significant results were further investigated. Group comparisons were checked with chi-square test and one-way ANOVAs, and Kruskal-Wallis test. In the comparison between age groups in the female sample only, analyses were computed using Student's *t*-test and Mann-Whitney test. As for the "Supplementary Analysis", Pearson correlation coefficients were used to investigate the correlation among fitspiration-related questions, AAI, and SCS. For mediation analysis, multiple regression analysis and Sobel test were adopted.

3. Results

3.1. Differences between IPEDs users and non-users

Of 729 participants, 214 (29.6%) reported resorting to the usage of IPEDs. Among these, the greatest percentage belonged to the Lithuanian group (36.4%), followed by Spain (19.6%), the United Kingdom (16.8%), Japan (14.5%), and Hungary (12.6%). For a detailed investigation and description on IPEDs consumption across countries during the COVID-19 lockdown, please refer to Dores et al., 2021 and Shibata et al., 2021 (Dores et al., 2021; Shibata et al., 2021).

In the present study, the sample was divided in two groups, according to the reported usage of IPEDs. Subsequently, additional tests were computed for significant results (see Table 2). Several differences emerged from the comparison, started from the percentage of participants belonging to each group in scoring lower values for the EAI ($X^2 = 8.64$, $p = 0.003$), and for the AAI ($X^2 = 17.09$, $p < 0.001$); no significant distinction was found for the SCS. With regards to the inquiries on fitspiration-related influence and attitude, only replies to item 6 did not result in statistical differences between the two groups. Conversely, popular social media profiles characterized the group of IPEDs users in terms on influence perceived (item 1), intake of supplements recommended (item 2), engagement in new profiles related to sport activities (item 3), pressure to exercise due to social media exposure (item 4), and the download of additional fitness application (item 5). Overall, the two groups reported statistically significant differences of time spent online both before and during the pandemic, displaying a notable variation.

3.2. Fitspiration and results for the EAI

In order to have a clearer view of the factors potentially influencing an addictive attitude towards physical exercise, further analyses investigated the differences between participants who scored below or above the cut-off value at the EAI, exploring their responses to the target fitspiration-related inquires. Results are shown in Table 3. The influence of profiles followed over one's own look (item 1), the engagement in IPEDs consumption, promoted by influencers (item 2), the increase of popular fitness profiles followed (item 3), the impact of post related to physical workout on social media over the pressure to exercise (item 4), and the download of new applications for sports (item 5) affected the two groups in significantly different extents, according to the statistics outcomes. Overall, the amount of time spent online for social networking activities (item 6) resulted as the only non-statistically different between the two groups. No differences were found in the two groups regarding the time spent online.

3.3. Fitspiration and results for the AAI

Similarly, additional investigation on the groups reporting high or

Table 2
Survey and questionnaires responses for users and non-users of IPEDs.

	Users	Non Users	Group **Differences**	*p-value*
	***N* = 214**	***N* = 515**		
$EAI_{\_over\ 24}$	18 (8.4%)	17 (3.3%)	$X^2 = 8.64$	**0.003**
$AAI_{\_over\ 21}$	45 (21.0%)	50 (9.7%)	$X^2 = 17.09$	**<0.001**
$SCS_{\_below\ 27}$	40 (18.7%)	80 (15.5%)	$X^2 = 1.10$	0.295
1. I feel that the influencers I follow affect my look more than before	1.88 (1.10)	1.64 (0.97)	$t = 2.81$	**0.005**
2. I feel more prone to use products or supplements recommended by influencers or seen on the Internet	1.87 (1.07)	1.42 (0.79)	$t = 6.43$	**<0.001**
3. I started to follow more influencers on social media in relation to fitness or sport activity	2.09 (1.30)	1.76 (1.11)	$t = 3.55$	**<0.001**
4. I feel more pressurized to exercise because of the constant exposure to exercise on social media *(without Spain)*	1.98 (1.17)	1.71 (0.98)	$t = 2.55$	**0.011**
5. I downloaded any new fitness app during this period of physical distancing	51 (23.8%)	73 (14.2%)	$X^2 = 9.99$	**0.002**
6. Since physical distancing I have spent time on non–work or study-related online activities, such as Social Networking	3.48 (1.08)	3.50 (1.08)	$t = -0.22$	0.823
Time online pre-Covid	3 [2; 4]	2 [1; 4]	$U = 49942.0$	**0.043**
Time online during Covid	4.5 [3; 6]	4 [2; 6]	$U = 48471.5$	**0.010**
Variation of time online	2 [1; 3]	1 [0; 2]	$U = 48370.5$	**0.008**

Results in bold are statistically significant. Item 6 includes browsing social media sites and messaging or communication over online social platforms. X^2 = chi-square test; t = Student's t-test; U = Mann-Whitney test.

