


Changes in the recreational physical activity (RPA) behaviours caused by COVID-19 lockdown – a case study of Poland

Joanna Kantyka ^a, Justyna Maciąg ^b and Damian Herman ^c

^aInstitute of Sport Sciences, The Jerzy Kukuczka Academy of Physical Education, Katowice, Poland; ^bFaculty of Management and Social Communication, Institute of Public Affairs, Jagiellonian University, Kraków, Poland;

^cDepartment of Sports Theory, The Jerzy Kukuczka Academy of Physical Education, Katowice, Poland

ABSTRACT

This article aims to describe, explain and compare the changes in Poles' recreational physical activity (RPA) behaviours that emerged in response to the restrictions introduced by the Covid-19 pandemic. The literature review revealed gaps regarding this subject. Of particular interest is taking into account the comparison of both the national and international context and the comprehensive approach to explaining the mechanism of change. Based on the literature, the theoretical framework was developed, which was then used to design an online questionnaire. The questionnaire was conducted from 20 May to 31 October 2020 and included 533 respondents. To analyse the data, a combination of quantitative and qualitative analysis methods was used (descriptive statistics and grounded theory techniques). Research has shown that RPA behaviours changed temporally or permanently. The behaviours were partially differentiated by gender and age. In comparison to other countries, it seems to be a result of the range and strictness of the introduced restrictions and national culture. The novelty of the work consists of the combined data analysis methods, which allow for an explanation of the mechanism of changes and a comparison of results with other countries.

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Introduction

Studies of physical inactivity have found a sedentary lifestyle and obesity to contribute to the emergence of risk factors for COVID-19 (Halabchi et al., 2020; Laddu et al., 2020; Simpson & Katsanis, 2020; Zachary et al., 2020; Coronavirus: Obesity increases risks, 2020). Maintaining an appropriate level of physical activity during lockdown is emphasised as having a protective effect against COVID-19 infection (Chen et al., 2020; Jakobsson et al., 2020). Self-isolation, social distancing, and other restrictions imposed to contain the COVID-19 pandemic impacted the lifestyles of millions of people worldwide (Lesser & Nienhuis, 2020). It has become much more difficult, or even possible, for people to pursue the same forms of RPA.

Changes in their RPA behaviours have been demonstrated by many studies (Antunes et al., 2020; Bann et al., 2020; Chen et al., 2020; Di Renzo et al., 2020; Dobrowolski & Włodarek, 2021; Kriaucioniene et al., 2020; Lesser & Nienhuis, 2020; López-Bueno et al., 2020; Phillipou et al., 2020; Sowier-Kasprzyk & Widawska-Stanisiz, 2020; Venter et al., 2020), but there is a paucity of works that describe and explain their mechanism in a comprehensive manner. Given that, the authors of this article undertook to answer the following specific research questions:

CONTACT Justyna Maciąg  justyna.maciag@uj.edu.pl  Department of Sports Theory, The Jerzy Kukuczka Academy of Physical Education, Katowice, Poland

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- How did the pandemic influence the motivations of leisure-time athletes in Poland for engaging in physical activity?
- How did the pandemic change the conditions of RPA?
- How did the manner of execution of RPA change?
- Did the pandemic have an effect on the respondents' perception of fitness and body mass?
- What factors explain their different responses to pandemic restrictions?
- How did restrictions influence their RPA strategies, and what were the strategies' consequences for their behaviour?

At the time of commencing the research, the authors were unable to refer to any studies regarding the effect of pandemic restrictions on RPA behaviours. Therefore, they first prepared a compilation of the characteristics and elements of recreational behaviours as the study's theoretical framework, and then used it to design an original survey questionnaire. The findings were analysed and compared with the results of studies on other countries in the discussion section. The article closes with conclusions and suggestions for further research.

Materials and methods

Sampling and data collection

The study was conducted in Poland from 20 May 2020 through 31 October 2020, i.e. during the strict lockdown months (20 May–6 June 2020) and the following 5 months when pandemic restrictions were partly eased (6 June to 31 October 2020). The authors used self-administered questionnaires, which were distributed among adult Poles selected using non-probability sampling. The links to the questionnaires were sent via social media (FB, LinkedIn), messaging applications (Messenger, WhatsApp), and email.

The questionnaires were completed by a total of 533 respondents aged 18–72 years (a mean age of 33.9 years, with a standard deviation of 13.8 years). Among the respondents, 41% were younger than 24, 60% were women, 45% lived in big cities or conurbations, and 63% had tertiary education (Table 1).

Research tools

The literature review allows the following elements of RPA behaviours to be identified.

Table 1. Participants' demographics.

