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Online Exercise Classes during the COVID-19 Related Lockdown in Germany: Use and Attitudes

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Abstract: Lockdown measures during the COVID-19 pandemic have led to reductions in physical activity (PA) worldwide. Leading public health organizations have recommended the use of online exercise classes (OEC) to compensate the loss of regular exercise classes. As of now, no data are available on the uptake of OEC and on users' attitudes. The aim of the current online survey was to assess the use of and attitudes towards OEC in Germany. Respondents indicated awareness and use of OEC, and levels of agreement with statements on OEC. Frequency of awareness and use of OEC according to PA status were calculated with contingency tables and the X^2 test. Differences between users and non-users were tested with the Student's *t*-test and the Mann–Whitney U test. Data on attitudes are presented as percentages, and Spearman correlations were calculated between attitudes and activity status, frequency of use, educational attainment, age and body mass index. A total of 979 datasets were analyzed. Of the respondents, 681 were aware of and 180, 118 and 84 used them <1 per week, 1–2 per week and ≥3 per week, respectively. Significantly more active respondents were aware of and used OEC compared to less active respondents. All in all, regular OEC use was quite limited. OEC was differentially attractive to people according to PA status, frequency of use, BMI and age. Tailoring OEC to current non-users and adding motivational support might enhance the regular use of OEC.

Keywords: internet; confinement; coronavirus; physical activity

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1. Introduction

The lung disease COVID-19, caused by the novel coronavirus SARS-CoV-2, reached the European continent in January 2020 and the World Health Organization (WHO) declared the disease a pandemic on the 11th March 2020 [1]. As a reaction, traditional public health measures such as shelter-in-place orders, social distancing and quarantine were introduced by a large number of countries to curb the spread of the virus and lower incidence rates and mortality [2]. In Germany, the lockdown measures affected all non-essential businesses, including sports clubs, fitness studios, activity trails and playgrounds [3]. Working from home was very strongly encouraged whenever possible. People were allowed to leave their houses, but seeing more than one person other than those living in the same household was forbidden. Despite progress in vaccination, mathematical modelling projections suggest that social distancing might be intermittently necessary as long as into 2022 [4]. Indeed, by now (spring 2021) many countries are in the third wave and have had to impose lockdowns again.

The pandemic itself and the public health measures taken in the effort to contain the spread of the virus have produced an unprecedented disruption of daily life and

impacted health-related lifestyles [5,6]. A large number of studies have documented the reduction in physical activity (PA) in the general population during the first lockdown in the spring of 2020 [7]. This is alarming since PA levels are already low in many Western countries, including Germany [8], and because physical inactivity is one of the major modifiable risk factors for chronic diseases and conditions with the highest burden of disease and premature death [9]. There is also irrefutable evidence on the beneficial effect of regular moderate PA on the immune system [10]. Modifiable risk factors for severe COVID-19 disease include chronic, inflammatory lifestyle-dependent diseases, such as obesity, diabetes, hypertension and cardiovascular diseases [11,12]. Emerging evidence also suggests that PA [13], as well as cardiorespiratory [14] and muscular fitness [15], might protect against severe COVID-19 disease (defined as hospitalization). In sum, regular PA is of utmost importance to maintain good health, and might play an as of now underappreciated role in COVID-19.

In the anticipation of further reduction of PA in the general population and as a countermeasure against confinement and loss of social contact, many governmental, professional PA and health organizations have started campaigns and urged the population to become or remain active [16–18]. The WHO Regional Office for Europe has provided basic information on the relevance of PA during self-isolation and recommended ways to be active, one of which was following "online exercise classes" [16]. Additionally, the National Health Service has emphasized the importance of maintaining PA for health in all age groups [17]. The Centers for Disease Control and Prevention has also endorsed "workout videos" [19]. The National Health Service has recommended online exercise classes in order to improve and maintain mental health [20].

Technology-supported approaches to promote PA have been shown to be effective in increasing PA, walking and energy expended [21–23]. These interventions, however, are at least partially theory-based and use different support mechanisms, such as tailored PA advice, goal setting, feedback, PA tracking, tele-counselling, online resources and online social support [22,23], which are not readily available with online exercise classes (OEC). OEC, however, seem to have apparent appeal in general, and in pandemic times in particular, since they are cost and time efficient and can be flexibly used in an environment with no infection risk. A recent multinational survey with 10,433 participants examined the interest in digital home exercise programs, and found that 68% of respondents reported such interest [24]. However, interest is not the same as (regular) use. Furthermore, the survey did not provide any data on users' attitude on the digital classes.