Table 3
Responses on fitspiration for participants who scored below/above cut-off value at the EAI.

	EAI <24	EAI >24	Group Differences	*p-value*
	***N* = 694**	***N* = 35**		
$SCS_{\_below\ 27}$	110 (15.9%)	10 (28.6%)	$X^2 = 3.921$	**0.048**
1. I feel that the influencers I follow affect my look more than before	1 [1; 2]	2 [1; 4]	$U = 9044.5$	**0.004**
2. I feel more prone to use products or supplements recommended by influencers or seen on the Internet	1 [1; 2]	2 [1; 3]	$U = 8335.5$	**<0.001**
3. I started to follow more influencers on social media in relation to fitness or sport activity	1 [1; 2]	2 [1; 4]	$U = 8695.0$	**0.002**
4. I feel more pressurized to exercise because of the constant exposure to exercise on social media *(without Spain)*	1 [1; 2]	2 [1; 3.75]	$U = 3057.5$	**0.009**
5. I downloaded any new fitness app during this period of physical distancing	113 (16.3%)	11 (31.4%)	$X^2 = 5.42$	**0.020**
6. Since physical distancing I have spent time on non–work or study-related online activities, such as Social Networking	4 [3; 4]	3 [3; 5]	$U = 11450.5$	0.549
Time online pre-Covid	2 [1; 4]	3 [2; 3]	$U = 10964.0$	0.323
Time online during Covid	4 [2; 6]	4 [3; 8]	$U = 11064.5$	0.371
Variation of time online	1.5 [0.5; 2]	1 [0; 3]	$U = 12028.0$	0.922

Results in bold are statistically significant. Item 6 includes browsing social media sites and messaging or communication over online social platforms. U = Mann-Whitney test; X^2 = chi-square test.

low levels of appearance anxiety was computed, comparing the responses to the items created on purpose to analyze the attitude to fitspiration-related constructs and social media exposure. Results are shown in Table 4. According to the results, statistically significant differences between the two groups were observed in each item, suggesting that appearance-related anxiety is highly associated with fitspiration contents exposure and engagement in social media activity. More precisely, participants scoring above the cut-off value, reported greater feelings of being affected by influencers in their looks (item 1), to be keener on using IPEDs sponsored or recommended by popular social media profiles (item 2), to follow more social media accounts regarding sports (item 3), to feel pressured to exercise due to physical activities promoted on social media (item 4), to have downloaded new fitness applications (item 5), and to have spent more time on social media for leisure (item 6), compared to the participants who scored lower values. The two groups also show significant differences in the time spent online before and during the Covid pandemic.

3.4. Differences among countries

Resulting differences from the cross-country investigation are reported in Table 5. The United Kingdom presented the largest percentage of participants who scored more than 24 on the EAI (11%), followed by Spain (5.7%), Hungary (4.3%), Japan (1.4%), and Lithuania (1.3%). Respondents with a scoring above 21 for the AAI were mainly from Hungary (19.1%), followed by United Kingdom (18.9%), Lithuania (14.3%), Japan (11.4%), and Spain (8.0%). With regards to the SCS, participants scoring less than 27 belonged primarily to the United Kingdom population (32.3%), followed by Hungary (19.1%), Spain (14.9%), Japan (11.4%) and Lithuania (10.3%). With regards to the fitspiration-related items, results concerning the influence perceived from popular fitness profiles on social network platforms (*"1. I feel that influencers I follow affect my look more than before"* showed significant differences across countries. Similar trends were found for the other items, with the United Kingdom population reaching mean scoring and percentages greater than the other investigated countries. Specifically, the inquiry on changes inherent to new influencers' profile followed (item 3) showed significant differences in the five populations. Likewise, responses to item 4 (*"I feel pressurized to exercise because of the constant exposure to exercise on social media"*) yielded a greater mean score in the UK population ($M = 2.21$, $SD = 1.26$), with Lithuania ($M = 1.73$, $SD = 0.99$), Japan ($M = 1.57$, $SD = 0.86$), and Hungary ($M = 1.49$, $SD = 0.78$) coming after. For this item, responses from the Spanish sample were not available. Participants from the UK represented the greatest percentage of those who downloaded new applications for fitness purposes during the period of social distancing ($n = 32$, 25.2%), followed by Spain ($n = 49$, 18.7%), Lithuania ($n = 33$, 14.8%), Hungary ($n = 6$, 12.8%), and Japan ($n = 4$, 5.7%). Lastly, the UK group reported to have spent more time on social media activities in the period of domestic isolation ($M = 3.65$, $SD = 0.94$), compared to Spain ($M = 3.56$, $SD = 1.17$), Lithuania ($M = 3.48$, $SD = 1.01$), Japan ($M = 3.37$, $SD = 1.12$) and Hungary ($M = 2.98$, $SD = 1.05$), emphasizing a significant difference among countries ($F_{(4,724)} = 3.82$, $p = 0.004$).

