e-Health

Digital Resources as a Tool for Physical Activity Promotion and Attendance among University Students: a Pilot Study

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Keywords

Digital resources • Physical activity • University students • Perceived well-being • COVID-19

Summary

Background. *Various digital resources (DR) to support people in staying physically active have recently been developed and diffused, especially among young people. Our study aimed to evaluate how the epidemiological scenario determined by the COVID-19 pandemic may have influenced the current methods of carrying out physical activity (PA) among university students.*
Methods. *An online survey was conducted to analyze DR usage habits as a tool useful for PA attendance before, during, and after the COVID-19 pandemic. Data from the World Health Organization (WHO)-5 questionnaire and the Body Mass Index were also collected.*
Results. *The survey, conducted on 656 university students (77.0 % female, 22.2 % male, 0.8 % not specified), revealed increased use of DRs during the confinement period, from 21.3% to 74.3%, as expected. Interestingly, DR usage remained 7% higher than before. Moreover, PA levels were related to higher perceived well-being (WHO-5), and DRs were associated with low/moderate PA intensity and lower BMI values. Specifically, DR use was revealed in 32% of those having a BMI under 24.9 and 17% of those with a BMI higher than 25.*
Conclusion. *This research highlights how DRs can represent a simple and economical way to stay active. Considering the importance of an active lifestyle for general well-being and health status maintenance, DR could be considered a good tool and included in policies to promote PA attendance in university students.*

Introduction

Physical activity (PA) plays a fundamental role in overall health, body composition, and perceived well-being, representing a key component of a healthy lifestyle. Keeping active physical habits leads to a wide range of benefits, such as an improvement in cardiovascular health and a decreased risk in type 2 diabetes and some types of cancer risks [1, 2]. PA positively impacts body weight distribution [3]; additionally, it can also have a positive impact on mental health, helping to reduce stress, anxiety, and depression in people of all ages and improving mood, sleep quality, and cognitive function [4]. In contrast, sedentary behavior has been associated with an increased risk of several chronic non-communicable diseases [5].
Unfortunately, the proportion of adults engaged in exercise, sport, or lifestyle PA, in general, has constantly decreased over the years [6], while sedentary time has increased over the last 10-year period among the entire population, including university students [7]. Although university students attending PA sciences and kinesiology programs are more prone to exercise and self-report more activity than students of other faculties [8], a recent study showed a decrease in fitness level and higher abdominal adiposity in a cohort of students, with respect to another group of students from the same institution and program, 30 years prior, potentially attributed to excessive stationary time [9].
Web-based technology and screen time have usually been considered as counterparts of active lifestyle behaviors. However, due to their appreciation and popularity, especially among young adults and children, but with increasing diffusion in other age groups, different technological devices aimed at active gaming and exercise have been developed [10]. Recent technologies provide various strategies for exercising, even in individual settings and at home. This has been particularly useful in maintaining activity during the COVID-19 pandemic: indeed, it has been reported that the use of digital supports has been associated with a positive attitude towards exercise at home during isolation [11]. Apart from simple fitness tracking apps, several examples of technologies aimed at supporting exercise are available, such as fitness programs that utilize interactive online equipment (treadmills, stationary bikes), virtual reality headsets, consoles designed to wirelessly monitor the user's movement, tele-exercise and eHealth, on-demand workout services or live streaming exercise sessions, distance learning classes, and webinars [12].
When the use of such innovative training devices was

analyzed in the context of health recommendations in pre-pandemic era, it proved to possibly constitute a sufficiently useful tool to perform PA to meet the needs of leisure time activities, and to reach the recommended intensity of PA to obtain pro-health benefits [13]. Therefore, digital resources (DR) have the potential to be effective tools for increasing participation in health-oriented PA.

In response to the spread of the SARS-CoV-2 virus in several countries, including Italy, quarantine measures were implemented to prevent infection transmission [14]. Among these measures, there was the closure of gyms, swimming pools, clubs, sports centers, and associations, except for those engaging in individual activities. Due to the stringent limitations on leaving home, lifestyle habits underwent significant changes, leading to a notable decrease in overall PA and an increase in sedentary behavior, along with the associated well-known risks of insufficient PA [15, 16].

In connection with the above, the PA "at home" was promoted by WHO during the pandemic confinement to maintain PA benefits in that challenging situation [17]. In that scenario, the use of DRs appeared to be convenient to stay active and continue exercising. With these premises, further use of PA-related technologies is likely to occur.

This study aims to analyze PA habits of university students before, during, and after the COVID-19 restriction period in relation to BMI and perceived well-being, with a particular focus on the exploitation of using DRs and their impact on current PA habits in such populations.

Methods

Study design

A descriptive cross-sectional study was carried out to analyze DR usage habits as a useful tool for PA attendance before, during, and after the COVID-19 pandemic. The study involved university students attending the University of Urbino Carlo Bo, Urbino, Italy. All participants were fully informed about the study requirements and were asked to accept the data sharing and privacy policy (in compliance with the privacy guarantee rules; EU Regulation 2016/679) before participating in the study. The study has been approved by the Ethics Committee of the University of Urbino Carlo Bo (Approval Number: 66/23.02.2023).

Data collection methods

Data were obtained from an online questionnaire, "The use of technologies and social media for the practice of physical activity," designed to collect information on physical habits in terms of frequency, intensity, duration, type, use of DRs such as electronic devices or use of online platforms, before, during, and after the COVID-19 pandemic restriction period, to date. Data were also related to BMI and perceived well-being. Data was collected using an *ad hoc* online questionnaire created on Google Forms and distributed through an email sent by the university secretariat following authorization from the ethics committee.

