The role of social networks and mobile applications in physical activity during the COVID-19 epidemic in Serbia

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Summary
After the outbreak of the novel SARS-COV-2 coronavirus, in the Chinese province of Wuhan that spread rapidly across the world, the Government of the Republic of Serbia introduced protection measures in March 2020, to prevent the spread of the infectious disease COVID-19 in Serbia. All gatherings indoors (sport, cultural and other events), as well as in parks and public places intended for recreation and sports, were prohibited. Shortly after, a lockdown took place which prohibited leaving home with the exception of basic needs, work from home was recommended and online schooling was introduced. The World Health Organization has recommended the use of online resources to maintain basic physical activity. In these circumstances of social distancing, this study examines the prevalence of physical activity supported by social networks and mobile applications during the COVID-19 lockdown in Serbia. The study was conducted as a cross-sectional study, using questionnaire distributed through social networks. The study found that more than a third of respondents (38.3%) used social networks or mobile apps to perform physical activity during the lockdown in Serbia; 27.1% used social networks/mobile apps before the pandemic, while 11.2% began to use social networks/mobile apps to perform physical activity during the lockdown. Easy access and review of exercises were the most common reasons for using social networks/mobile apps. 40% of the participants in the study agreed that social networks/mobile apps make it easier to engage in physical activity. Based on the presented results, it can be concluded that the promotion of physical activity at home through social networks and mobile apps can provide an invaluable contribution to maintaining physical activity globally during pandemics such as COVID-19.

Keywords: physical activity, mobile applications, social networks, COVID-19, pandemics, lockdown
INTRODUCTION

After the outbreak of the novel SARS-COV-2 coronavirus, in the Chinese province of Wuhan that spread rapidly across the world, the Government of the Republic of Serbia introduced protection measures in March 2020, to prevent the spread of the infectious disease COVID-19 in Serbia. All gatherings indoors (sport, cultural and other events), as well as in parks and public places intended for recreation and sports, were prohibited. Shortly after, a lockdown took place which prohibited leaving home with the exception of basic needs, work from home was recommended and online schooling was introduced. Having been constricted to the confinement of their homes, people experienced a decline in their physical activity (1). The World Health Organization (WHO) recommended performing a minimum of 150 minutes of moderate or intense activity per week as sufficient for the normal functioning of the cardiovascular system. Populous was advised to continue exercising in their homes and the use of online resources was suggested to maintain basic physical activity. As a consequence, gyms, sports halls and yoga classes have been brought into our homes. Social networks, mobile applications, video clips, endless streams of information, ready and easily accessible for use, had great potential to contribute to the further development of physical activity during COVID-19 pandemic. The promotion of physical activity through social networks and applications became an invaluable asset. A systematic review of studies examining the impact of mobile phones in reducing inactivity showcased a positive effect in promoting physical activity during COVID-19 pandemic (2). In circumstances of social distancing, this study aimed to examine the prevalence of physical activity supported by social networks and mobile applications during the COVID-19 epidemic in Serbia.

MATERIAL AND METHODS

The study was conducted as a cross-sectional study, using a questionnaire intended to examine habits in physical activity during the COVID-19 epidemic in Serbia. The questions from the first part of the questionnaire referred to: the demographic characteristics of the respondents, physical activity before the COVID-19 epidemic, and the attitudes about the frequency of exercise. The second part of the questionnaire examined the impact of social networks and mobile applications on the frequency of physical activity during the epidemic. The questionnaire was distributed through social networks.

Statistical analysis

Descriptive and inferential statistical methods were used in this study. Descriptive methods included measures of: central tendency (mean), variability (range, standard deviation) and absolute and relative numbers. Differences in distribution of variables between groups were analyzed using Pearson Chi-Square test. In all analyses, the significance level was set at 0.05. Statistical analysis was performed using IBM SPSS statistical software (SPSS for Windows, release 25.0, SPSS, Chicago, IL).

RESULTS

A total of 206 respondents, with equal gender distribution (50.0%) and mean age of 30.3±10.5 years were included in the study. The age of the respondents ranged from 16 years, for the youngest respondent, to 65 years, for the oldest respondent. Seventy respondents (34.0%) had secondary school education level and lower, while 66% of the surveyed population completed higher education, i.e. university education.