Demographics	Frequency	%
Gender		
Female	318	59.7
Male	215	40.3
Age		
up to 24 years	222	41.3
25–44 years	189	35.2
above 44 years	126	23.5
Mean = 33.93, SD = 13.79, range = 14–72		
Education		
Higher	339	63.6
Secondary	188	35.3
Primary	6	1.1
Place of residence		
Big city/conurbation	240	45.0
Medium town	163	30.6
Small town	74	13.9
Village	56	10.5

- motivations (i.e Alexandris et al., 2002; Gabler, 2002),
- conditions – time, place, barriers (i.e Alexandris & Stodolska, 2004; Chick & Dong, 2003; Park et al., 2017),
- manner of execution – frequency, form (indoor, outdoor), type of sport (Ham et al., 2009; Maciąg & Kantyka, 2020; White et al., 2016; WHO, 2010; Zhang et al., 2015).

The above elements were used to construct a survey questionnaire with closed-ended and semi-open-ended questions in order to gather information about respondents' RPA before the lockdown, during the strict lockdown, and in the 5 months after its restrictions were eased. The questionnaire also asked people to assess how the lockdown affected their body mass and fitness. The internal consistency of the questionnaire measured with Cronbach's alpha was 0.84.

For the mechanism of changes in RPA behaviours to be better understood and explained, two open-ended questions were included in the questionnaire so that the respondents could freely express their feelings, emotions, and opinions on:

- actions taken by local authorities, the media, celebrities, coaches, etc., to encourage people to engage in physical activity (334 answers) and
- actions that local authorities, the media, celebrities, coaches, etc., should have taken to encourage people to engage in physical activity (296 answers).

The questionnaire was approved by the Bioethics Committee at the Jerzy Kukuczka Academy of Physical Education, Katowice, Poland (decision no. KB/29/2020) as conforming to the ethical standards of the 2013 Declaration of Helsinki (World Medical Association 2013).

Data analysis

The survey data were analysed using a combination of quantitative and qualitative analysis tools. Respondents' demographics and answers to the closed-ended questions were transformed into descriptive statistics (modes, medians, means, standard deviations, and percentages) (Little, 2013) and analysed in Statistica 13 (Tibco, Inc.). In order to determine whether the two qualitative characteristics in the population were independent of each other, the χ^2 test was used. Differences between results obtained for the pre-, in- and after-lockdown periods were tested for statistical significance with Friedman's test (a non-parametric equivalent of the one-factor repeated measures ANOVA) (Stanisz, 2006).

Answers to the open-ended questions were analysed using grounded theory methods and techniques. The coding process consisted of open coding and axial coding (Strauss & Corbin, 1990). The purpose of open coding was to identify dominant codes and categories in respondents' answers (Babbie, 2013; Charmaz, 2009; Creswell, 2013; Kaiser & Presmeg, 2019; Konecki, 2000). The open-coding procedure involved concept-driven coding and data-driven coding. First, a set of predefined codes directly relating to the open-ended questions was assigned to the data. Then, data driven-coding was applied to find the emerging codes (Figure 1). A number of in vivo codes were also identified (Figure 1).

Axial coding comprises six subcategories (Kaiser & Presmeg, 2019; Konecki, 2000):

- the phenomenon – the object of exploration,
- the context – the place, time, and space where the phenomenon takes place,
- causal conditions – circumstances conducive to the emergence of the phenomenon,
- intervening conditions – circumstances that modify the character and intensity of the phenomenon and influence strategies,

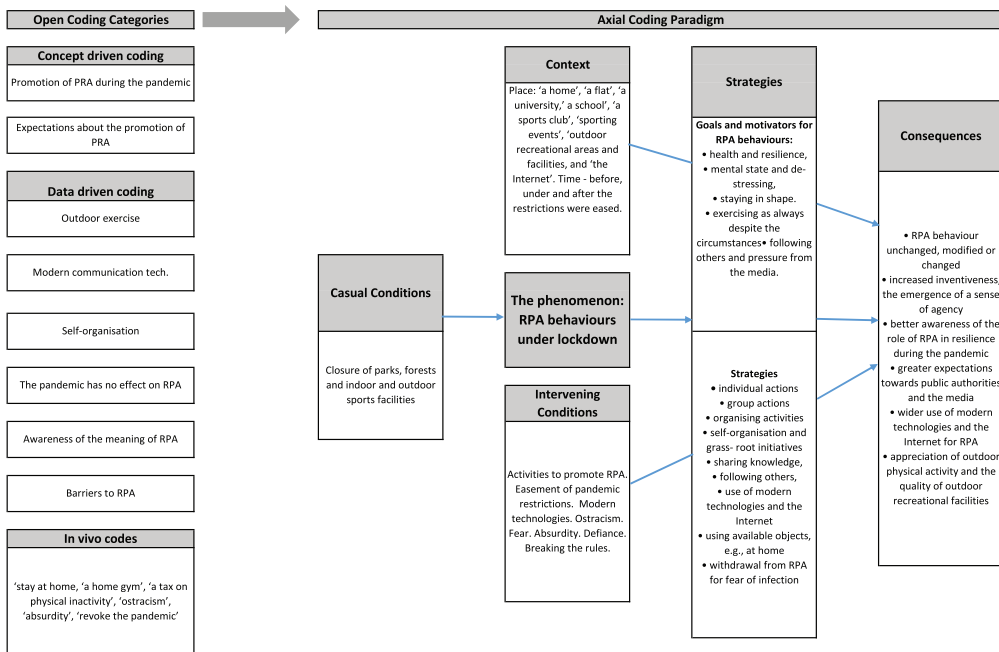


Figure 1. The mechanism of changing in the RPA behaviours caused by lockdown – findings from the qualitative data analysis.