Since OEC have been widely encouraged as a potential means of maintaining PA during self-isolation, data on actual use is of high relevance. To the best of our knowledge, no study so far has assessed the use of and users' attitudes towards OEC in an ecological sample. The aim of the present study was to determine whether respondents knew of and, if they did, used OEC and with which frequency in Germany during the first COVID-19 related lockdown in the spring of 2020. Further, we were interested in users' attitudes towards OEC. We hypothesized that the majority of respondents were aware of OEC, but many less used them regularly. We also hypothesized that facilitating factors (e.g., time flexibility) were seen as attractive, whereas lack of social interaction and lack of trainer's supervision were perceived as barriers.

2. Materials and Methods

2.1. Study Design and Recruitment

We conducted a cross-sectional online survey using the SoSci Survey tool (SoSci Survey GmbH, Munich, Germany, https://www.soscisurvey.de/, 23 April–12 September 2020) in the German general population. All participants provided informed consent. Prior to launching the survey, an ethical approval by Goethe University, Frankfurt was obtained (reference number 2020-18).

Respondents were recruited via snowball sampling. The link to the survey was distributed electronically via authors' professional and personal networks. Recipients

of the mailings were invited to further distribute the link in their respective networks and publish it on their websites and other communication channels (e.g., newsletters) as applicable and appropriate.

2.2. Questionnaire

The survey instrument covered two major thematic sections: one on habitual PA and one on the use of and attitude towards OEC. Questions on anthropometric data (BM1–2), and PA (PE1–PE8) were identical with the respective questions from the European Health Interview Survey (EHIS wave 2) [25], and wording was identical with the official German translation. The EHIS PAQ survey instrument has been shown to have acceptable-to-good reliability and validity [26]. All questions on PA were posed twice, once relating to conditions prior to lockdown ("normal"), and once relating to lockdown ("lockdown") conditions. Data on habitual PA has been published elsewhere [27].

Participants were asked to indicate whether they were aware of OEC and, if yes, whether they have already used such offers. In cases of affirmative answers, frequency of use per week should be indicated. Further, responders were invited to indicate their level of agreement or disagreement on a symmetric four level agree–disagree scale for five statements on OEC (flexible time management; lack of interaction with other exercisers during OEC; lower level of motivation in OEC; lack of instructor's support during OEC; and boringness of OEC).

Participants were asked to indicate their highest educational attainment according to the International Standard Classification of Education (ISCED 2011) [28], and to state whether they were in a short-time work scheme in addition to whether they were working remotely.

2.3. Data Processing and Statistical Analysis

PA data were processed and scored according to the official EHIS-PAQ scoring protocol [29]. Leisure time PA (total minutes of sports, fitness and recreational leisure time activities in at least 10 min bouts per week; LTPA) and days of muscle-strengthening activities per week (DMSA) were used to define compliance with WHO PA recommendations, and classify respondents as active or inactive [30]. Body mass index (BMI) was calculated using self-reported body weight and height.

Data are presented as frequencies (categorical variables), mean and standard deviation (SD) (scaled parameters). Awareness and use of OEC according to activity status were analyzed via contingency tables and the Chi^2 test. Differences in LTPA and DMSA, age and BMI between those who reporting being aware vs. being not aware of OEC, as well as using vs. not using OEC, respectively, were assessed with the Student's *t*-test. For the educational attainment we used the respective non-parametric test (Mann–Whitney U test). The level of agreement to OEC statements (flexible time management, missing social interaction, motivation, instructor's support and boringness) was correlated to PA activity status (active vs. inactive), frequency of OEC, educational attainment, age and BMI using the Spearman correlation coefficient (rho).

All statistical analyses were computed using IBM SPSS software, V.22 (IBM, Armonk, VA, USA). Significance was accepted for p-values ≤ 0.05.

3. Results

3.1. Sample Characteristics

After removing 25 datasets because of missing data necessary for the Student's t-test (age, sex, and BMI), 979 datasets (n = 703; 71.8% females) were included in the detailed analysis. Participants were 44.0 $\pm$ 14.7 years old and had a BMI of 24.6 $\pm$ 5.4. For detailed sample characteristics, please see Tables 1 and 2.