Table 4
Responses on fitspiration for participants who scored below/above cut-off value at the AAI.

	AAI <21	AAI >21	Group Differences	*p-value*
	N = 634	**N = 95**		
$SCS_{\_below\ 27}$	80 (12.6%)	40 (42.1%)	$X^2 = 52.240$	**<0.001**
1. I feel that the influencers I follow affect my look more than before	1.63 (0.93)	2.26 (1.31)	$t = -5.82$	**<0.001**
2. I feel more prone to use products or supplements recommended by influencers or seen on the Internet	1.50 (0.85)	1.92 (1.14)	$t = -4.30$	**<0.001**
3. I started to follow more influencers on social media in relation to fitness or sport activity	1.79 (1.13)	2.32 (1.41)	$t = -4.13$	**<0.001**
4. I feel more pressurized to exercise because of the constant exposure to exercise on social media *(without Spain)*	1.69 (0.95)	2.47 (1.38)	$t = -6.05$	**<0.001**
5. I downloaded any new fitness app during this period of physical distancing	99 (15.6%)	25 (26.3%)	$X^2 = 6.70$	**0.010**
6. Since physical distancing I have spent time on non–work or study-related online activities, such as Social Networking	3.44 (1.06)	3.86 (1.13)	$t = -3.44$	**0.001**
Time online pre-Covid	2 [1; 3.5]	3 [2; 4]	$U = 23544.5$	**<0.001**
Time online during Covid	4 [2; 5.5]	5 [4; 8]	$U = 20876$	**<0.001**
Variation of time online	1 [0; 2]	2 [1; 4]	$U = 22217.5$	**<0.001**

Results in bold are statistically significant. Item 6 includes browsing social media sites and messaging or communication over online social platforms. X^2 = chi-square test; t = Student's t-test.

3.5. Differences between sexes

Table 6 reports the main results concerning the differences between male and female participants emerging from the completion of the questionnaire and of the inquires related to fitspiration attitudes and exposure to exercise on social media. Significant outcomes emerged in the comparison of AAI means and in the percentage of respondents scoring over 21. Respectively, women show a higher mean score compared to men ($t = -5.42$, $p < 0.001$), and constituted most of the sample that exceed the cutoff value ($X^2 = 6.44$, $p = 0.011$). Moreover, women were most likely to start following influencers in relation to fitness activities ($t = -2.23$, $p = 0.027$) and to spend more time on Social Network ($t = -3.99$, $p < 0.001$) compared to men. Since the difference in AAI scoring was statistically salient, further analyses were conducted on the female sample solely. Results are displayed in Table 7.

3.5.1. Fitspiration-related inquiries

With respect to attitudes and behaviors concerning fitspiration, differences between the male and female groups were observed in items investigating the variations in following more fitness/sport popular profiles on social media (*"I started to follow more influencers on social media in relation to fitness/sport activity"*, $t_{(728)} = -2.23$, $p = 0.027$, $d = 0.17$) and the time spent on social media platforms for leisure during domestic self-isolation (*"Since physical distancing, I have spent time on non-work or study-related activities, such as Social Networking"*, $t_{(728)} = -3.99$, $p < 0.001$, $d = 0.33$), with women reporting greater mean values for both items compared to men. No significant results emerged with regards to sex differences in IPEDs consumption, pressure felt to do physical exercise due to social media or influencers' profile exposure, or the download of fitness applications.

3.5.2. Exercise Addiction Inventory

Among the 729 participants from five different countries considered in this study, results showed a mean score of 16.85 ($SD = 4.28$) on the EAI, with male participants displaying significantly higher values ($M_{male} = 17.40$, $SD = 4.38$) than their female counterparts ($M_{female} = 16.64$, $SD = 4.22$), $t_{(728)} = 2.13$, $p = 0.034$, d = 0.18. Scores equal to or above the cutoff point of 24, indicating problematic exercise with the

Table 5
Fitspiration investigation, Exercise Addiction Inventory (EAI), Appearance Anxiety Inventory (AAI), and Self-Compassion Scale (SCS) scores with specification for country differences.