- strategies – motivations, goals, action plans, and specific behaviours resulting from the phenomenon and
- consequences – the effects of conditions and strategies.

The results of the qualitative data analysis are summarised in Figure 1.

As recommended by (Charmaz, 2009) the coding stayed close to the original data.

Results

The presentation of the results starts with the quantitative analysis findings.

Motivations for engaging in RPA during lockdown

Answering the question about their motivations for engaging in RPA during the lockdown, most respondents indicated health reasons, such as the need to better function physically (52.7%) and raise mood (52.0%). The motivations of male and female respondents were not significantly different. As regards psychological motivations, the most frequent were fun and relaxation (61.9%) (Table 2).

The psychological motivations differed between male and female respondents in reference to 'opportunity for self-realisation' and 'de-stressing'.

The lockdown as a motivation for engaging in RPA

The study sought to determine whether the restrictions influenced respondents' decisions to undertake RPA. More than 36% of them stated that they were physically active both before and during lockdown, 35% exercised less during lockdown, and more than 19% started to exercise more.

Table 2. Respondents' motivations for RPA during the lockdown.

Motivation	Male N (%)	Female N (%)	Total N (%)
	215 (40.3)	318 (59.7)	533 (100)
Health motivations			
Maintaining a proper body mass	94 (43.7)	149 (46.9)	243 (45.6)
Medical indications	9 (4.2)	6 (1.9)	15 (2.8)
Improvement of physique			
Better physical function	120 (55.8)	161 (50.6)	281 (52.7)
Improvement of immunity	64 (29.8)	91 (28.6)	155 (29.1)
Improvement of mood	120 (55.8)	157 (49.4)	277 (52.0)
Improvement of sleep quality	19 (8.8)	30 (9.4)	49 (9.2)
Others	17 (7.9)	12 (3.8)	29 (5.4)
Psychological motivations			
De-stressing	73 (34.0)	121 (38.1)	194 (36.4)
Self-realisation	79 (36.7)	81 (25.5)	160 (30.0)
Use of leisure time	53 (24.7)	81 (25.5)	134 (25.1)
Fun, recreation, relaxation	138 (64.2)	192 (60.4)	330 (61.9)
Fashion for healthy living	15 (7.0)	31 (9.7)	46 (8.6)
Others	15 (7.0)	18 (5.7)	33 (6.2)

Pandemic restrictions had a different effect on the RPA of male and female ($\chi^2 = 37.64$ at $p < 0.00001$). The level of RPA did not change during the lockdown for almost 48% of male and 28.3% of female, 13.5% and 23%, respectively, started to exercise more, and 0.9% and 8.5% took up exercise for the first time (Table 3).

The conditions of RPA (time, place, barriers)

Asked to indicate lockdown-related barriers to RPA, 27.4% of men and 16.0% of women did not indicate any. For the other respondents, the biggest problems were the closure of parks, forests, and other spaces where they exercised (35.5%). Interesting differences were observed regarding the perceived barriers between men and women. The proportion of women indicating a lack of time due to childcare responsibilities was almost three times as big as that of men (8.5% vs. 3.3%). Women also pointed to a lack of an instructor who could motivate them to exercise (Table 4).

Manner of execution – the effect of lockdown on RPA frequency

In order to make it easier for participants to assess how restrictions impacted the frequency of their RPA, it was divided into three levels:

- low RPA (1–2 sessions per week),
- moderate RPA (3–4 sessions per week),
- high RPA (5–7 sessions per week).

Table 3. The lockdown as a motivation for engaging in RPA.

Type of engagement	Male N (%)	Female N (%)	Total N (%)
	215 (40.3)	318 (59.7)	533 (100)
I continue to exercise, although less frequently since the pandemic broke out.	77 (35.8)	110 (34.6)	187 (35.1)
I continue to exercise as before.	103 (47.9)	90 (28.3)	193 (36.2)
I've been physically active all the time, but I exercise more frequently during the lockdown.	29 (13.5)	73 (23.0)	102 (19.1)
I started to exercise when lockdown was introduced, and I still do.	4 (1.9)	18 (5.7)	22 (4.1)
I started to exercise when lockdown was introduced, but now I don't.	2 (0.9)	27 (8.5)	29 (5.4)

Table 4. Barriers to engaging in RPA during the lockdown.