Table 1. Sample characteristics (n = 979).

Characteristics		n	Mean ± SD
Age (y)	females	703	42.9 ± 14.0
	males	276	46.7 ± 16.0
Weight (kg)	females	703	68.2 ± 15.0
	males	276	84.6 ± 19.2
Height (m)	females	703	1.68 ± 0.06
	males	276	1.80 ± 0.07
BMI (kg/m^2)	females	703	24.1 ± 5.2
	males	276	25.9 ± 5.4

Abbreviation: BMI = body mass index.

Table 2. Highest educational attainment of the participants (n = 979).

Highest Educational Attainment	n (%)
Missing	1 (0.1)
Lower secondary education	106 (10.8)
Higher secondary education	134 (13.7)
Post-secondary non-tertiary education	55 (5.6)
Short-cycle tertiary education	16 (1.6)
Bachelor or equivalent level	161 (16.4)
Master or equivalent level	396 (40.4)
Doctoral or equivalent level	110 (11.2)

3.2. Physical Activity Status

During lockdown 551 respondents (56.3%) fulfilled the endurance (≥150 min/week) and 369 (37.7%) complied with the muscle-strengthening (≥2 days/week) part of the PA recommendations. Compliance with both parts was 30.4% (n = 298).

3.3. Awareness of Online Exercise Classes

Of the 978 respondents (one missing), 681 were aware of OEC. There was a significant relationship between PA status (active vs. inactive) during lockdown and awareness of OEC, such that more inactive respondents were not aware of OEC, and more active respondents reported being aware of OEC (X^2[978, 1] = 24.103, $p < 0.001$, V = 0.16), cf. Table 3.

Table 3. Physical activity status and awareness of online exercise classes.

		Inactive	Active	
not aware of OEC	counts	239	58	297
	%	35.1%	19.5%	30.4%
aware of OEC	counts	441	240	681
	%	64.9%	80.5%	69.6%
total	counts	680	298	978
	%	100%	100%	100%

Abbreviation: OEC = online exercise classes.

Respondents who reported not being aware of OEC were older ($p < 0.001$), had a higher BMI ($p < 0.001$) and engaged in muscle-strengthening activities less often ($p = 0.001$). No difference was observed in LTPA ($p = 0.068$), cf. also Table 4. Educational attainment differed significantly (Z = 3.094, $p = 0.002$) between those aware of OEC (n = 681, mean rank = 507.24, median education level: Bachelor or equivalent level) and those not aware of OEC (n = 297, mean rank = 448.82, median education level: short-cycle tertiary education).

Table 4. Awareness of online exercise classes.

		n	Mean	SD	T	df	*p*-Value	Mean Difference	Cohen's d	95% CI (Difference) Lower	95% CI (Difference) Upper
Age (y)	aware of OEC	681	42.5	14.2	4.752	976	0.000	−4.8	0.33	−6.8	−2.8
	not aware of OEC	297	47.3	15.4							
BMI (kg/m^2)	aware of OEC	681	24.0	5.2	4.987	976	0.000	−1.9	0.35	−2.6	−1.1
	not aware of OEC	297	25.9	5.7							
LTPA (min/week)	aware of OEC	681	198.5	218.9	1.825	976	0.068	28.5	0.13	−2.1	59.1
	not aware of OEC	297	170.0	236.0							
DMSA (days/week)	aware of OEC	681	1.6	1.9	3.299	976	0.001	0.4	0.23	0.2	0.7
	not aware of OEC	297	1.2	1.9							

Abbreviations: METmin/week = metabolic equivalent of task-minutes per week; BMI = body mass index; LTPA = leisure time physical activity; DMSA = days of muscle-strengthening activities; and TRPA = transport-related physical activity.

3.4. Use of Online Exercise Classes

Of the 681 participants reporting awareness of OEC, 382 had tried them, and 180, 118 and 84 had used them <1 per week, 1–2 per week and ≥3 per week, respectively, cf. also Figure 1.