	Spain N = 262	Lithuania N = 223	UK N = 127	Japan N = 70	Hungary N = 47	CountryDifferences	*p-value*
$EAI_{\_over\ 24}$	15 (5.7%)	3 (1.3%)	14 (11.0%)	1 (1.4%)	2 (4.3%)	$X^2 = 17.65$	**0.001**
$AAI_{\_over\ 21}$	21 (8.0%)	32 (14.3%)	24 (18.9%)	9 (12.9%)	9 (19.1%)	$X^2 = 11.57$	**0.021**
$SCS_{\_below\ 27}$	39 (14.9%)	23 (10.3%)	41 (32.3%)	8 (11.4%)	9 (19.1%)	$X^2 = 31.26$	**<0.001**
1. I feel that the influencers I follow affect my look more than before	1.77 (1.08)	1.56 (0.84)	2.06 (1.19)	1.59 (0.91)	1.38 (0.68)	$F = 6.93$	**<0.001**
2. I feel more prone to use products or supplements recommended by influencers or seen on the Internet	1.52 (0.90)	1.52 (0.86)	1.66 (0.99)	1.56 (0.88)	1.60 (0.88)	$F = 0.70$	0.596
3. I started to follow more influencers on social media in relation to fitness or sport activity	1.70 (1.06)	1.73 (1.10)	2.04 (1.20)	1.61 (1.01)	1.70 (1.06)	$F = 2.97$	0.019
4. I feel more pressurized to exercise because of the constant exposure to exercise on social media	–	1.73 (0.99)	2.21 (1.26)	1.57 (0.86)	1.49 (0.78)	$F = 9.62$	**<0.001**
5. I downloaded any new fitness app during this period of physical distancing	49 (18.7%)	33 (14.8%)	32 (25.2%)	4 (5.7%)	6 (12.8%)	$X^2 = 14.63$	**0.005**
6. Since physical distancing I have spent time on non-work or study related online activities, such as Social Networking	3.56 (1.17)	3.48 (1.01)	3.65 (0.94)	3.37 (1.12)	2.98 (1.05)	$F = 3.82$	**0.004**
Time online pre-Covid	2.0 [1.0; 3.0]	2.0 [1.0; 3.17]	3.0 [2.0; 5.0]	3.0 [2.0; 4.0]	3.0 [1.0; 5.0]	**50.519**	**<0.001**
Time online during Covid	3.5 [2.0; 5.0]	4.0 [2.0; 5.0]	5.0 [3.0; 8.0]	4.0 [2.0; 6.0]	5.0 [2.0; 6.0]	**34.710**	**<0.001**
Variation of time online	2 [1; 2]	1 [0.5; 2]	2 [1; 3]	1 [0; 2]	1 [0; 3]	**17.690**	**0.001**

Results in bold are statistically significant. For items related to time spent online before and during the pandemic, Kruskal-Wallis test is used for comparison. Item 6 includes browsing social media sites and messaging or communication over online social platforms. X^2 = chi-square test; F = one-way ANOVA.

Table 6
Comparison for sex differences in fitspiration-related items, Exercise Addiction Inventory (EAI), Appearance Anxiety Inventory (AAI), and Self-Compassion Scale (SCS) scoring.

	Total Sample	Male	Female	Sex	*p-value*
	N = 729	**N = 202**	**N = 527**	**Differences**	
1. I feel that the influencers I follow affect my look more than before	1.71 (1.01)	1.64 (0.99)	1.74 (1.02)	$t = -1.15$	0.253
2. I feel more prone to use products or supplements recommended by influencers or seen on the Internet	1.55 (0.90)	1.48 (0.87)	1.58 (0.91)	$t = -1.32$	0.186
3. I started to follow more influencers on social media in relation to fitness or sport activity	1.85 (1.18)	1.70 (1.12)	1.91 (1.20)	$t = -2.23$	**0.027**
4. I feel more pressurized to exercise because of the constant exposure to exercise on social media *(without Spain)*	1.81 (1.06)	1.70 (1.06)	1.85 (1.06)	$t = -1.37$	0.173
5. I downloaded any new fitness app during this period of physical Distancing	124 (17.0%)	34 (16.8%)	90 (17.1%)	$X^2 = 0.01$	0.0.93
6. Since physical distancing I have spent time on non-work or study-related online activities, such as Social Networking	3.50 (1.08)	3.24 (1.09)	3.59 (1.06)	$t = -3.99$	**<0.001**
EAI_{Mean}	16.85 (4.28)	17.40 (4.38)	16.64 (4.22)	$t = 2.13$	**0.034**
^{EAI}-over 24	35 (4.8%)	12 (5.9%)	23 (4.4%)	$X^2 = 0.79$	0.373
AAI_{Mean}	15.72 (4.67)	14.26 (4.47)	16.29 (4.63)	$t = -5.42$	**<0.001**
^{AAI}-over 21	95 (13.0%)	16 (7.9%)	79 (15.0%)	$X^2 = 6.44$	**0.011**
SCS_{Mean}	32.40 (5.99)	33.40 (5.77)	32.02 (6.04)	$t = 2.84$	**0.005**
^{SCS}-below 27	120 (16.5%)	27 (13.4%)	93 (17.6%)	$X^2 = 1.95$	0.163
Time online pre-Covid	2.0 [1.0; 4.0]	2.75 [1.38; 4.0]	2.0 [1.0; 3.5]	$U = 48549.5$	0.062
Time online during Covid	4 [2.0; 6.0]	4.0 [2.0; 7.0]	4.0 [2.0; 6.0]	$U = 49224.0$	0.113
Variation of time online	1.5 [0.5; 2]	1.35 [0; 3.0]	1.5 [0.5; 2.0]	$U = 51595.5$	0.514