Sample characteristics

The study population considered was all students attending the University of Urbino Carlo Bo in the academic year 2022/2023. Specifically, the questionnaire was sent to a total of 14,127 students, 9,254 females, and 4,873 males. The sample size was estimated using the standard formula for calculating the sample size needed in population analyses, assuming a 95% confidence level ($Z = 1.96$), an estimated proportion of 0.5 ($p = 0.5$), and a margin of error of 5% ($E = 0.05$); applying the finite population correction and estimating data collection from 14,127 students, we obtain a needed sample size of 374. Details about the academic fields of students attending the University of Urbino are reported in the Supplementary Materials (Fig. S1).

Survey administration

The survey was conducted between 7th March 2023 and 28th April 2023. Students were asked to indicate their PA habits before (8th March 2020), during (in Italy from 8th March 2020 to 25th May 2020 [14]), and after the end of the pandemic home confinement period (from the moment in which sports facilities were reopened and the practice of PA was again possible; the dates were different according to local epidemiological data about COVID-19 incidence at the regional level). Multiple participation was prevented by making mandatory the use of the university account to fill out the questionnaire and limiting each participant to one reply.

The questionnaire, reported in the Supplementary Materials (Tab. S1), was divided into three main sections. In the introductory part, personal data were requested, such as the province of origin, sex, age, height, and whether the student's home had an uncovered area available/private garden, outdoor area/common garden, or no outdoor area/garden. The second part aimed to collect information on PA practice before, during, and after the COVID-19 restriction period in terms of indoor/outdoor PA, frequency (days per week), and perceived intensity (vigorous, moderate/vigorous, moderate/low, low). The weight was asked in order to calculate the body mass index (BMI) in each period. The survey also investigated the attendance or the use of courses, online or digital platforms, multimedia tools or equipment, apps, online lessons, or social media to practice PA. The questions included the type of services used by the student [Streaming services for exercise/Lessons facilitated online live or recorded, via platforms/Free apps /Social media/Active electronic games (*e.g.* games using Wii Balance Board, Xbox Kinect, *etc.*)/Equipment connected to the internet/Fitness programs for subscribers, via app or online/Online or digital training or running platforms] and the frequency of use (Rarely/Sometimes/Often/Always). Students were specifically asked to indicate the use of DRs only if actively used for carrying out the exercise, and not only for monitoring the activities. Those who continued to use technology to practice PA even after the end of the state of emergency were asked to indicate the reasons for their choice.

The last part of the survey included the World Health

Organization-Five Well-Being Index (WHO-5), which referred to the last 14 days [18]. The WHO-5 items are: (1) "I have felt cheerful and in good spirits", (2) "I have felt calm and relaxed", (3) "I have felt active and vigorous", (4) "I woke up feeling fresh and rested" and (5) "My daily life has been filled with things that interest me". Each of the five items is scored from 5 (all of the time) to 0 (none of the time). The raw score, therefore, theoretically ranges from 0 (absence of well-being) to 25 (maximal well-being). Because scales measuring health-related quality of life are conventionally translated to a percentage scale from 0 (absent) to 100 (maximal), the perceived well-being raw score obtained from the WHO-5 questionnaire was multiplied by 4 [18].

Statistical analysis

Exploratory statistical analyses were conducted in order to find differences in the distribution of the physically active students according to gender, availability of outdoor spaces, and BMI. Differences in the distribution of PA attendance according to gender and availability of outdoor spaces were evaluated by chi-square test. Differences in BMI between active and sedentary students were evaluated by students' t-test. Differences in DR use, considering PA type and intensity, were evaluated using the chi-square test.

Spearman's rho coefficients were calculated to find correlations between BMI (POST) and WHO-5 score and age, PA frequency (days per week, POST), PA intensity (POST), and the frequency of DR use (POST).

Results

Study population

A total of 656 students attending the University of Urbino participated in the study (77.0 % female, 22.2 % male, 0.8% not specified). Considering that the student population of the academic year in which the study was conducted was 14,127 students, of whom 9,254 were female, the sample in this study was 5.49% and 3.01% representative for females and males attending the university, respectively. Considering students' responses based on academic fields, we didn't find any differences between the percentages of students attending the University and the adherence to the study from each group (Fig. S1). The mean age of participants was 26.0 and 27.8 for females and males, respectively. Although the mean age is relatively high, suggesting greater interest in the survey from older students, the median age was 23 for females and 22 for males. This discrepancy was due to the presence of a subset of the adult student population. Responders were: 21.6% in the first, 16.7% in the second, 18.5% in the third, 16.4% in the fourth, and 17.5% in the fifth year of study; 9.5% exceeded the normal duration of the years of study.

PA attendance and Body Mass Index

In Table 1, differences in PA attendance in the study population are reported. PA attendance was about 70% in each of the time periods investigated, without significant differences between periods ($p > 0.05$). Males were more active than females during the pre- and post-restriction period ($p < 0.05$), differing by about 10%. PA attendance was also evaluated considering the availability of outdoor spaces (*i.e.* none, shared, or private gardens), revealing no significant differences in the three periods considered.

Concerning the BMI distribution in the study group, 69.31% of participants showed a BMI under 24.9, while 11.69% and 2.69% were overweight and obese, respectively, without differences between periods considered ($p > 0.05$; chi-squared test), and 16.31% of participants did not indicate their body weight. Significant differences in BMI between active and non-active students were found in female "pre" and male "during" only. BMI values remained essentially stable,

Tab. I. Physical activity attendance in the study population.