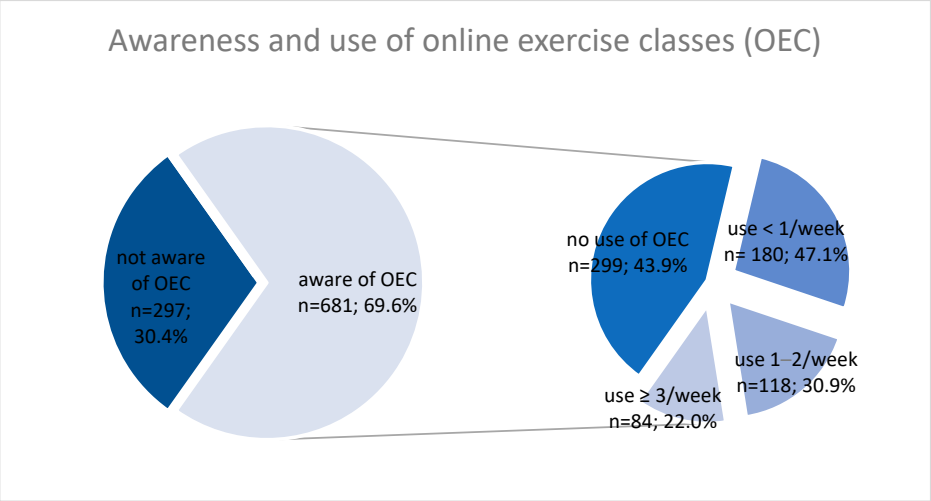


Figure 1. Awareness and use of online exercise classes; Abbreviation: OEC = online exercise class.

There was a significant association between PA status (active vs. inactive) during lockdown and use of OEC (X^2[681, 1] = 49. 150, $p < 0.001$, V = 0.27), cf. also Table 5.

Table 5. Physical activity status and use of online exercise classes.

		Inactive	Active	
OEC non-user	counts	237	62	299
	%	53.7%	25.8%	43.9%
OEC user	counts	204	178	382
	%	46.3%	74.2%	56.1%
total	counts	441	240	681
	%	100%	100%	100%

Abbreviation: OEC = online exercise classes.

Respondents who reported not having used OEC were older ($p = 0.012$), had a higher BMI ($p < 0.001$) and had engaged in lower LTPA ($p = 0.003$) and fewer muscle-strengthening activities ($p < 0.001$), cf. also Table 6. Educational attainment did not differ significantly

between users (n = 382, mean rank = 338.95) and non-users (n = 299, mean rank = 343.62) demonstrating a mean educational level of 'Bachelor or equivalent' for users and non-users (Z = 0.322, p = 0.747).

Table 6. Use of online exercise classes.

		n	Mean	SD	T	df	*p*-Value	Mean Difference	Cohen's d	95% CI (Difference) Lower	95% CI (Difference) Upper
Age (y)	OEC use no OEC use	382 299	41.3 44.0	14.1 14.1	2.509	679	0.012	−2.7	0.19	−4.9	−0.6
BMI (kg/m^2)	OEC use no OEC use	382 299	23.1 25.2	4.0 6.3	5.091	476.8	0.000	−2.1	0.39	−2.9	−1.3
LTPA (min/week)	OEC use no OEC use	382 299	220.3 170.6	208.8 228.5	2.959	679	0.003	49.7	0.23	16.7	82.7
DMSA (days/week)	OEC use no OEC use	382 299	2.0 1.1	1.9 1.8	6.908	679	0.000	1.0	0.53	0.7	1.3

Abbreviations: METmin/week = metabolic equivalent of task-minutes per week; BMI = body mass index; LTPA = leisure time physical activity; DMSA = days of muscle-strengthening activities; and TRPA = transport-related physical activity.

In the subsample of OEC users (n = 382), a significant association with moderate effect size was found between activity status (active vs. inactive) and frequency of OEC use (X^2[382, 2] = 63.359, p < 0.001, V = 0.41). The majority (62.5%) of inactive respondents reported use less than once a week, while 38.2% of active respondents used OEC once or twice, and 35.4% even three times or more per week (Table 7).