Results in bold are statistically significant. Item 6 includes browsing social media sites and messaging or communication over online social platforms. t = Student's t-test; X^2 = chi-square test. U = Mann-Whitney test.

risk for addiction, were observed in the 4.8% ($n = 35$) of the total sample. In this group, the percentage of men ($n = 12$, 5.9%) did not differ significantly from the number of women ($n = 23$, 4.4%) ($X^2_{(1, 34)} = 0.79$, $p = 0.373$).

Table 7
Socio-demographic features and survey responses among the female participants who scored more than the cut-off value (21) for the AAI, divided and compared according to age differences.

	18 - 25 yo	>25	Age	*p-value*
	N = 25	N = 54	Differences	
Country			6.606	0.145
United Kingdom	10 (40.0%)	10 (18.5%)		**0.041**
Lithuania	9 (36.0%)	20 (37.0%)		0.929
Spain	5 (20.0%)	12 (22.2%)		0.823
Hungary	1 (4.0%)	5 (9.3%)		0.659
Japan	0 (0.0%)	7 (13.0%)		0.91
Occupation			$X^2 = 34.781$	**<0.001**
Employed	7 (20.0%)	38 (70.4%)		
Student	17 (68.0%)	3 (5.6%)		
Freelance	0 (0.0%)	10 (18.5%)		
Unemployed	1 (4.0%)	3 (5.6%)		
Activity			$X^2 = 0.050$	0.823
None	5 (20%)	12 (22.2%)		
Yes	20 (80%)	42 (77.8%)		
IPEDs usage			$X^2 = 0.138$	0.771
None	15 (60.0%)	30 (55.6%)		
Yes	10 (40.0%)	24 (44.4%)		
EAI_{Mean}	17.52 (4.13)	17.81 (5.07)	$t = 0.254$	0.800
^{EAI}-over 24	1 (4.0%)	6 (11.1%)	$X^2 = 1.070$	0.422
SCS_{Mean}	24.92 (5.83)	28.04 (6.06)	$t = 2.152$	**0.035**
^{SCS}-below 27	17 (68.0%)	20 (37.0%)	$X^2 = 6.580$	**0.010**
AAI_{Median} [Q_1; Q_3]	23.0 [22.0; 26.83]	24.0 [21.8; 27.0]	$U = 651.0$	0.799
Time online pre-Covid	4.0 [3.0; 4.0]	2.0 (1.0; 3.0)	$U = 361.0$	**0.001**
Time online during Covid	6.0 [4.0; 8.0]	5.0 [2.9; 7.0]	$U = 477.5$	**0.036**

Results in bold are statistically significant. Item 6 includes browsing social media sites and messaging or communication over online social platforms. X^2 = chi-square test; U = Mann-Whitney test.