		Pre			During			Post		
		PA	no PA		PA	no PA		PA	no PA	
Total[a]	656	445 (67.8)	211 (34.7)		460 (70.1)	196 (29.9)		447 (68.1)	209 (31.9)	
Female[a]	505	330 (65.3)	175 (34.6)		355 (70.3)	150 (29.7)		334 (66.1)	171 (33.9)	
Male[a]	146	111 (76.0)	35 (24.0)		102 (69.9)	44 (30.1)		110 (75.3)	36 (24.7)	
Pns[a]	5	4 (80.0)	1 (20.0)	*p = 0.015*[c]	3 (70.1)	2 (29.9)	*ns*[c]	3 (60.0)	2 (40.0)	*p = 0.035*[c]
Outdoor spaces										
None[a]	212	132 (62.3)	80 (37.7)		139 (65.6)	73 (34.4)		132 (62.3)	80 (37.7)	
Shared[a]	118	84 (71.2)	34 (28.8)		84 (71.2)	34 (28.8)		80 (67.8)	38 (32.2)	
Private[a]	326	229 (70.2)	97 (29.8)	*ns*[c]	237 (72.7)	89 (27.3)	*ns*[c]	235 (72.1)	91 (27.9)	*ns*[c]
BMI										
Female[b]		21.7 ± 3.8	22.7 ± 5.4	*p = 0.035*[d]	22.0 ± 4.7	22.6 ± 4.3	*ns*[d]	22.1 ± 4.6	22.0 ± 3.9	*ns*[d]
Male[b]		22.5 ± 2.9	24.1 ± 4.6	*ns*[d]	22.3 ± 2.8	24.6 ± 4.5	*p = 0.007*[d]	23.6 ± 3.0	23.0 ± 3.6	*ns*[d]
Pns[b]		21.0 ± 2.8	21.4 ± n.c.	n.c.[d]	21.4 ± 3.8	21.4 ± n.c.	n.c.[d]	18.7 n.c.	22.7 ± n.c.	n.c.[d]

[a] *n* (%); [b] mean ± standard deviation; [c] chi-squared test; [d] t-test; *ns*: not significant; n.c.: not calculable; *Pns*: "*prefer not to say*"; PA: physical activity.

without significant variations among the three time intervals (paired ANOVA, not shown).

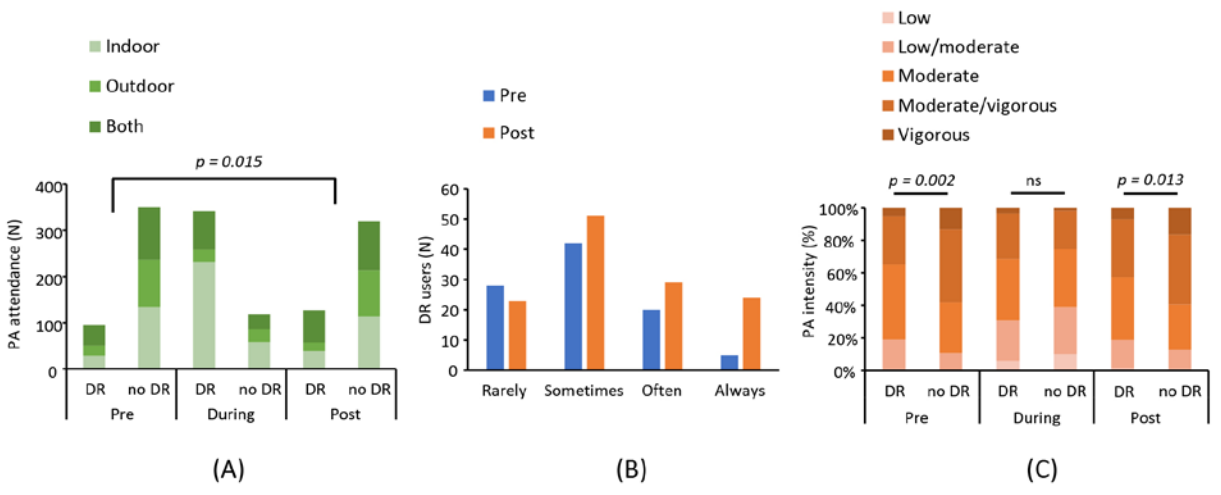
Trends in the use of DRs for PA

The use of DRs in the student population and the influence of the COVID-19 pandemic on their use were then evaluated in physically active participants (Fig. 1). Results revealed a marked increase in DR use during the restriction period, as expected, with a prevalence rising from a starting value of 21.3% to 74.3% and a statistically significant growth ($p < 0.001$) (Fig. 1A). Interestingly, after the end of the restriction period, their use remained more popular than before; in fact, the percentage of students that kept the habit of DRs use for PA attendance was 28.4%, a proportion significantly higher than that of the period before the pandemic restrictions (+7%; $p < 0.05$) (Fig. 1A). DRs were mainly used by female students, representing 77.9 %, 83.6 %, and 79.5 % of total users before, during, and after the pandemic period, respectively. The DRs were mainly used by participants who performed both indoor and outdoor activities during pre- ($p < 0.05$) and post- ($p < 0.01$) restriction periods, whereas, during the pandemic confinement, since PA was forcedly conducted indoors, DR use was more frequent for the at-home PA (Fig. 1A).