Barrier	Male N (%)	Female N (%)	Total N (%)
	215 (40.3)	318 (59.7)	533 (100)
Lack of free time due to job demands	34 (15.8)	41 (12.9)	75 (14.1)
Lack of free time due to child and family care responsibilities	7 (3.3)	27 (8.5)	34 (6.4)
Home conditions inappropriate for RAF	49 (22.8)	59 (18.6)	108 (20.3)
Lack of self-discipline	23 (10.7)	43 (13.5)	66 (12.4)
Lack of motivation to exercise	31 (14.4)	60 (18.9)	91 (17.1)
Lack of sports equipment	43 (20.0)	54 (17.0)	97 (18.2)
Having to exercise alone	26 (12.1)	44 (13.8)	70 (13.1)
Lack of a trainer	7 (3.3)	26 (8.2)	33 (6.2)
Ban on entry to parks, forests, and other outdoor spaces	76 (35.3)	113 (35.5)	189 (35.5)
Lack of skills and knowledge of how to exercise	3 (1.4)	17 (5.3)	20 (3.8)
Impossibility of pursuing one's favourite sport	73 (34.0)	105 (33.0)	178 (33.4)
Illness	5 (2.3)	6 (1.9)	11 (2.1)
Others	3 (1.4)	5 (1.6)	8 (1.5)
No barrier	59 (27.4)	51 (16.0)	110 (20.6)

Table 5. Impact of lockdown on the RPA frequency.

RPA frequency	Pre-lockdown N (%)	Under lockdown N (%)	Eased lockdown N (%)
High	163 (33.5)	159 (31.2)	172 (35.4)
Moderate	227 (46.7)	183 (36.0)	218 (44.9)
Low	96 (19.8)	167 (32.8)	119 (24.5)

Table 6. Impact of lockdown on the RPA frequency (by male and female).

RPA frequency:	Pre-lockdown		Under lockdown		Eased lockdown	
	Male N (%)	Female N (%)	Male N (%)	Female N (%)	Male N (%)	Female N (%)
	209 (43.4)	273 (56.6)	213 (42.3)	291 (57.7)	213 (42.3)	291 (57.7)
High	82 (39.2)	79 (28.9)	65 (30.5)	93 (32.0)	72 (33.8)	96 (33.0)
Moderate	99 (47.4)	127 (46.5)	80 (37.6)	102 (35.1)	106 (49.8)	112 (38.5)
Low	28 (13.4)	67 (24.5)	68 (31.9)	96 (33.0)	35 (16.4)	83 (28.5)

The Friedman's rank test results showed significant differences in the number of workout sessions performed by participants before, during, and after the easing of lockdown (chi-square = 44.76; $p < 0.0001$) (Tables 5, 6).

Before lockdown, 33.5% of the respondents exercised frequently. Restrictions slightly reduced their rate to 31.2%, but after they were eased, the rate rose again to 35.4%. Therefore, lockdown did not have a significant effect on respondents with a high RPA level, but in the case of moderately active respondents, it turned out to be considerable. The proportion of the latter decreased from 46.7% before to 36.0% under lockdown and increased again to 44.9% (an almost pre-lockdown level) after its restrictions were eased. In the case of respondents with a low RPA level, the respective rates were 19.8%, 32.8%, and 24.5%. The pre-lockdown frequency of workout sessions was significantly different for men and women (chi-square = 11.24; $p = 0.0036$), but following the introduction of lockdown differences disappeared (chi-square = 0.34; $p = 0.8443$) to re-emerge with the relaxation of its restrictions (chi-square = 11.32; $p = 0.0035$).

Manner of execution – the effect of lockdown on the type and number of sports

Restrictions changed the types and number of sports undertaken by respondents. Before the lockdown, the most preferred type was a group gym workout (40.7%). During the lockdown, it was cycling (36.3%), and this tendency was continuing after restrictions were eased (Table 7). Some

Table 7. Impact of the lockdown on the type of sports.

Type of RPA:	Pre-lockdown N (%)	Under lockdown N (%)	Eased lockdown N (%)
Cycling	211 (39.2)	195 (36.3)	230 (47.4)
Swimming	112 (20.8)	16 (3.0)	78 (16.1)
Water exercises	20 (3.7)	5 (1.0)	5 (1.0)
Gym workout	206 (38.3)	76 (14.1)	151 (31.1)
Gymnastics/yoga	122 (22.7)	162 (30.1)	129 (26.6)
Outdoor running	172 (32.0)	179 (33.3)	159 (32.8)
Slow jogging (outdoors)	35 (6.5)	43 (8.0)	40 (8.3)
Nordic walking	49 (9.1)	38 (7.1)	42 (8.7)
Team games	122 (22.7)	40 (7.4)	100 (20.6)
Group fitness	219 (40.7)	89 (16.6)	165 (34.0)
Dancing	30 (5.6)	17 (3.2)	24 (5.0)
Tennis, squash	22 (4.1)	7 (1.3)	23 (4.7)
CrossFit	22 (4.1)	24 (4.5)	19 (3.9)

changes in preference types of sports were short-lived, and it could be observed that outdoor activities became more appreciated.