3.5.3. Appearance Anxiety Inventory

With regards to the AAI, the total sample reported a mean score of 15.72 ($SD = 4.67$), with the female group showing greater values ($M_{female} = 16.29$, $SD = 4.63$) compared to the male group ($M_{male} = 14.26$, $SD = 4.47$), high-lighting a statistical significance between the two populations ($t_{(728)} = -5.42$, $p < 0.001$, $d = 0.45$). A further inspection into the responses above the cut-off value ($N = 95$), set at 21, which suggest higher levels of appearance-related anxiety, emphasized once again a significant difference between male and female groups ($X^2 = 6.44$; $p = 0.011$), with a greater number of women ($N_{female} = 79$) showing appearance anxiety compared to men ($N_{male} = 16$). Due to the relevance of this result, the subgroup of female participants belonging to the group that scored above than the cut-off value was subsequently analyzed to check for age differences. Table 7 shows differences between young women (18–25 years old) and those older than 25 years of age in the responses provided in the survey. Statistically significant outcomes between age groups emerged in the United Kingdom sample, with a prevalence of young women (40.0%) reporting greater levels of appearance anxiety. The chi-square test revealed considerable differences also in the composition of the sample with regards to occupational situation ($X^2 = 34.781$, $p < 0.001$). Concerning physical activity and the consumption of enhancers/supplements, no significant distinction was detected by women's age, including scoring for the EAI. Interestingly, outcomes for the SCS differentiated significantly between the two groups of age, both for the overall average scores ($t_{(77)} = 2.152$, $p = 0.035$) and for the results below the cut-off point ($X^2 = 6.580$, $p = 0.010$). Another divergent factor between the young women and those older than 25 years of age refers to the time spent online before the period of self-isolation and during the pandemic. No differences

emerged in respect of fitspiration exposure and attitude.

3.5.4. Self-Compassion Scale

Referring to the total sample of 729 participants, mean scores for the SCS resulted statistically different between men and women ($t_{(728)} = 2.84$, $p = 0.005$, $d = 0.23$), with the former achieving greater mean values compared to their female counterparts. Further inquiries on the participant scoring less than the cut-off value ($n = 120$, 16.5%), indicating low levels of self-compassion and self-empathy, did not emphasize discrepancies between the number of men ($n = 27$, 13.4%) and of women ($n = 93$, 17.6%) at a statistical level.

4. Discussion

This study focuses on the fitspiration phenomenon that has spread widely on many popular social media platforms in the first period of physi-cal distancing due to the COVID-19 pandemic while taking into account both behavioral (i.e., compulsive exercise, IPEDs consumption) and emotional/psychological (i.e., appearance-related anxiety, self-compassion) responses (Cataldo et al., 2021b). Within the same project, Dores et al. (2021) investigated in detail the relationships among IPEDs consumption, compulsive exercise, while Shibata et al. (2021) explored the intertwined association among mental health, excessive physical exercise and IPEDs intake. The aim of the present study is to examine the role of social media influence as a possible factor contributing to a set of connected issues attributable to the fitspiration construct.

4.1. IPEDs users vs non-users confrontation

Comparing IPEDs users and non-users, the scoring to fitspiration and social media influence (items 1–5) were significantly different between the two groups, especially those assessing the recommendation of IPEDs from influencers (item 2) and the increased of popular profiles followed in relation to fitness or sport activity (item 3). However, the variations in time spent on social networking activities was comparable between the two populations (item 6). This could imply that it is the quality of the messages shared rather than the quantity of social media exposure that might affect or promote IPEDs utilization, advocating the need for a broader understanding of the phenomenon of influencers, especially those operating in fitness and/or beauty industries. Moreover, also the ratio of scoring over the cut-off values from EAI and AAI were significantly different. Tak-ing a closer look to the results involving EAI and AAI, respondents who scored above the cut-off values, as shown in Tables 3 and 4, were also keener to use supplements suggested by influencers (item 2). Conversely, self-compassion levels below cut-off edge were not statistically significant, suggesting that IPEDs consumption might be explained by purposes connected to the performance of the physical activity rather than emotional reasons. Taken together, these results advocate a need to further investigate the role of fitness influencers in increase the knowledge on IPEDs and demystify the effects on both the body and fitness performance. Furthermore, it is necessary to investigate more in detail the causal relationship between these factors, to intervene on the IPEDs consumption at a preventive level and reduce the risk for abusive usage (Dores et al., 2021; Shibata et al., 2021).