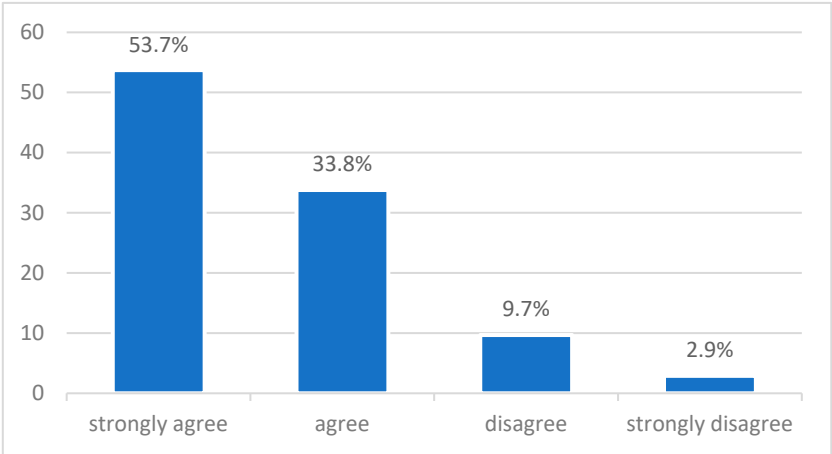
Table 7. Frequency of the use of online exercise classes according to physical activity status.

Frequency of OEC Use		Inactive	Active	
<1/week	counts %	133 65.2%	47 26.4%	180 47.1%
1–2/week	counts %	50 24.5%	68 38.2%	118 30.9%
≥3/week	counts %	21 10.3%	63 35.4%	84 22.0%
total	counts %	204 100%	178 100%	382 100%

Abbreviation: OEC = online exercise classes.

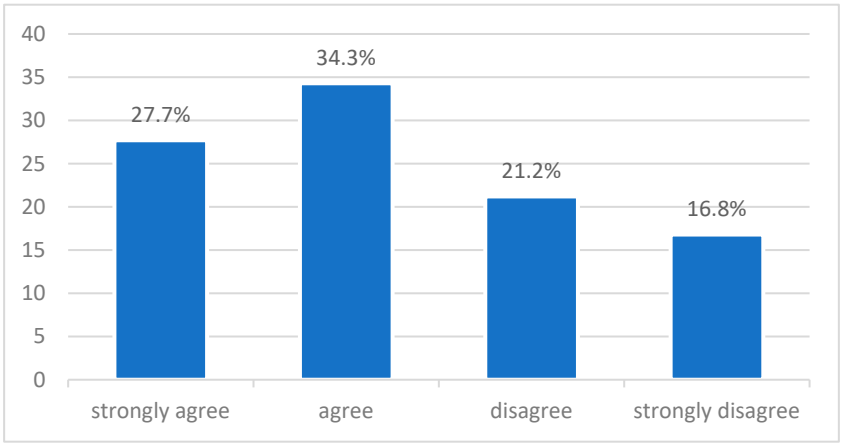
3.5. Users' Attitudes towards Online Exercise Classes

Descriptive analysis of users' attitudes towards OEC are illustrated in Figure 2.

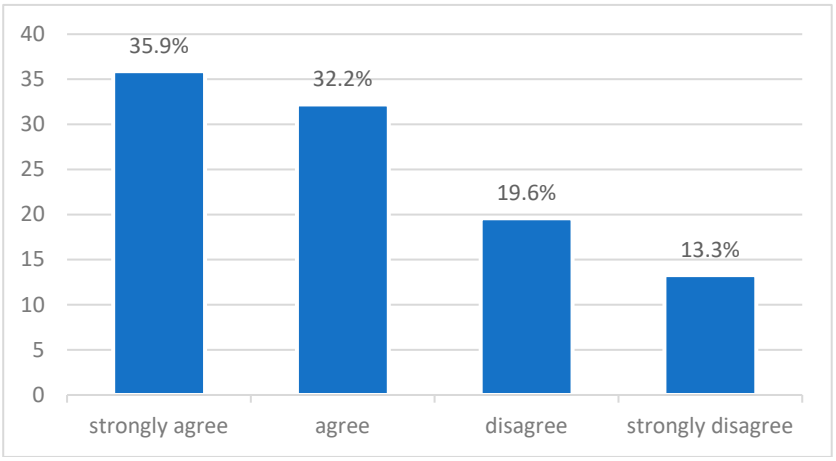


(**a**) online exercise classes allow time flexibility (n = 382)