It was also found that the lockdown affected the number of exercised sports. The proportion of participants who did at least two sports was reduced from 70.5% to 48.4%.

Respondents' self-assessments of their fitness and body mass

The effect of the lockdown on respondents' assessments of their fitness and body mass proved to be ambiguous. An increase in body mass was indicated by 23% of the respondents, whereas 19% claimed that it decreased. Differences in self-assessments were unrelated to respondents' gender (Table 8).

Nearly half of the respondents were of the opinion that their physical fitness post-lockdown was the same as before, one-fourth thought that it was lower, and almost one-fifth believed it was higher. Participants' perceptions of their fitness were unrelated to gender, but a statistically significant relationship was established between perceived fitness and age ($\chi^2 = 10.16$; $p = 0.0377$) (Table 8).

The above analysis shows quantitative changes in respondents' RPA behaviours brought about by the lockdown. To gain an insight into the wider context of the changes and to better explain their mechanism, a qualitative analysis of the data was also performed.

The context, circumstances and changes in respondents' RPA behaviours – the results of a qualitative analysis

Respondents' answers were subjected to qualitative analysis to determine the context and causal, and intervening conditions that influenced their strategies and consequently modified their RPA

Table 8. Impact of the lockdown on the respondents' perceptions of their fitness and body mass.

Respondents	Male N (%)	Female N (%)	Age N (%)		
			up to 24	25-44	45 and older
Body mass:					
yes, I gained weight	46 (21.6)	77 (26.5)	48 (22.5)	40 (22.7)	36 (30.3)
no, my weight hasn't changed	126 (59.2)	153 (52.6)	112 (52.6)	99 (56.3)	70 (58.8)
no, I lost weight	41 (19.2)	61 (21.0)	53 (24.9)	37 (21.0)	13 (10.9)
Physical fitness:					
improved	40 (18.8)	65 (22.3)	55 (25.8)	39 (22.2)	12 (10.1)
is the same	122 (57.3)	143 (49.1)	97 (45.5)	97 (55.1)	72 (60.5)
deteriorated	51 (23.9)	83 (28.5)	61 (28.6)	40 (22.7)	35 (29.4)

behaviours in the period under consideration. The results of open and axial coding are shown in [Figure 1](#).

Context

The context was analysed with respect to time, place, and space ([Figure 1](#)). The key importance of ‘a home’ (‘a flat’) as ‘the place’ was confirmed by in vivo codes. The code ‘stay at home’ was understood in two ways, as a place where one could safely exercise (‘a home gym’) and as a symbol of frustration and absurdity. This observation is supported by the following statements:

Most measures encouraged people to stay at their homes (you know, one can run even in the garage) ‘Stay at home’? This wasn’t a promotion of a healthy lifestyle. . . . [code: absurd recommendations, ref. 1¹].

The respondents perceived ‘a home’ as distinctly different from outdoor spaces, which became more desirable and appreciated as a place for RPA under the lockdown. However, those who left their homes to enjoy outdoor physical activity faced the risk of being ostracised, as the following opinions show:

[. . .] disapproval for going outside during the pandemic. Runners are [considered] an evil that spreads the virus [code: ostracism, ref. 1, 3].

Causal conditions

The strongest determinants of respondents’ RPA behaviours were bans and restrictions ([Figure 1](#)). The majority of respondents were very critical about these precautions:

I felt reluctance to engage in physical activity [code: ostracism, ref. 2] *[. . .] banning physical activity is a mistake. [. . .] and those closed swimming pools. . . Nonsense. . .* [code: absurd restrictions, ref. 3].

Intervening conditions

The majority of respondents were of the opinion that their RPA behaviours were mainly shaped by initiatives that sports clubs, coaches, celebrities, athletes, local authorities, universities, and individuals undertook to promote recreational physical activity and presented via the Internet and various media. The respondents indicated that:

Many workout sessions were broadcast live and free-of-charge by social media to make people more active physically [code: online training, ref. 52]

A number of challenges were announced, many of which aimed to raise funds to support the fight against COVID-19. This line of action can be illustrated by the following statements:

Actions such as the New Balance initiative – the brand committed to contribute 10 PLN to the fight against COVID-19 for every 10 km people ran and confirmed the fact with a screenshot from any application for runners [code: online workout, ref. 83].

Strategies

The respondents undertook RPA mainly to improve their physical and mental health, to de-stress, to set a personal example, and to be part of the physically active community. As the following answers show, they were also motivated by other people and urged by the media to increase physical activity:

The consequences of physical inactivity and the benefits and advantages of physical activity were demonstrated, such as weight loss, a better figure [. . .], and a better mood [code: awareness of RPA, ref. 17].

For some respondents, exercising was a way to cope with stress. These respondents believed that:

Physical activity helps relieve the stress of isolation and fear [code: awareness of RPA, ref. 6].