Figure 1B outlines the increase in the use of DRs in the period post-COVID-19 restrictions. Specifically, the distribution of DRs frequency changed significantly ($p < 0.01$), with a decrease in the participants who rarely used DRs, and an increase in those who used them often and always. The association between DR use and PA intensity was also analyzed. Results showed a different distribution of PA intensity between DR users and non-users (Fig. 1C). Particularly, low/moderate and moderate PA were more frequent in DR users, with respect to no DR ones, both pre ($p < 0.01$) and post ($p < 0.001$) pandemic restriction periods (Fig. 1C), whereas no significant differences were found during. In other words, except for the home confinement period, people prone to use DRs for PA attendance were likely those practicing recreational activities at low/moderate intensity instead of competitive athletes or exercisers at high fitness levels. However, these considerations need to be confirmed in larger studies. The main type of DRs used was streaming services for exercise, chosen by 40.1% of participants; these services offer a wide range of fitness-related video content accessible for on-demand streaming, including diverse disciplines such as yoga, pilates, high-intensity workouts, dance, and cardio workouts (Fig. 2A). Free apps and social media were chosen by 17.6% and 17.3% of participants, respectively. Live or recorded online lessons were used by 12% of participants. Finally, 8.5% chose fitness programs by subscription, 3.8% chose active electronic games, and only 0.7% chose internet-connected equipment (Fig. 2A).

The reasons why participants continued to use DRs in the post-restriction period were practicality, lower cost, feeling more comfortable, and less waste of time; moreover, approximately 16% of participants learned about DRs during the pandemic period, appreciated these resources, and decided to maintain the new habit (Fig. 2B). Finally, correlations between healthy parameters and age, PA habits, and DR use were analyzed in the post-restriction period. The BMI was chosen as the anthropometric value associated with physical health status. Among active participants, 32% of those having a BMI under 24.9 and 17% of those with a BMI higher than 25 (overweight and obese) use DR. In fact, the univariate analysis showed a slight but significant negative correlation between BMI and DR use, hypothesizing a positive role of DR use in influencing anthropometric values (Tab. III). Moreover, a significant positive correlation between BMI (Post) and age was found.

Fig. 1. Physical activity (PA) and Digital Resource (DR) use in the study population. A) Attendance of PA performed outdoors, indoors, or both in DRs and non-DRs users. B) Frequency of DR use before and post-COVID-19 pandemic restrictions. C) PA intensity in DRs and non-DRs users. Exact p-values are reported; ns, not significant; chi-squared test.



Tab. II. Spearman's correlation coefficients between body mass index and WHO-5, and physical activity habits and digital resource use.

		PA habits		
	Age (n = 656)	Days/week (n = 656)	Intensity (n = 656)	DR use (n = 447)[a]
BMI (Post)	0.191**	*ns*	*ns*	-0.142*
WHO-5 score	*ns*	0.228**	0.260**	*ns*

[a] Active participants only. BMI: Body Mass Index; PA: Physical Activity; DR: Digital Resource. * $p = 0.005$. ** $p < 0.001$.

Perceived mental well-being in DR users

The World Health Organization-Five Well-Being Index (WHO-5), a self-reported measure of current mental well-being based on a short assessment of respondents' feelings over five items, was used to evaluate perceived well-being in survey participants [18]. Physically active and inactive participants have significantly different mean scores ($p < 0.001$), with mean values of 57.3 ± 18.8 and 49.1 ± 20.2, respectively. Regarding PA habits, both frequency and intensity showed a significant positive correlation with the WHO-5 score, regardless of the use of DRs (Tab. III).

Discussion

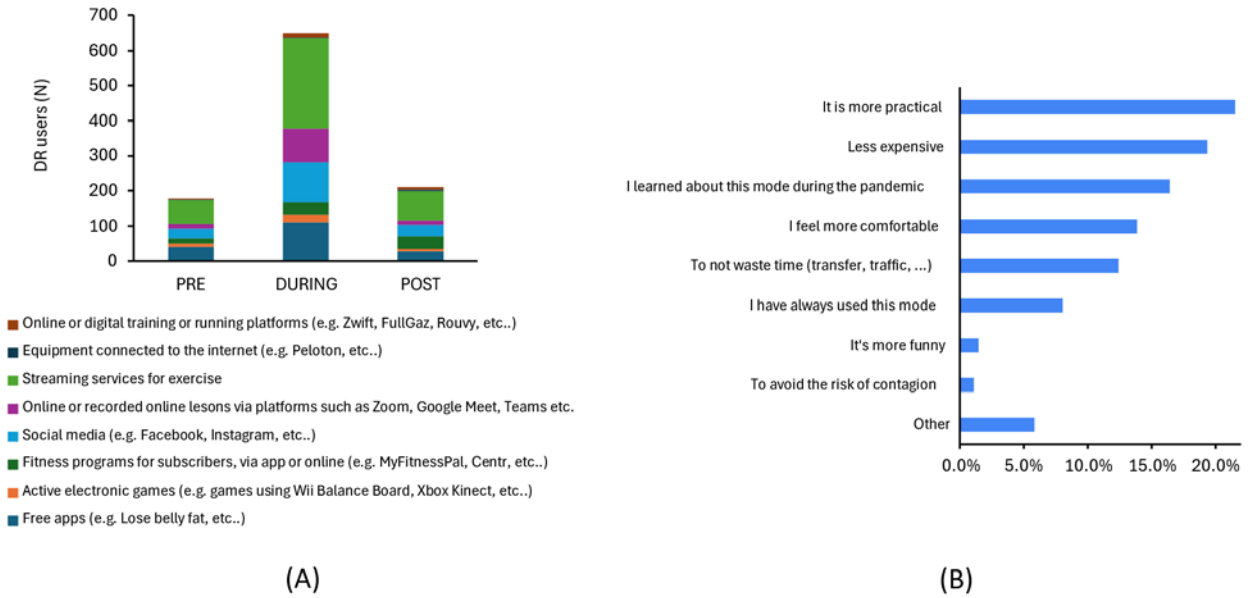
The emergency determined by the COVID-19 pandemic, which resulted in a restriction of all activities and home confinement in 2020, strongly affected people's habits, with particular concern for those related to PA and nutrition. Data collected by Ferrara et al. [19] among university students confirmed, also in this age group, the decrease in the time spent in PA, the change in the type and level of PA, and the increase in sitting time and sedentary behaviors were confirmed, especially for females. The unavailability of specific equipment and facilities understandably played a major role in this scenario [15].