4.2. Fitspiration-related factors and differences between sexes

According to a recent investigation by Griffith and colleagues on exposure to fitspiration contents highlighted that women tend to be more subjected to fitness-related images compared to men (Griffiths and Stefanovski, 2019). Results from the present study support this finding, especially with regards to the increased number of fitness influencers followed during the lockdown and the intensified time spent on social media. This heightened contact with images showing toned and slim bodies might have, in turn, incremented the appearance anxiety associated with body image, and decreased self-compassion. The latter was significantly lower in women compared to men in the considered sample, in agreement with other findings (Arigo et al., 2021; Souza and Hutz, 2016) (please, see Yarnell et al. for a meta-analysis (Yarnell et al., 2015). A very interesting outcome emerging from the statistical analyses, is that the AAI represented the fac-tor with the strongest effect in determining differences between the two samples, both when analyzing the average score and the high-risk group. These results are in line with previous findings regarding the offline context (Garcia, 1998; Dion et al., 1990), and virtual social interactions (Hawes et al., 2020; Cataldo et al., 2021a). However, results in literature are not consistent, as a lot of research has been focused exclusively or predominantly on female samples (Griffiths and Stefanovski, 2019). It appears clear that both these two factors, appearance anxiety and self-compassion, are associated with body image concerns (Barron et al., 2021; Griffiths and Stefanovski, 2019; Cohen et al., 2017) with greater effects in women. In fact, in the focus on the female sample showing high risk for appearance-related anxiety, self-compassion turned out to be a significantly connected domain, together with the time spent online, which significantly increased during the self-isolation period. Moreover, the present findings highlight further intra-sample differences, with regards to age groups. Younger women, aged between 18 and 25 years old, displayed lower scoring for SCS compared to the older group. A reason could reside in the complex nature of self-compassion, which is described as a resultant of multiple factors, such as self-kindness, common humanity, mindfulness (Neff, 2003a), together with self-judgment, isolation, and over-identification with negative thoughts (Neff, 2016). These components have been proved to be sensitive to age groups, and generally self-compassion is considered to increment in time (Murn and Steele, 2020), and to act as a protective factor against health issues, both physical and mental (Allen et al., 2012; Homan, 2016). As such, promoting activities oriented to self-compassion enhancement might bring more benefit, especially in stressful periods like indoor lockdown where general health is threatened. Preliminary results obtained from the additional analysis in the Supplementary Material suggest a negative correlation between self-compassion and both fitspiration and appearance anxiety (see Table S1 in the “Supplementary Materials”). A further investigation between the sum of fitspiration-related items and AAI scores shows that the effect is stronger when SCS scores act as a mediator. However, when the fitspiration-related items are considered individually, the direct effect is greater than the indirect effect (see Table S3 in the “Sup-plementary Materials”). This discrepancy could suggest that, while targeted features of the examined construct are more associated with appearance anxiety, the general concept of the phenomenon resents the influence of the levels of self-compassion. In turn, this result might reflect the multifaceted nature of fitspiration that involves different mechanisms according to the specific component that is under investigation.

4.3. Differences in time spent online before and during the pandemic

Overall, a considerable increase of time spent online was recorded in all the involved countries (see Table 5). Within this result, it is possible to note some differences especially concerning the outcomes that more appear to have resented of this increase. In fact, significant values were also find between the groups on users and non-users of IPEDs (see Table 2) and between AAI levels below and over the cutoff score (see Table 4). More in detail, the difference remained at a significant level in the comparison of the female respondents scoring greater values of AAI and divided by age (see Table 7). However, the time spent online was not a significant outcome in the comparison concerning the excessive physical activity (see Table 3). Taken together, these differences suggest that for some factors, such as appearance anxiety and IPEDs consumption, a prolonged exposure to online content might exacerbates pre-existing issues, while the same is not confirmed for excessive workout. This slight though relevant distinction could indicate that, especially in

the case of physical activity, the quality of the media to which the person is exposed to plays a more impactful role in the emergence or maintenance of the problematic behavior.

4.4. Differences among countries

The involvement of more countries provided the possibility to compare the contribution of contextual characteristics in the manifestation of the specific phenomenon analyzed. With regards to the online connection, all the countries showed and increased amount of time spent during the period of social or physical distancing, compared to the pre-Covid condition. This result might suggest a general greater exposure to idealistic contents, offering a partial or filtered version of reality, that could have contributed to exacerbate already existing maladaptive mechanisms, especially those involving the body-image like appearance anxiety and excessive exercise. The significant differences across countries, in relation to social media activity and influence were showed the UK the highest mean score for all the items often followed by Spain (items 1,3,5,6). It is possible to suppose that a greater availability of fitness contents in specific languages, especially on social media and on the internet, such as English and Spanish, could impact more compared to other countries the effect of the exposure, with the linguistic contents (audio or written) boosting the effect of graphic/video contents (Blanco et al., 2010). Similarly, UK and Spain presented higher percentages of respondents with increased risk for problematic exercise, together with a greater amount of time spent online, both pre-Covid and during the pandemic. The combination of these factors appears to confirm the association between problematic physical workout and protracted exposure to online sport or fitness related contents. For more detailed cross-country confrontation on EAI, AAI and SCS, please refer to Dores and colleagues (Dores et al., 2021).