Figure 1 shows the attitudes of the respondents about performing regular physical activity. Out of a total of 206 respondents, 70 (34.0%) believed that it is desirable to perform physical activity almost every day. Sixty-four percent of the surveyed population considered it preferable to exercise several times a week, while 1.9% believed that performing physical activities once a week or less is sufficient (Figure 1).

Men more often stated that it is necessary to perform physical activities almost every day, while women more often stated that it is enough to perform physical activity several times a week or less (p=0.039). Older respondents more often stated that it is necessary to perform physical activities almost every day, while younger respondents more often stated that it is enough to perform physical activity several times a week or less (p=0.012). Table 1 presents the distribution of respondents’ attitudes regarding the performance of regular physical activity in total and by gender.

More than two thirds of respondents (71.6%) performed regular physical activity before lockdown due to the COVID-19 epidemic in Serbia. Almost half (45.6%) of
the respondents exercised several times a week, 18% almost every day, while 6.8% exercised once a week or less. Men performed regular physical activity more often than women before the COVID-19 epidemic in Serbia (p<0.001). During the lockdown due to the COVID-19 epidemic in Serbia, two thirds (68.9%) of the respondents performed regular physical activity. 39.3% of respondents exercised several times a week, 21.8% almost every day, while 7.8% exercised once a week or less. Younger respondents performed regular physical activity more often than older ones during the COVID-19 epidemic in Serbia (p=0.059).

More than half of the surveyed population (68.6%) did not change their habits in performing physical activities during the COVID-19 epidemic in Serbia (54.4% exercised before the epidemic and continued exercising during the epidemic; 14.2% did not exercise before or during the epidemic). Discontinuation in performing physical activity during the COVID-19 epidemic was observed in 17.2% of respondents. A total of 14.2% of respondents started exercising during the epidemic. Men were more likely to give up exercise than women, while women were significantly more likely to start exercising (p=0.006). Younger respondents started exercising more often than older ones, while older respondents gave up exercising significantly more often (p = 0.023). Figure 2 presents the performance of physical activity before and during the lockdown due to the COVID-19 epidemic in Serbia.

Table 1. Distribution of respondents’ attitudes regarding the performance of regular physical activity in total and by gender

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Gender</th>
<th>p</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Performed physical activity before pandemic</td>
<td>146 (71.6)</td>
<td>83 (83.0)</td>
<td>62 (60.8)</td>
</tr>
<tr>
<td>Performed physical activity during pandemic</td>
<td>142 (68.9)</td>
<td>73 (71.6)</td>
<td>68 (66.7)</td>
</tr>
<tr>
<td>Motivation for performing physical activity</td>
<td>Health</td>
<td>Physical appearance</td>
<td>Energy consumption</td>
</tr>
<tr>
<td></td>
<td>111 (78.7)</td>
<td>61 (83.6)</td>
<td>50 (73.5)</td>
</tr>
<tr>
<td></td>
<td>68 (48.2)</td>
<td>27 (37.0)</td>
<td>41 (60.3)</td>
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<td></td>
<td>42 (29.8)</td>
<td>19 (26.0)</td>
<td>23 (33.8)</td>
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<td></td>
<td>46 (32.6)</td>
<td>17 (23.3)</td>
<td>29 (42.6)</td>
</tr>
<tr>
<td></td>
<td>117 (57.4)</td>
<td>63 (61.8)</td>
<td>54 (52.9)</td>
</tr>
<tr>
<td></td>
<td>Used before pandemic</td>
<td>55 (70.5)</td>
<td>22 (75.9)</td>
</tr>
<tr>
<td></td>
<td>Started using during pandemic</td>
<td>23 (29.5)</td>
<td>7 (24.1)</td>
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<tr>
<td></td>
<td>86 (42.4)</td>
<td>31 (30.4)</td>
<td>55 (54.5)</td>
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<tr>
<td></td>
<td>As usual</td>
<td>39 (1.3)</td>
<td>24 (23.5)</td>
</tr>
<tr>
<td></td>
<td>As I could adjust to newly emerged situation</td>
<td>109 (54.0)</td>
<td>55 (53.9)</td>
</tr>
<tr>
<td></td>
<td>Demotivated, anxious</td>
<td>54 (26.7)</td>
<td>23 (22.5)</td>
</tr>
<tr>
<td></td>
<td>I have not changed my habits in performing physical activity</td>
<td>74 (36.3)</td>
<td>45 (44.1)</td>
</tr>
<tr>
<td></td>
<td>I stopped performing physical activity</td>
<td>36 (17.6)</td>
<td>8 (7.8)</td>
</tr>
<tr>
<td></td>
<td>I continued performing physical activity</td>
<td>94 (46.1)</td>
<td>49 (48.0)</td>
</tr>
<tr>
<td></td>
<td>A lack of free time</td>
<td>19 (52.8)</td>
<td>3 (37.5)</td>
</tr>
<tr>
<td></td>
<td>A lack of motivation</td>
<td>18 (50.0)</td>
<td>4 (50.0)</td>
</tr>
<tr>
<td></td>
<td>Financies</td>
<td>5 (13.9)</td>
<td>1 (12.5)</td>
</tr>
</tbody>
</table>