These results were slightly in contrast with those obtained by the present work, in which we observe a constant PA attendance level throughout the considered period (pre-,during, and post-restrictions time), with an average value of about 70%, which is much higher than the one reported by Ferrara et al. (mean value 50%) [19]. However, in accordance with previously shown data, males were more physically active, at least in the pre-pandemic era.

During the pandemic restrictions, an increase in the outdoor PA practice and at-home activities, and a decline in sports center membership have been reported, while online services (free or not) were increasingly preferred [11]. López-Carril et al. [20], highlighted the role of social media and DRs during the COVID-19 lockdown in improving PA practice in university students, being used as channels to motivate people to perform PA, promote it, or learn about new training disciplines.

The WHO Global Action Plan on Physical Activity 2018-2030 [21] aims to reduce global levels of physical inactivity through the development of innovative digital approaches for promotion, such as the mobile-phone-based mActive program [22], which is consistent with the new WHO guidelines on physical activity and sedentary behaviour [23]. Indeed, recent intervention studies reported the successful promotion of PA behaviour change through mobile devices [24-26]. In accordance

Fig. 2. Digital Resource types and reasons for using them. A) Digital Resource (DR) types chosen by study participants in the three periods considered. B) Reasons for using DRs after pandemic restrictions.



with these data, our results show that the use of DRs to practice PA during the pandemic period strongly increased in the participants, from 21.3% to 74.3%. This significant rise could also explain the trend of PA attendance during restriction times, maybe maintained over time and improved also thanks to the increased use of DRs.

Many technologies have been designed to support people in staying physically active, ranging from exergames, activity trackers, and motivational apps. Besides those, the opportunity to practice PA by means of online video tutorials or lessons provided in tele-exercise mode is increasingly considered convenient. The underlying reasons, as arising from the results of this survey, are linked to money and time saving, along with a more comfortable feeling associated with the "at home" exercising mode. As underlined in a recent systematic review by Valeriani et al., being habitually active and using DRs may be associated with a positive attitude towards exercise at home during isolation. Moreover, the promotion of exercise through DRs is particularly important in those groups who are usually less engaged in PA [11]. The results from our study confirm this relevant consideration: participants who used DRs for PA are mainly engaged in moderate and low/moderate activities, suggesting that DR promotion should be useful, especially for recreational activities, instead of professional ones.

Considering the gender variable, our data fully agree with previously reported ones [20], with DRs mainly used by females (average value of 80% before, during, and after the pandemic period). This difference could be partially explained by the fact that in the present study there was a higher prevalence of women. However, also López-Carril et al. also indicated the same trend in DR users, even if most of the participants in their study were men [20].

It has been shown that excessive use of social media is associated with an increasing sense of loneliness and anxiety levels [27]. Notably, in this study, the WHO-5 score data assessed in DR users is not significantly different from that of non-users, leading to the hypothesis that PA attendance through DR does not affect/impact mental well-being. Interestingly, we found a preliminary correlation between the use of DRs and lower BMI and age, which may suggest a possible usefulness of DRs in the weight control of younger people. However, this finding should be deeply investigated through larger studies.

University students experience higher levels of sedentary time compared to the general young adult population, with an increasing trend in the last ten years [28]. Accordingly, levels of sedentary time accumulated by university students have been associated with an increased risk for detrimental health outcomes. This aspect has been confirmed by the WHO-5 questionnaire, through which we found that the self-reported measure of participants' mental well-being was positively correlated and improved with PA attendance, intensity, and frequency. Unfortunately, this result was not related to the use of DRs. A larger study could be useful to better investigate this variable.

Considering that many adult health-related behaviours are established during late adolescence and young adulthood, the university years are an important period for developing future life patterns [7], making imperative the development of effective evidence-based interventions to increase university students' PA [29]. Scientific literature offers a wide range of strategies to promote PA among university students, and DRs have emerged as particularly promising tools. In fact, it has been recently reported that mobile apps and fitness trackers to support PA self-monitoring [30], social media, and text messaging to deliver motivational reminders and create virtual support groups [31], digital health platforms such as web-based programs and gamified apps (*e.g.* exergames) [32], and real-time feedback systems [33].

A limitation of this study could be the possibility of a selection bias due to the way in which the questionnaire was distributed and the adherence to the survey. More active students could be attracted to participate, underestimating the real proportion of people with sedentary lifestyles. Notably, the percentage of sedentary students among participants is in line with the recent statistics [7]. Another limitation of the study is the validity of self-reported measures, which could lead to overestimating or underestimating PA behaviors and being prone to inaccuracies. However, this study represents an explorative survey for the evaluation of DR use in a university population. In fact, further evidence from larger studies involving several Universities is needed to confirm these findings and explore the PA habits of using DRs and possible health implications in the post-pandemic era.

Conclusion

In conclusion, these findings highlight the need for future initiatives and policies targeting sedentary behavior among college students. Indeed, this particular target population would greatly benefit from PA promotion interventions, taking into account strategies that appeal to younger age groups and involving DRs as a cost-effective and easy tool for daily use. In terms of practical considerations, this study strengthens the role of DRs in creating opportunities to attend higher levels of PA, also to connect with customers and offer innovative PA proposals.

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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest Statement

The Authors declare that there is no conflict of interest.

Human Subjects Approval Statement

The study has been approved by the Ethics Committee of the University of Urbino Carlo Bo (Approval Number: 66/23.02.2023).