5. Conclusions

The present multicultural investigation on fitspiration phenomenon and its related factors (i.e., excessive/compulsive exercise, appearance-related anxiety, use of IPEDs) captures a rich frame of a complex construct during a difficult period characterized by physical or social distancing, self-isolation and uncertainties caused by the COVID-19 pandemic. Results add evidence concerning fitspiration, which is a recent phenomenon that have increased enormously in the last years. As people spent more time on social media during the domestic lockdown, it is important to define what kind of user could be more at risk to develop a problematic usage of social platform or to be influenced by trends promoted by popular users, as these behaviors might be triggered or worsen in stressful situations, such as the restrictions due to the Sars-Cov-2 outbreak. A strength of this investigation is that data were collected promptly at the very beginning of the social and physical isolation, especially in European countries, representing a strength of the study, together with the inclusion of multiple cultural groups and a comparison between the men and women. Nonetheless, there are a few limitations that need to be accounted. First of all, the sample consists of individuals recruited *via* internet-based services and took part in the study voluntarily, affecting the actual generalizability of results to a wider population. However, research on the discussed topics utilized similar procedures, hence the comparison of results is feasible. Moreover, the study adapted a methodology based on self-report questionnaires, which completion could be resent of personal feelings, social desirability. With regards to the questionnaires, it is important to mention that for the AAI a statistical cut-off point was employed to detect high anxiety related to physical appearance, instead of a clinical score, which is vacant. Furthermore, a description of social media activities was not collected, to have a clearer view of the influences of specific platforms, of the patterns of usage (i.e., passive vs. active), and eventual fitness celebrities followed. It is important to mention that the items were created specifically for this study since no other tool assessing fitspiration is currently validated and available. Therefore, further efforts are required to develop new psychometric measures to further investigate the fitspiration phenomenon both as a whole and in its different components. Lastly, the cross-sectional design adopted by this study prevents from formulating causal inferences; however, associations among the diverse concurring factors provided results for subsequent speculations. All these limitations were largely affected by constraints due to external contingencies and could be overcome by future research.

Additional investigations should focus on the role of fitspiration influencers on social media, to better investigate the frequency, the characteristics of media posted, and feedback received from other users. The importance to delineate this increasing phenomenon accurately is of great relevance for the implication in clinical work in several fields (i.e., psychological, psychiatric, nutrition) and to outline more personalized interventions, aimed to improve the overall biopsychosocial quality of life. Despite the limita-tions aforementioned, this investigation contributes to the growing field of research surrounding new social media trends and related risks. As such, future studies should investigate fitspiration-related mechanisms also in relation to eating habits and the perceived quality of life, as pre-(Cataldo et al., 2021b). However, study, such factors have not been taken into viously theorized in the model by Cataldo and colleagues in the context of the present consideration as they might have been affected by the pandemic-derived contingencies, framing a less reliable overview of the issue. Findings from the present study could serve not only to highlight the relevance of cross-cultural diversities that might enhance the urge to exercise but also to help local institutions in promoting more proper initiatives for indoor fitness activities in the targeted populations. Moreover, results could be implemented in delineating specific prevention programs addressed to specific populations, according to their specific fragility, characteristics, and needs.

Ethics

The studies involving human participants were reviewed and approved by Human Sciences Ethics Committee at the University of Hertfordshire (HSK/SF/UH/00104). and by the Ethics Committees of each participating country. It complied with the Declaration of Helsinki and with the European General Data Protection Regulation. The participants provided their written informed consent to participate in this study.

Authors contribution

IC: Writing – Original Draft; Investigation (analysis of results); Data Curation; Writing – Review and Editing.

JB: Formal Analysis; Investigation; Data Curation; Writing – Review and Editing.

ARD: Investigation; Data Collection; Writing – Review and Editing.

IPC: Writing – Review and Editing.

PS: Data collection.

IDL: Data collection.

MAGM: Data collection.

ARMV: Data collection.

ZD: Data collection; Funding Acquisition.

AS: Data collection.

KEA: Data collection.

MS: Data collection.

KK: Data collection.

HF: Data collection; Funding Acquisition.

EMAA: Data collection.

GM: Data collection.

FB: Data collection; Funding Acquisition.

IGB: Data collection.

AP: Data collection.

HBJ: Data collection.

GE: Supervision; Writing – review and editing.

OC: Conceptualization; Investigation; Writing – review and editing; Supervision; Funding Acquisition.

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Declaration of competing interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Data availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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Appendix A. Supplementary data

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