Figure 2. The performance of physical activity before and during the COVID-19 lockdown in Serbia

During the lockdown due to the COVID-19 epidemic in Serbia, the motivation for performing regular physical activity among the respondents was different. Health, as one of the drivers, was present in the majority of respondents (78.9%). Almost half (48.6%) commented physical appearance as driver, while one third stated that energy consumption and having free time were drivers for performing physical activity during the lockdown (30.3%...
and 32.4%, respectively). Female respondents were more likely to have physical appearance as a motivation for performing regular physical activity, as well as having free time than male respondents (p=0.006 and p=0.014, respectively). Physical appearance and having free time were drivers for performing regular physical activity more often for younger respondents than for older ones (p<0.001 and p=0.053, respectively).

Forty two percent of respondents used mobile applications/social networks to perform physical activities before the lockdown caused by the COVID-19 epidemic in Serbia. Before pandemic, women more often used mobile applications/social networks to perform physical activities than male respondents (p=0.001). The tendency of more frequent use of mobile applications/social networks for performing physical activities was noticed rather among younger than older respondents (p=0.073). Twenty one percent of the respondents used mobile applications, 20.9% used Instagram, 7.3% used Facebook, while 13.1% of respondents used other social networks in order to perform physical activity (Figure 3).

During the lockdown, more than one third of the respondents (38.3%) used social networks/mobile applications in order to perform physical activity. 27.2% of the respondents stated they used social networks before the pandemic, while 11.2% stated that they started using social networks/mobile applications for performing physical activity during the pandemic (Figure 4).

Availability and review of exercises were the most common reasons for using social networks/mobile applications (85.1%). Financial reasons or the absence of payment of a personal trainer was the reason in 27.6% of the surveyed population, while 23.0% of respondents stated saving time as the most common reason for using social networks/mobile applications in performing physical activity. Forty percent of the surveyed population partially or completely agrees that social networks/mobile applications make it easier for an individual to engage in physical activity. Almost one third of the respondents (32.7%) have a neutral attitude, while 27.4% of the surveyed population partially or completely disagree with the statement that social networks/mobile applications make it easier for an individual to engage in physical activity.

More than half of the respondents (53.9%) stated that they adapted to the current situation during the lockdown, while 26.6% of the surveyed population felt demotivated/ anxious, and 19.6% of the respondents stated that they felt as usual. Respondents with a lower level of education felt more often demotivated or anxious than respondents with a higher level of education (p=0.054).

After the lockdown, almost half of the respondents continued to perform physical activities (46.1%), while 36.4% stated that they did not change their habits related to exercising. 17.5% percent of the surveyed population gave up exercising after the lockdown. Female respondents gave up performing regular physical activity more often than male respondents (p=0.001). The most common reason for giving up exercise after the lockdown was the lack of free time (52.8%). Half of the surveyed population stated the lack of motivation as the reason, while the financial problem was present in 13.9% of the surveyed population. Due to lack of time, younger respondents more often gave up performing physical activities after the state of emergency than older respondents (p=0.061).

**DISCUSSION**

This paper investigates the representation of digital sports activities, i.e. the role social networks and mobile applications take in the interest of promoting and providing ease of physical activity. The study was conducted during the conditions of social distancing caused by the COVID-19 pandemic in Serbia. Having the social climate shift to more isolated state, social networks would experience a rise in userbase and become a backbone of communication and information exchange across the world. Notably, the state of emergency would lead participants of recreation centres, fitness halls and sports clubs to a change in their environment. Having restricted access to spaces of physical activity they sought alternatives. The World Health Organization (WHO) would go on to recommend maintaining basic physical activity levels by using “online resources” (4). A switch would take place,
replacing any face to face interaction between trainers and trainees with the so-called online environment.