Authors' contributions

GA and MDS conceived the study; GBa, PF, and PI, optimized the questionnaire and collected data; MDS, VG, and GBa, data elaboration and statistical analysis; GFS and GBr, conceptualization and revision; MDS and GA, drafted the manuscript. All authors revised and approved the final manuscript.

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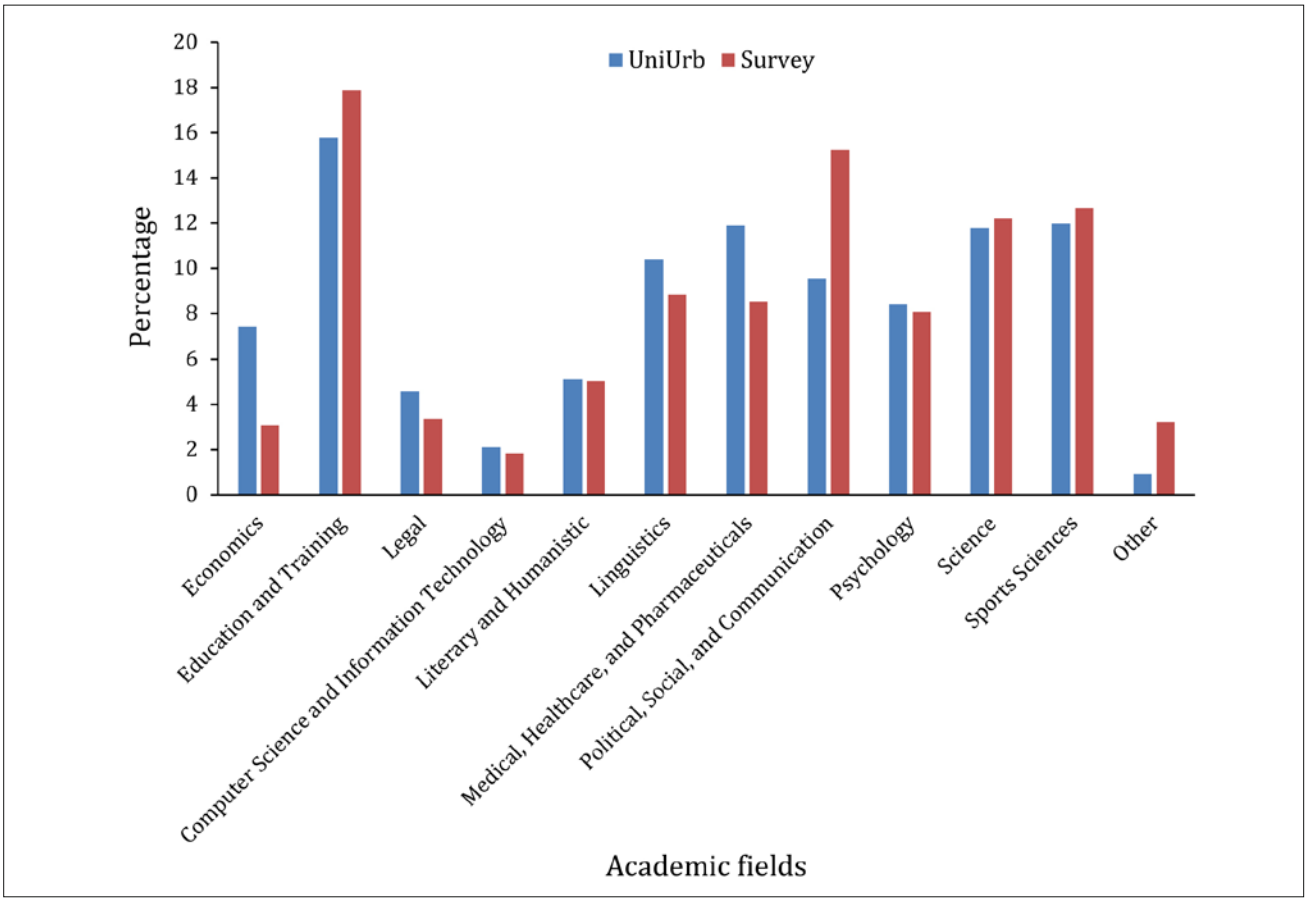
Supplementary material

Fig. S1. Academic fields of students attending the University of Urbino in the academic year 2022/2023 (Blue) and students participating in the survey (Orange). Data are represented as percentages. Source: https://ustat.mur.gov.it/.



Tab. S1. Questionnaire.

THE USE OF TECHNOLOGIES AND SOCIAL MEDIA FOR THE PRACTICE OF PHYSICAL ACTIVITY
The purpose of the questionnaire is to investigate physical activity habits in terms of frequency, intensity, duration, type, use of electronic devices, or use of online platforms, before, during, and after the COVID-19 pandemic, up to now, in relation to BMI and perceived well-being. The questionnaire is multiple-choice and should take approximately 5 minutes to complete.
SECTION 1: INFORMED CONSENT
Please be advised that data collection will be conducted in compliance with privacy regulations (EU Regulation 2016/679 and Legislative Decree 196/2003). The data will be reported in aggregate form, without identifying details, to ensure anonymity and will not be communicated or disseminated in any way except for research purposes.
Do you consent to data processing?
• I consent *(continue to the next section)*
• I deny consent *(submit the form)*
SECTION 2: ANAGRAFIC INFORMATION
- Which province are you from? (Please use CAPITAL LETTERS to indicate your province's abbreviation, *e.g.* RC, RM, AG, AL, *etc.)*
- Gender:
• Female
• Male
• I prefer not to answer
-Age:
-Your height: (indicate height in centimeters)
-Specify your degree class: *(e.g.* L22, L01, L02, LM4, LM67, *etc.*)
-Year of study
• o First
• o Second
• o Third
• o Fourth
• o Fifth
• o Not yet completed
-Does your HOME have:
• o Outdoor area/private garden
• o Outdoor area/shared garden
• o No outdoor area/garden
SECTION 3: BEFORE
- BEFORE the health emergency (before March 8, 2020), your body weight was:
(indicate weight in kilograms)
IT IS USED EXCLUSIVELY TO CALCULATE YOUR BMI
IF YOU DO NOT WISH TO PROVIDE THIS INFORMATION, ANSWER: no
- Did you engage in physical activity BEFORE the health emergency (before March 8, 2020)?
• Yes, INDOOR physical activity *(goes to section 4)*
• Yes, OUTDOOR physical activity *(goes to section 4)*
• Yes, both INDOOR and OUTDOOR physical activity *(goes to section 4)*
• No *(goes to section 6)*
SECTION 4: IF YES
- BEFORE the health emergency, how many DAYS per week did you engage in physical activity?
• 1
• 2
• 3
• 4
• 5