An important motivator for people was the personal example of trainers, athletes, and celebrities. The respondents indicated that:

Physical activity [was] promoted by coaches who exercised to set an example [code: personal example, ref. 1].

The following statements point out that motivating each other to exercise became important during the pandemic:

I think that many people had the problem of finding motivation when they were home alone, when 'nobody looked at them' [code: motivation by group, ref. 3]. *We and our acquaintances motivated one another on social media* [code: motivation by other persons, ref. 1].

The respondents also pointed to the media pressure on being physically active at home. They illustrated it with the statements:

[the media] *urged [people] to work out at home and made them feel an inner pressure 'when everyone does something, exercises and develops, I have to follow suit'* [code: awareness of RPA, ref. 41].

Interestingly, some respondents believed that pandemic restrictions did not have an effect on their RPA motivations and goals. This is well illustrated by the statement:

I think everyone who wanted to continue to exercise, and still does, will do everything to work out without any encouragement [code: individual decisions, ref. 4].

Many respondents indicated that RPA should be encouraged in spite of the situation. In their opinion:

Sports events should still be promoted and organised, perhaps with fewer spectators and some restrictions, but still [code: absurd restrictions, ref. 3].

In response to the context and causal and intervening conditions, the respondents developed various strategies that translated into specific RPA behaviours. A respondent could carry on with the current workout programme, change the manner of RPA, or start competing in individual sporting events or challenges. An explanation of this strategy can be found in the following statement:

It is the individual decision of each of us how to stay in shape and physically active [code: individual decisions, ref. 1].

Pandemic restrictions contributed to a rise in grass-roots initiatives addressed to both close friends and strangers, revealing the ability of citizens to self-organise and act independently. People started:

... exercising together on their balconies and terraces. [code: working out together, ref.1].

The sharing of experiences with others and inspiring them to exercise also became more common. The respondents indicated:

... friendly rivalry in sharing videos, pictures of home workout, and creative ideas for coping with the situation. [code: motivation by group, ref. 3].

Another action strategy consisted in following the example of friends, celebrities, actors and actresses, coaches, athletes, etc. The respondents referred to:

Celebrities promoting a healthy lifestyle, eating healthy, and exercising during the pandemic, when there is more time for self-development [code: celebrities promote, ref. 23].

The in vivo code 'a home gym' implies that the respondents exercised using various household objects and made wide use of modern technologies and the Internet. The code 'online workout' was found in 86 responses.

Some respondents pointed to cases of people reducing their RPA or withdrawing from it completely because of the risk of infection. They explained the reaction as follows:

Many people are scared [code: fear ref.1] because of '*being warned again and again against the risk of contracting the coronavirus*' [code: fear, ref. 2].

The lockdown contributed to people expecting more from the national and local authorities and the media (the printed press, TV, and radio stations) regarding their efforts to encourage and

finance or co-finance physical activity of citizens and to provide indoor and outdoor recreational facilities. Some measures expected by the respondents included:

“Social and advertising campaigns promoting a healthy lifestyle [code: social campaigns ref. 4], Lower admission prices to sports facilities. . . [code: lower prices, ref. 1], Promoting places for physical activity, such as bike paths, outdoor gyms, school pitches [code: promoting, ref.1], TV workout programmes (for people who do not use the Internet or cannot afford to pay for streamed workout sessions) [code: non-use of the Internet, ref. 1].

The results of the qualitative analysis are summarised in [Figure 1](#).

Discussion

Both quantitative and qualitative analysis showed that the leisure-time athletes participating in the study differently responded to restrictions, and the duration of changes in their RPA behaviours varied in length.

The lockdown did not change the study participants' motivations. As before, the most important for them were health, appearance (Chen et al., 2017), enjoyment, a better mood, and de-stressing (Jonsdottir et al., 2010; Maciąg & Kantyka, 2020; Nadri et al., 2016; Simmonds et al., 2016). However, the results of the qualitative analysis indicated that new motivations were added to this list, such as a need to improve mental and physical resilience and soothe frustration, anger, fear, and anxiety stoked by emergency health restrictions that, according to some respondents, were absurd and inconsistent. Continuing to exercise outdoors (despite mandatory self-isolation) was also a manifestation of one's resistance and independence. RPA became a confirmation that a normal and regular life rhythm was possible even in the precarious and volatile environments. This new function of RPA seems to not yet have been noted in other studies.

Lockdown increased the risk of obesity (Cuschieri & Grech, 2020; Dobrowolski & Włodarek, 2021; Li et al., 2020). (Kriaucioniene et al., 2020) have noted that body mass changes during the strict lockdown mostly affected people with elevated BMI. However, significant changes in respondents' body mass during lockdown have not been found in either this study or other studies (Dobrowolski & Włodarek, 2021; Kriaucioniene et al., 2020). A probable reason why such a relationship was not observed in Poland was the short duration of the first strict lockdown (2 weeks only). A 2021 Ipsos survey found, however, that an extended period of reduced RPA contributed to an increase in Poles' body mass (Ipsos, 2021).