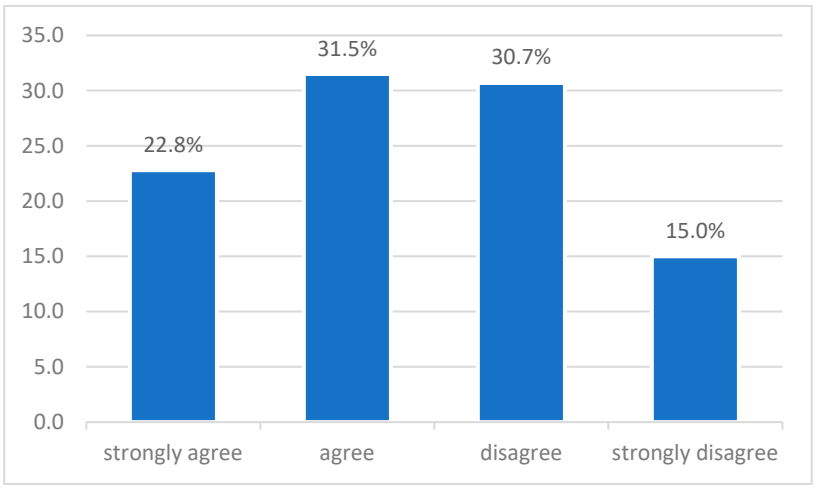
Figure 2. *Cont.*



(**b**) with online exercise classes I miss the interaction with other exercisers (n = 382)

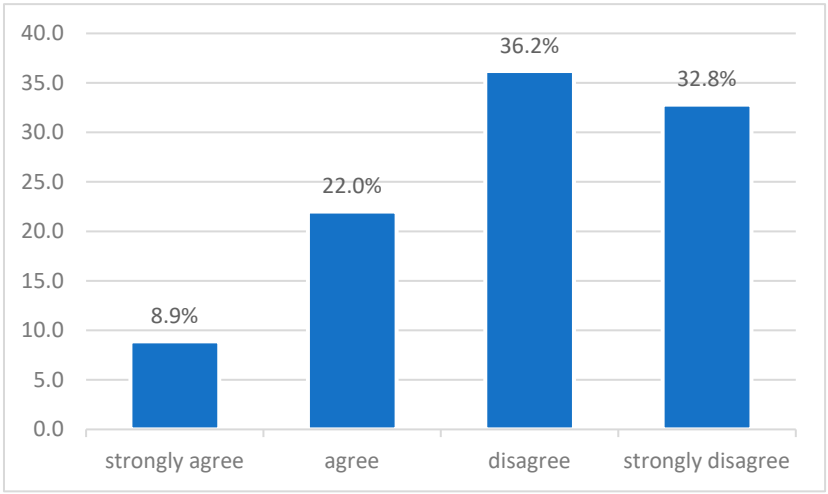


(**c**) I can motivate myself less well during online exercise classes (n = 382)



(**d**) with online exercise classes I miss the individual guidance (support) of the trainer (n = 381)

Figure 2. *Cont*.



(**e**) Online exercise classes are boring (n = 381)

Figure 2. Users' Attitudes.

The level of agreement (1 = strongly agree, 2 = agree, 3 = disagree and 4 = strongly disagree) to the respective attitude questions was partly related to PA status (active vs. inactive). There was a significant negative correlation between being active and disagreement towards an advantageous flexible time management (rho = −0.118), and a significant positive correlation between being active and disagreement to a lower level of motivation (rho = 0.108) or boringness (rho = 0.104). Lacking social interactions and instructor's support were not correlated significantly to PA status ($p > 0.05$) (Table 8).

Table 8. Correlation analyses between activity status and attitudes towards online exercise classes (n = 382).

	Physical Activity Status	
OEC Are Associated with . . .	**Spearman's Rho**	***p*-Value**
flexible time management	−0.118	0.021
lack of social interaction	0.020	0.696
lower level of motivation	0.108	0.034
lack of instructor's support	0.046	0.374
boringness	0.104	0.042

Abbreviation: OEC = online exercise classes.

There was a highly significant correlation between the level of agreement (1 = strongly agree, 2 = agree, 3 = disagree and 4 = strongly disagree) with all attitude-related statements and the frequency of OEC use (<1/week = 1, 1–2/week = 2 and ≥3/week = 3), cf. also Table 9.

Table 9. Correlation analyses between the frequency of OEC use and attitudes towards online exercise classes (n = 381).

	Frequency of OEC Use	
OEC Are Associated with . . .	**Spearman's Rho**	***p*-Value**
flexible time management	−0.268	<0.001
lack of interaction	0.149	0.004
lower level of motivation	0.283	<0.001
lack of instructor's support	0.281	<0.001
boringness	0.306	<0.001

No significant correlations ($p > 0.05$) were found between the level of agreement (1 = strongly agree, 2 = agree, 3 = disagree and 4 = strongly disagree) with any of the attitude-related statements and respondents' educational attainment, cf. also Table 10.