▶

• 6
• 7
- BEFORE the health emergency, how many HOURS/MINUTES of physical activity did you perform in TOTAL per week?
(EXAMPLE: If you performed 2 hours of physical activity 3 times a week, you would answer this question: 6 hours)
• 30 minutes
• 1 hour
• 2 hours
• 3 hours
• 4 hours
• 5 hours
• 6 hours
• 7 hours
• 8 hours
• 9 hours
• 10 hours
• 11 hours
• 12 hours
Other.
-BEFORE the health emergency, at what INTENSITY physical activity was performed?
• Mostly Vigorous Intensity
• Between Moderate and Vigorous
• Mostly Moderate Intensity
• Between Moderate and Low
• Mostly Low Intensity
- BEFORE the health emergency, did you use courses, online or digital platforms, multimedia tools or equipment, apps, online lessons, or social media to practice physical activity?
(*e.g.* YouTube, online courses organized by my gym via Zoom or Google Meet, Instagram, Facebook, Lose Belly Fat, Wii Balance, Peloton, *etc.*)
• NO TRACKING APPS (Google Fit, Huawei Health, Runtastic, RunKeeper, *etc.*)
• Yes *(goes to section 5)*
• No *(goes to section 6)*
SECTION 5: IF YES
WHICH courses, online or digital platforms, multimedia tools or equipment, apps, online lessons, or social media did you use to exercise? You can select multiple answers.
(*e.g.* YouTube, online classes organized by my gym, Instagram, Facebook, Lose Belly Fat, Wii Balance, Peloton, *etc.*)
NO TRACKING APPS (Google Fit, Huawei Health, Runtastic, RunKeeper, *etc.*)
• Exercise streaming services (*e.g.* YouTube, Dailymotion, *etc.*)
• Live or recorded online classes facilitated via platforms such as Zoom, Google Meet, Teams, *etc.* (*e.g.* dance, sports training, and fitness classes)
• Free apps (*e.g.* Lose Belly Fat, *etc.*)
• Social media (*e.g.* Facebook, Instagram, *etc.*)
• Active electronic games (*e.g.* games using the Wii Balance Board, Xbox Kinect, *etc.*)
• Internet-connected equipment (*e.g.* Peloton, *etc.*)
• Subscriber fitness programs, via app or online (*e.g.* MyFitnessPal, Centr, *etc.*)
• Online or digital training or running platforms (*e.g.* Zwift, FullGaz, Rouvy, *etc.*)
- BEFORE the pandemic, HOW OFTEN did you exercise using multimedia tools or equipment, apps, courses, online lessons, or social media?
• Rarely
• Sometimes

▶

• Often
• Always
SECTION 6: DURING
- DURING the health emergency (between March 8, 2020, and May 25, 2020), your body weight was:
(indicate weight in kilograms)
IT IS USED EXCLUSIVELY TO CALCULATE YOUR BMI
IF YOU DO NOT WISH TO PROVIDE THIS INFORMATION, ANSWER: no
- Did you engage in physical activity DURING the health emergency (between March 8, 2020, and May 25, 2020)?
• Yes, INDOOR physical activity *(goes to section 7)*
• Yes, OUTDOOR physical activity *(goes to section 7)*
• Yes, both INDOOR and OUTDOOR physical activity *(goes to section 7)*
• No *(goes to section 9)*
SECTION 7: IF YES
- BEFORE the health emergency, how many DAYS per week did you engage in physical activity?
• 1
• 2
• 3
• 4
• 5
• 6
• 7
- DURIING the health emergency, how many HOURS/MINUTES of physical activity did you perform in TOTAL per week?
(EXAMPLE: If you performed 2 hours of physical activity 3 times a week, you would answer this question: 6 hours)
• 30 minutes
• 1 hour
• 2 hours
• 3 hours
• 4 hours
• 5 hours
• 6 hours
• 7 hours
• 8 hours
• 9 hours
• 10 hours
• 11 hours
• 12 hours
• Other
- DURING the health emergency, at what INTENSITY physical activity was performed?
• Mostly Vigorous Intensity
• Between Moderate and Vigorous
• Mostly Moderate Intensity
• Between Moderate and Low
• Mostly Low Intensity
- DURING the health emergency, did you use courses, online or digital platforms, multimedia tools or equipment, apps, online lessons, or social media to practice physical activity?
(*e.g.* YouTube, online courses organized by my gym via Zoom or Google Meet, Instagram, Facebook, Lose Belly Fat, Wii Balance, Peloton, *etc.*)
NO TRACKING APPS (Google Fit, Huawei Health, Runtastic, RunKeeper, *etc.)*
• Yes *(goes to section 8)*