Various studies exploring “online fitness” as a growing trend during 2020 and 2021, have been conducted worldwide (5). Germany had shut doors on recreation centres and sports halls as early as March, not opening them until May 2020 and again from November 2020 all throughout the winter season. Based on the representative results of the study conducted in Germany during this time, it was concluded that the state of emergency lead to a decline in sports activities both in the elderly and young population. The study presented results that showcased 2% of the elderly population using online fitness activities in the first two weeks of the state of emergency, with a tendency to grow in the later stages of the pandemic (6). A survey conducted between April and May 2020 in the UK showed that 19-23% of the population used online activities during the state of emergency caused by the COVID-19 pandemic. Our results indicated that more than a third of respondents (38.3%) in Serbia used social networks, ie mobile applications in order to perform physical exercise (7).

A study conducted in Belgium showcased results that indicate that people who exercised using online help before the COVID-19 pandemic increased their level of exercise during the state of emergency (8). A study in Brazil showcased results stating that 23% of the surveyed population started using online fitness classes and that 20% watched online videos regarding fitness exercises during the pandemic (9). One in five German citizens would state that they used social networks to perform physical exercise at least once during the COVID-19 pandemic, ie 23% of the total 1,508 respondents included in the study (10). Our study showcased that 27.2% of respondents used social networks to perform physical exercise even before the emergency, while 11.2% started using social networks and/or mobile applications during the state of emergency. According to the results of the study conducted in Germany (10) the share of digital sports activities increased significantly by as much as 19%. However, the trend of digital sports activities would not sustain its popularity, the conclusion of the state of emergency would lead to a decline in sports activities both in the elderly and young population. The study presented results that showcased 2% of the elderly population using online fitness activities in the first two weeks of the state of emergency, with a tendency to grow in the later stages of the pandemic (6). A survey conducted between April and May 2020 in the UK showed that 19-23% of the population used online activities during the state of emergency caused by the COVID-19 pandemic. Our results indicated that more than a third of respondents (38.3%) in Serbia used social networks, ie mobile applications in order to perform physical exercise (7).

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Alfavaz et al. (11) found in their study negative effects of self-isolation and quarantine on physical activity in adults, which can be explained by the difficulties of individuals having to change their routines that were previously acquired in fitness clubs and gyms. Positive attitudes were observed in our study regarding the use of social networks/ie mobile applications when performing physical exercise, as well as in the study conducted in Saudi Arabia (12). Ease of availability and a review/selection of exercises were the most common reasons for using social networks/mobile applications in 85.1% of the surveyed population, according to our results. Financial reasons ie lack of funds for a personal trainer was a primary reason for 27.6% of respondents, while 23.0% stated saving time as the most common reason for using social networks/mobile applications for the purpose of performing physical exercise. The influence of social networks/mobile applications on engaging in physical activity was the topic of research in the study of Ammar (13) et al., as well as Kaur et al (14). Despite the positive observations found in the study conducted in Saudi Arabia as well as the influence of social media presented by the Ammar and Kaur studies, the results showed a different aspect, The level of physical activity obtained when home exercising was not sufficient to meet the regular physical activity patterns that existed before self-isolation conditions (12-14). AlMarzooki’s research (12) showcased a strong relation between the attitude towards using social networks and levels of physical activity obtained. In addition, the results identified age, level of physical activity and average hours spent on social media as a significant predictors of attitudes toward their use. The results are in line with the finding found in the Shimoga et al (15) study, where frequency of social media use was strongly associated with physical activity.