Our study found that pandemic restrictions re-ranked barriers to RPA, created new ones, or strengthened some of those that already existed. Before the lockdown, most people pointed to a lack of time as the main factor preventing RPA (Biernat et al., 2018). Poles additionally indicated their disinterest in physical activity, reluctance to exercise, and a preference for effortless leisure activities (*Information society in Poland in 2020*, 2020). Lockdown in a wide range eliminated a lack of free time as a major obstacle. Lack of commuting, shopping, visiting, etc. gave an extra time. Our study showed that new barriers to RPA appeared, such as the closure of parks, forests and other open spaces to the public, and the impossibility of pursuing one's favourite sport. Moreover, people who wanted to exercise outdoors risked being ostracised for violating the anti-Covid regulations and acting against the public interest. Some respondents in our study admitted that the vision of being ostracised was disturbing and upsetting for them. This finding, too, has not yet been reported by other studies.

Among barriers to RPA indicated by women, the lack of free time due to childcare responsibilities and the lack of a trainer during the pandemic were indicated more often. This suggests that the restrictions even raised barriers faced by women in the conservative family model that still prevails in Poland. According to Hofstede, Poland, has a predominantly male culture (<https://www.hofstede-insights.com/country/poland/>). The cultural aspects of engaging in RPA have already been explored in earlier studies (Hawkins et al., 1999; Chick & Dong, 2003). It has been shown, for instance, that a country's culture may significantly influence the findings of research on RPA (Chick

& Dong, 2003). However, the theme of cultural determinants has not yet been addressed in studies of RPA behaviours during the lockdown. Likewise, the role of a trainer, even though the latter was investigated before in connection with the service quality of fitness clubs (Papadimitriou & Karaterliotis, 2000). Both these factors certainly deserve to further analysis during future research.

Our study has shown that the frequency of workout sessions performed before, under, and after relaxation of lockdown was statistically significantly different. Similar results have been published by the authors of studies on other countries (Ammar et al., 2020; Bann et al., 2020; Di Renzo et al., 2020; Lesser & Nienhuis, 2020; Maugeri et al., 2020; Phillipou et al., 2020; Venter et al., 2020). Our findings are aligned with the observations reported by (Sowier-Kasprzyk & Widawska-Stanis, 2020) who found that the users of fitness clubs exercised as frequently as before by participating in online workouts. Similarly, Antunes et al. (2020) showed that the Portuguese regularly participated in physical activity in spite of lockdown, and Lesser & Nienhuis, (2020) established that 40.3% of the Canadians, who regularly exercised before the pandemic increased workout frequency. Interesting changes are reported regarding the behaviours of people who rarely participated in RPA before the lockdown. In our study, this category of respondents started to exercise more frequently after lockdown was introduced. A similar finding was reported by an Australian study, where 36% of 'occasional recreational athletes' increased workout frequency after the pandemic broke out (Phillipou et al., 2020). However, in the Canadian study by Lesser & Nienhuis (2020) 40.5% of the respondents who rarely exercised became even more sedentary during the lockdown.

Based on the results of the qualitative analysis, we made an attempt to explain what caused our respondents to adapt their RPA behaviours. As already mentioned, the lockdown not only enhanced Poles' motivations for participating in physical activity but also provided new arguments for being physically active, which have not yet been explored. It also contributed to more workout opportunities being offered by the Internet, TV, and social media. Celebrities, coaches, popular athletes, and physical education students committed to promoting physical activity and a healthy lifestyle. This 'let's exercise' atmosphere may have 'persuaded' people who had rarely exercised to increase their participation in recreational sports.

The results of our study suggest that while pandemic restrictions may have permanently reduced the number of sports in which the respondents engaged, they did not have an effect on the types of sports they preferred. Our finding of increased importance of outdoor sports, such as cycling, running, etc., during lockdown is consistent with results reported by (Venter et al., 2020) for Norway. In Norway, where pandemic restrictions were less severe outdoor physical activity increased by 291% compared with its pre-lockdown level. It is emphasised that in addition to having many benefits for mental health (Baur & Tynon, 2010; Berdejo & Espinola et al., 2021; Bowler et al., 2010; Bratman et al., 2019; Lesser & Nienhuis, 2020; Marston et al., 2020; Nguyen & Brymer, 2018), exposure to and recreation in nature has a special stimulating effect on the activity of children, the elderly, and people with motor disabilities (Shin et al., 2011).

Our study has found that the way the respondents adapted their RPA behaviours during lockdown were related to some extent to their age and gender. Pre-lockdown differences in workout frequency between age groups disappeared after the introduction of restrictions, and this remained so after they were relaxed. An association has been found between respondents' age and workout frequency and the self-assessment of physical fitness. Different results were obtained by Antunes et al. (2020) showing that older respondents increased their RPA more than younger ones. In our study, more young respondents (to 24 years of age) than those aged 45 and above reported that their physical fitness improved during lockdown.