▶

• No *(goes to section 9)*
SECTION 8: IF YES
WHICH courses, online or digital platforms, multimedia tools or equipment, apps, online lessons, or social media did you use to exercise? You can select multiple answers.
(*e.g.* YouTube, online classes organized by my gym, Instagram, Facebook, Lose Belly Fat, Wii Balance, Peloton, *etc.)*
NO TRACKING APPS (Google Fit, Huawei Health, Runtastic, RunKeeper, *etc.)*
• Exercise streaming services *(e.g.* YouTube, Dailymotion, *etc.*)
• Live or recorded online classes facilitated via platforms such as Zoom, Google Meet, Teams, *etc.* (*e.g.* dance, sports training, and fitness classes)
• Free apps (*e.g.* Lose Belly Fat, *etc.*)
• Social media (*e.g.* Facebook, Instagram, *etc.*)
• Active electronic games (*e.g.* games using the Wii Balance Board, Xbox Kinect, *etc.*)
• Internet-connected equipment (*e.g.* Peloton, *etc.*)
• Subscriber fitness programs, via app or online (*e.g.* MyFitnessPal, Centr, *etc.*)
• Online or digital training or running platforms (*e.g.* Zwift, FullGaz, Rouvy, *etc.*)
- DURING the pandemic, HOW OFTEN did you exercise using multimedia tools or equipment, apps, courses, online lessons, or social media?
• Rarely
• Sometimes
• Often
• Always
SEZIONE 9: AFTER
- NOW, your body weight IS:
(indicate weight in kilograms)
• IT IS USED EXCLUSIVELY TO CALCULATE YOUR BMI
• IF YOU DO NOT WISH TO PROVIDE THIS INFORMATION, ANSWER: no
……
- NOW that the health emergency period is over (*i.e.*, from the time you were able to resume physical activity until sports facilities reopened, depending on your region), are you exercising?
• Yes, INDOOR physical activity *(goes to section 10)*
• Yes, OUTDOOR physical activity *(goes to section 10)*
• Yes, both INDOOR and OUTDOOR physical activity *(goes to section 10)*
• No *(goes to section 12)*
SECTION 10: IF YES
-NOW, how many DAYS per week did you engage in physical activity?
• 1
• 2
• 3
• 4
• 5
• 6
• 7
-NOW, how many HOURS/MINUTES of physical activity did you perform in TOTAL per week?
(EXAMPLE: If you performed 2 hours of physical activity 3 times a week, you would answer this question: 6 hours)
• 30 minutes
• 1 hour
• 2 hours
• 3 hours
• 4 hours
• 5 hours

▶

• 6 hours
• 7 hours
• 8 hours
• 9 hours
• 10 hours
• 11 hours
• 12 hours
• Other
-NOW, at what INTENSITY physical activity was performed?
• Mostly Vigorous Intensity
• Between Moderate and Vigorous
• Mostly Moderate Intensity
• Between Moderate and Low
• Mostly Low Intensity
- NOW, did you use courses, online or digital platforms, multimedia tools or equipment, apps, online lessons, or social media to practice physical activity?
(e.g. YouTube, online courses organized by my gym via Zoom or Google Meet, Instagram, Facebook, Lose Belly Fat, Wii Balance, Peloton*, etc.)*
• NO TRACKING APPS (Google Fit, Huawei Health, Runtastic, RunKeeper, *etc.)*
• Yes *(goes to section 11)*
• No *(goes to section 12)*
SECTION 11: IF YES
-WHICH courses, online or digital platforms, multimedia tools or equipment, apps, online lessons, or social media did you use to exercise? You can select multiple answers.
(*e.g.* YouTube, online classes organized by my gym, Instagram, Facebook, Lose Belly Fat, Wii Balance, Peloton, *etc.*)
NO TRACKING APPS (Google Fit, Huawei Health, Runtastic, RunKeeper, *etc.*)
• Exercise streaming services (*e.g.* YouTube, Dailymotion, *etc.*)
• Live or recorded online classes facilitated via platforms such as Zoom, Google Meet, Teams, *etc.* (*e.g.* dance, sports training, and fitness classes)
• Free apps (*e.g.* Lose Belly Fat, *etc.*)
• Social media (*e.g.* Facebook, Instagram, *etc.*)
• Active electronic games (*e.g.* games using the Wii Balance Board, Xbox Kinect, *etc.*)
• Internet-connected equipment (*e.g.* Peloton, *etc.*)
• Subscriber fitness programs, via app or online (*e.g.* MyFitnessPal, Centr, *etc.*)
• Online or digital training or running platforms (*e.g.* Zwift, FullGaz, Rouvy, *etc.*)
- NOW, HOW OFTEN did you exercise using multimedia tools or equipment, apps, courses, online lessons, or social media?
• Rarely
• Sometimes
• Often
• Always
-NOW that the state of emergency is over, why do you use these technologies to exercise? You can choose several options.
• Because I've always done it
• To avoid the possibility of contagion
• To avoid wasting time (*e.g.* getting stuck in traffic on my way to the gym or another place where I exercise)
• Because I discovered this option during the pandemic and want to continue using it
• Because it saves money
• Because it's more convenient
• Because I feel more comfortable
• Because I prefer to socialize online with people like me who use classes or apps to stay fit
• Because it's more fun

▶

• Other...
SECTION 12: WHO-5
-For each of the 5 statements, please indicate the one that most closely matches how you felt over the past 2 weeks. (TABLE)
• I felt cheerful and in a good mood.
• I felt calm and relaxed
• I felt active and vigorous
• I woke up feeling refreshed and rested
• My daily life has been full of things that interest me
• All the time
• Most of the time
• More than half the time
• Less than half the time
• Sometimes
• Not at all