Home digital sports activities usually require certain technical equipment, as well enough space at home. In this context, it is understandable that digital sports are more socially selective than traditional offline sports. Ng and co-workers (16) showed a finding in their study where fitness applications were more popular among young people, and persons of better financial status. The results of the study conducted in Germany (10) support these claims and show that users of digital sports are younger, better educated and in better financial condition. Such claim indicates that persons of age rarely participate in digital sports activities. Lower representation of older users of digital sports is probably a consequence of technological barriers or the lack of motivating or health-oriented content intended for older users. Digital sports have proven to be more attractive within the female population rather than the male population. This is the result of digital sport platforms being more oriented towards exercises based on body shaping, dance or yoga. The results of our study are in line with the before mentioned findings, where, before the COVID-19 pandemic in Serbia, women
more often used mobile applications and social media to perform physical exercise rather than the male respondents. Also, our study showed the younger respondents having a higher tendency to use mobile applications and social media to perform physical exercise rather than the older respondents. However, after the abolition of the state of emergency, female respondents were more likely to give up regular physical activity rather than the male respondents. Due to lack of time, being the primary reason, the younger population was more likely to give up on regular physical activity rather than the older respondents, after the abolition of the state of emergency.

According to the results of most studies, the active users of digital sports mostly used digital sports activities even before the period of the state of emergency caused by the COVID-19 pandemic. Therefore, it can be assumed that the use of social networks as well as mobile applications for performing physical exercise allowed the already active population to remain active during the pandemic. It however failed to motivate and stimulate the larger share of the inactive population to start using sports activities during the self-isolation period. Thus, digital sports activities encourage individuals to stay active and play an important role in public health during a pandemic, such as this one. Various practical implications arise from the most current research, especially when mentioning sports clubs, gyms and fitness centres, suggesting the introduction of digital sports activities to their already existing portfolio. This kind of digital data could be an extension to traditional offline activities, giving individuals with limited time or mobility an opportunity to participate in sports activities. Digital sports activities are not expected to completely replace traditional offline sports, but for many they could become a temporary and easily accessible supplement, in the post-pandemic period.

CONCLUSION
Promotion of performing physical activity at home through social networks and mobile applications can make an invaluable contribution to maintaining physical activity globally during pandemics such as COVID-19.

REFERENCES
Sažetak

Nakon što se u kineskoj provinciji Wuhan pojavio novi virus, SARS-KOV-2, koji se ubrzo razprostirio širom sveta, u martu 2020. godine Vlada Republike Srbije je uvela mere zaštite za sprečavanje i širenje zarazne bolesti KOVID-19 u Srbiji. Zabranjena su sva okupljanja u zatvorenom prostoru (sportske, kulturne i druge manifestacije), kao i kretanje u parkovima i javnim površinama namenjenim za rekreaciju i sport. U piku epidemije, uvedeno je vanredno stanje tokom koga je zabranjeno kretanje na javnim mestima, odnosno van stanova, prostorija i objekata za stanovanje u stambenim zgradama i izvan domaćinstva, preporučen je rad od kuće i uvedeno onlajn školovanje. Svetska Zdravstvena Organizacija preporučila je održavanje nivoa bazične fizičke aktivnosti korišćenjem tzv. onlajn resursa. Na osnovu svega navedenog, u ovom radu istražena je zastupljenost fizičke aktivnosti potpomoću društvenih mreža i mobilnih aplikacija u uslovima socijalnog distanciranja nastalog usled epidemije KOVID-19 u Srbiji. Studija je sprovedena kao studija preseka, sa korišćenjem upitnika distribuiranog preko društvenih mreža. Utvrđeno je da je nešto više od trećine ispitanika (38.3%) koristilo društvene mreže, odnosno mobilne aplikacije u cilju obavljanja fizičke aktivnosti tokom vanrednog stanja u Srbiji, od čega je 27.1% koristilo društvene mreže i pre vanrednog stanja, dok je 11.2% počelo da koristi društvene mreže/mobilne aplikacije za obavljanje fizičke aktivnosti tokom vanrednog stanja.

Laka dostupnost i pregled vežbi bili su najčešći razlog korišćenja društvenih mreža/mobilnih aplikacija. 40% učesnika studije smatralo je da društvene mreže, odnosno mobilne aplikacije olakšavaju bavljenje fizičkom aktivnošću. Na osnovu dobijenih rezultata može se zaključiti da promocija fizičke aktivnosti u kućnim uslovima preko društvenih mreža i mobilnih aplikacija može pružiti neprocenjiv doprinos održavanju fizičke aktivnosti na globalnom nivou tokom pandemije kao što je KOVID-19.

Ključne reči: fizička aktivnost, mobilne aplikacije, društvene mreže, KOVID-19, pandemija, vanredno stanje

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