Table 10. Correlation analyses between educational attainment and attitudes towards online exercise classes (n = 382).

	Educational Attainment	
OEC Are Associated with . . .	**Spearman's Rho**	***p*-Value**
flexible time management	0.012	0.820
lack of interaction	0.033	0.515
lower level of motivation	0.001	0.988
lack of instructor's support	0.018	0.727
boringness	−0.034	0.382

There were significant correlations ($p < 0.05$) between the level of agreement (1 = strongly agree, 2 = agree, 3 = disagree and 4 = strongly disagree) with attitude-related statements (lack of instructor's support, boringness) and the respondents' age, cf. also Table 11.

Table 11. Correlation analyses between the respondents' age and attitudes towards online exercise classes (n = 382).

	Age (y)	
OEC Are Associated with . . .	**Spearman's Rho**	***p*-Value**
flexible time management	0.049	0.335
lack of interaction	−0.095	0.063
lower level of motivation	−0.073	0.153
lack of instructor's support	−0.103	0.045
boringness	−0.131	0.011

There was a positive significant correlation between the level of agreement (1 = strongly agree, 2 = agree, 3 = disagree and 4 = strongly disagree) with the attitude-related statement 'flexible time management' and the respondents' BMI. Moreover, there were negative significant correlations with the attitude related statement 'lower level of motivation' and 'boringness' and the respondents' BMI ($p < 0.05$) cf. also Table 12.

Table 12. Correlation analyses between the respondents' BMI and attitudes towards online exercise classes (n = 382).

	BMI (kg/m^2)	
OEC Are Associated with . . .	**Spearman's Rho**	***p*-Value**
flexible time management	0.185	<0.001
lack of interaction	−0.044	0.388
lower level of motivation	−0.101	0.049
lack of instructor's support	−0.052	0.306
boringness	−0.102	0.047

4. Discussion

The main aim of our study was to assess to what extent German adults were aware of and used OEC, which have been promoted during the COVID-19 related lockdown in the spring of 2020. As hypothesized, in our sample almost 70% of all respondents reported being aware of such classes. At the same time, only about one in five of all respondents reported regular (at least once a week) use of OEC. Both awareness and use of OEC were higher in respondents who were complying with WHO PA recommendations during

lockdown, who were younger and who had lower BMI. Additionally, frequency of use was significantly higher in active respondents. These characteristics might be indicative of an altogether higher health and PA consciousness.

There might be several reasons for limited regular use of OEC. With a higher number of sunny hours, higher temperatures and lower precipitation than usual the weather was very pleasant in Germany during the first lockdown [31]. Compared to other European countries, such as Italy and Spain, lockdown measures in Germany were less strict, and leaving one's house was never limited [32]. These two factors combined might have made using OEC in one's home less appealing. A further aspect might be the missing of social interaction, as was also documented in our results. In line with our findings, a recent qualitative study from France found that older adults were not interested in training videos that were offered to them during the lockdown, and perceived being alone as demotivating for PA [33]. Almost 70% of OEC users in our survey strongly agreed or agreed that they had to motivate themselves harder when engaging in OEC than in regular ones. This result is confirmed by qualitative studies in which participants report a challenge in finding the motivation to regularly exercise in lockdown, even if internet-based alternatives are available [34,35]. Barrett and colleagues also reported that some participants indeed tried OEC but were not able to keep with it because of motivational factors [35]. Over 60% of OEC users in our sample reported missing the interaction with other exercisers. Being part of a group, peer encouragement and PA as an opportunity to socialize are established facilitators for PA [36,37]. Indeed, in the elderly engagement in PA is often motivated by the wish to increase social connections [38], and social motives might be more relevant for older than younger adults [39]. Safety aspects, such as fear of injury or fall, might have also prevented some from exercising using an OEC without an instructor's individual guidance. Finally, in Germany fast internet is not available everywhere, and certain population groups' digital skills are partially limited [40].