Male and female respondents in our study differed with respect to psychological motivations for engaging in RPA, the decision to start exercising, and workout frequency. While most women saw RPA as an opportunity to de-stress, men tended to view it as a way of self-realisation. We suppose that a major barrier to women's participation in RPA is Poland's male culture. Only 30% of the women and almost 50% of the men in our survey were physically active during the first lockdown. Our findings are consistent with the findings of other researchers (Bernstein et al., 2001; Jurakic et al., 2009; Leslie

et al., 2001; Rütten et al., 2003; Sjöström et al., 2006; Statistics Poland, 2017). Before the lockdown, the frequency of participation in RPA was different for men and women, and during lockdown, it became similar and remained such in the following months. This suggests that women's response to the first wave of the lockdown was stronger than men's and that they made bigger changes to their RPA behaviours. In contrast, Antunes et al. (2020) found that Portuguese men were physically more active during the pandemic than women.

Limitations

The main limitations of the study include the following:

- the use of respondents' self-assessments.
- the respondents were selected using non-probability sampling ((Babbie, 2013)).
- the questionnaires were distributed via social media and email (81.4% regularly use the Internet, 65% use email, 53% - social media²).
- the analysis of the respondents' RPA behaviours focused on the limited period.

Conclusion

The main cognitive conclusion that can be drawn from our study is that the lockdown entailed changes in leisure-time athletes' patterns in Poland. In comparison to other countries, it seems to be a result of the range and strictness of the introduced restrictions and national culture. Some of the changes in Poles' RPA (such as lower workout frequency) have been short-lived, but others seem to be permanent (e.g. a reduction in the number of exercised sports). RPA has gained a new function, becoming for many people a way to manifest their resistance and to have a normal life during the lockdown. Also, some cultural barriers to women's RPA were strengthened. The model of Poles' RPA has been found to vary to some extent between genders and age groups. New directions for further studies emerged from this research: the theme of cultural determinants of RPA, the phenomena of 'let's exercise' atmosphere and its impact on people, and the expectation related to public entities.

The study also has some methodological implications for future research. They support the use of a comprehensive approach and the inclusion of qualitative methods into the range of research methods used so far. It would thus be possible to study the mechanism of changes in the RPA behaviours from a new perspective and to explain them in terms of people's feelings, emotions, opinions, and expectations.

Notes

1. The NVivo software gives the structure of codes and references. Each code is assigned with one or more references taken from respondents' opinions shared in the questionnaires.
2. (Information society in Poland in 2020, 2020).

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Joanna Kantyka PhD is a lecturer and researcher at the Jerzy Kukuczka Academy of Physical Education, Institute of Sport Sciences. She obtained a master's degree in physical education. Research interests include recreational physical activity behaviours, well-being and wellness, and marketing in sport and recreation. She has 50 publications, including 7 monographs. The creator of the aqua fitness exercise programme for older women at the Center for Research and Implementation of Strategies Supporting Healthy Aging (RIDage) at the Jerzy Kukuczka Academy of

Physical Education - a project financed by the Minister of Science and Higher Education in Poland. Related to recreation and sport, she has the title of Master of sport management and recreation instructor (fitness, aqua fitness, Nordic Walking, skiing, volleyball). Since 2015, he has been managing his own fitness club where he conducts aqua fitness classes.

Justyna Maciąg possesses a habilitation degree and PhD in management and quality sciences, a master of economics in specialisations: education and accountancy. Researcher, lecturer, consultant and facilitator. Research interests concern concepts and methods of improvement, service quality, effectiveness and efficiency of management, as well as cultural and process conditions for implementing continuous improvement methods. She has 97 scientific publications, including 6 books. Actively cooperates in the national and international dimensions. Since 2017, she has been coordinating the activities and carrying out regular events for the LeanHE Poland community of practitioners. It operates in the global LeanHE network that connects researchers and practitioners in the field of continuous improvement methodologies. She completed research stays as part of the NCN Miniatura 1 project (Canada, Norway, the UK, and the Netherlands). She collaborates with the Una Europa project.

Damian Herman PhD – lecturer and researcher at the Jerzy Kukuczka Academy of Physical Education, Department of Sports Theory, Chair of Methodology and Statistics. Achieved Master's degrees in physiotherapy as well as technology and computer sciences. Dean's plenipotentiary in education quality. Academic teacher responsible for Information Technology, Information in Tourism and Recreation, Information in Management, and Biostatistics. Co-author in more than 20 articles in e-business, social media, sport and recreation. Deeply involved in Olympic sport – curling as a player (eighth place in the World Championship), as a coach (Team Poland at Youth Olympic Games), and as an organiser of international tournaments.

ORCID

Joanna Kantyka  <http://orcid.org/0000-0002-8799-4452>

Justyna Maciąg  <http://orcid.org/0000-0003-2833-4945>

Damian Herman  <http://orcid.org/0000-0002-1473-4115>

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