The large majority of OEC users (87.5%) appreciated the time flexibility offered by this format. This finding is not surprising since time constraints and management including competing duties, such as child care, are often cited barriers to regular PA [36,41]. This could have even been further exacerbated during lockdown with increased care work [42]. About 70% of OEC users did not perceive OEC as boring, which is an additional asset. Experience of boredom has been identified as a barrier to PA [43] and might detrimentally affect performance as well as contributing to a feeling of exercise being more taxing [44].

Slightly more than half of OEC users reported missing the individual guidance of an exercise instructor. It is plausible that some of the OEC users in the current study were experienced exercisers who did not feel the need of supervision. Older people, however, typically appreciate the presence of a qualified instructor; indeed, a systematic review found that the elderly often perceive exercise without an instructor as not being safe [37].

The correlation analysis indicates that OEC might be differentially attractive to people according to PA status, frequency of use, BMI and age, implying that the very same aspects of OEC might be perceived differentially. Frequent users seemed to appreciate the beneficial aspect of OEC (flexible time management) and did not perceive apparent negative factors such as lack of social interaction and instructor's support, lower level of motivation or boredom as barriers. Similarly, for younger respondents lack of instructor's support and boringness were less of a barrier. On the other hand, people with a higher BMI perceived OEC as requiring more self-motivation and being boring.

We are not aware of previous reports on the use of and attitudes towards OEC during the first COVID-19 related lockdown, and comparison with other forms of technology-supported approaches are limited. Digital health interventions and internet-delivered interventions have been shown to lead to a small but significant increase in PA [45,46]. These studies and interventions typically provide participants with various forms of support, but even so Davies and colleagues caution about the generalizability of the results if widely disseminated [45]. This caution seems to be well founded, since large differences in dropout and website usage have been reported in a randomized controlled trial and

a randomized ecological trial with the same content (walking promotion) [47]. All in all, because of very high attrition and low usage, real-world impact of web-based interventions seem to be less well established [47]. In this sense, our survey is closer to an ecological approach, and results should be seen in this context.

Schwartz and colleagues have designed and tested a live, online, group training intervention among elderly adults during the first COVID-19 related lockdown in Israel. This tailored approach with technical support was feasible, and participants enjoyed live interactions with the instructors and personal feedback during the sessions [48]. Another study in Israel also found that a custom-made intervention with technical and motivational support was perceived as enjoyable in the elderly sample, so much so that about half of the participants wished to continue with the OEC even after the lockdown [49]. These studies highlight the necessity of designing interventions for specific target groups and underline the relevance of providing support. This approach however cannot realistically be used at the population level, since with the self-organized use of OEC neither technical nor motivational support is available [35].

Our study has important practical implications. With ever emerging new variants of the coronavirus [50], recurring lockdowns and closure of PA infrastructure cannot be fully ruled out. As such, it is important to improve PA options with low infection risk, such as OEC, and learn more about their use. Taken together, OEC have certain advantages, such as low cost, time efficiency and flexibility, and might be regularly used by a small group of people. Lack of motivational support, interaction, instructor supervision and safety concerns however might make them less attractive as a regular exercise option for others [35,47]. Tailoring OEC to specific groups, such as the overweight, which currently tend not to use these, and providing feedback and support might improve uptake. Future research should confirm our results in a representative sample using validated instruments. Furthermore, qualitative approaches might shed light on further barriers to OEC use and ways to overcome those.

Our study has some strengths and limitations. To the best of our knowledge, this is the first report on the use of and attitudes towards OEC during the COVID-19 related lockdown, and as such provides the first data on this topic. The relatively large sample size has allowed a detailed analysis to describe users' and non-users' profiles. A further strength of our study is the use of the validated EHIS questionnaire to assess PA and anthropometric data. Our survey is limited by self-reporting, the comparatively low number of male respondents and respondents with lower educational attainment. Self-selection bias cannot be ruled out. Additionally, the instrument used to assess attitudes towards OEC has not been validated.

5. Conclusions

Promoting PA during lockdown is paramount to maintain good mental and physical health. We have shown that relatively high awareness notwithstanding, use of OEC was generally speaking limited during the first COVID-19 related lockdown in Germany. Users appreciated time flexibility, but other aspects, such as lack of social interaction with peers and difficulty to motivate oneself, might have overweighed this. Exercising using OEC seems to be differentially attractive to different respondent groups. Taken together, OEC cannot be regarded as a panacea for physical inactivity during social distancing. Further research is needed to establish factors such as tailoring and ongoing support that might improve OEC uptake, and to assess the effectiveness of these measures.

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