

Perceptions on Nordic Walking in women post COVID-19 pandemic: motivations and future intentions

SARA ALIBERTI

Department of Political and Social Studies, University of Salerno, 84084, Fisciano, ITALY

Published online: January 31, 2023

(Accepted for publication January 15, 2023)

DOI:10.7752/jpes.2023.01018

Abstract

Problem statement. The COVID-19 pandemic effect led to a reduction in psychological, social, and physical wellbeing, due to social isolation and sedentariness. Interventions are needed to prevent and improve wellbeing, especially among adult women, for whom the greatest health problems arisen. Ecological exercise can produce greater health benefits than indoor training, including improved humor, self-esteem, physical fitness and reduced stress, anxiety, and depression. Nordic Walking (NW) is an ecological activity, whose beneficial effects can be extended to both healthy people and those with diseases. However, we had to try to understand the motivations that make an individual, especially in adulthood, choose to engage in physical activity (PA), using the push-pull motivational framework. **Purpose.** The aim of the study was to investigate the adult women's motivations to practice PA post-COVID-19, the relationship among the variables analyzed, and their perceptions about the intention to practice NW in the future, to improve their physical, social, and mental wellbeing. **Methods.** A convenience sample of 65 women (50.07 ± 7.85 years old) was recruited for the study. A structured questionnaire was formulated, based on a thorough literature review, consisting of three sections: demographic characteristics, pull-push motivational factors to PA and future intention to perform NW. **Results.** Most adult women did not perform PA because of the boredom caused by the repetition of exercises and for fear of infection. However, they would prefer to practice outdoor activities in the future, including NW, through a teaching method different from the prescriptive one, the solution to which could be the heuristic learning. Motivations to take part in PA course varied according to the age: the younger ones had the need to improve their mental and physical state, while the older ones the need for social and autonomy. **Conclusions.** Future studies should focus on implementing an original and innovative protocol, that is not performance-oriented, but also aimed to improve social and mental wellbeing. The utility of the study is to provide more information to wellness instructors to attract potential customers to participate in PA courses.

Keywords: wellbeing, adults, PA, outdoor, teaching methods, sports science

Introduction

The COVID-19 pandemic has significantly changed the world's population lifestyles. After China, Italy was the first country to face the COVID-19 diseases. Lockdown was the measure adopted to limit the risk of contagion, leading to social isolation and increased sedentariness. In general, the pandemic effect led to a reduction in psychological, social, and physical wellbeing, both crucial parameters affecting quality of life. Quality of life is defined by World Health Organization (WHO, 1952) as "an individual's subjective perception of a complete state of physical, psychological, and social well-being, and not only with the absence of disease, configuring itself as a multidimensional concept". It is important to promote this parameter, given the Italian demographic debt. Forecasts on Italy's demographic future from the National Institute of Statistics (ISTAT) are alarming. Since 2015, Italy has entered a phase of demographic decline. ISTAT (2018) estimates about 168.7 elderly for every 100 young people, and that, in 20 years, this ratio will be 265 elderly for every 100 young people. The considerable growth in the proportion of the elderly will have a considerable social impact. On one hand, the increase in life horizon and better health conditions, will enable them to actively contribute to the development of society. On the other hand, there will be an increase in people in old age who may need help due to health problems. It turns out that prevention is important, starting early on to promote quality of life through constant physical activity (PA). It is well established that regular PA helps to age well; it is a natural medicine that has no contraindications and is good for all ages. However, more and more people are becoming sedentary, resulting in increased health care expenditures. Policies and actions need to be put in place to give everyone the opportunity to practice PA. To do this, we need to start from the state of the art of the effects of the COVID-19 pandemic toward the well-being of the Italian population.

According to the latest research, the COVID-19 pandemic has primarily caused a significant increase in the prevalence of anxiety, stress, and depressive symptoms (Brooks et al., 2020; Rossi et al., 2020ab) due to social isolation. An increase in psychiatric symptoms and mental health problems in the general population is expected (Giallonardo et al., 2020). According to the WHO (2020), special attention should be paid to mental

health. Inactivity and sedentariness were an important consequence of the pandemic effect. Zaccagni et al. (2021), in their systematic review, found a significant reduction in the amount of PA compared to before isolation, due to the restrictions imposed. The home environment has proved to be very influential on the desire to train (Raiola et al., 2020). Indeed, even before the COVID-19 pandemic, physical inactivity was one of the most important public health challenges to be addressed globally. In fact, more than a quarter of people worldwide did not reach the levels of PA recommended by the WHO (Guthold et al., 2018).

The COVID-19 pandemic intensified gender-related mental health problems (Almeida et al., 2020). Women experienced worsened health status and increased self-reported depressive symptoms, stress, anxiety, depression (Aliberti & Raiola, 2021; Solomou & Constantinidou, 2020). Generally, factors that predispose women to depressive symptoms could be pregnancy (Smorti et al., 2019), pain of various kinds, unemployment, and the postmenopausal phase (Cybulska et al., 2020). Women, already at a higher risk of depression than men (Bansal et al., 2015), faced several stressful situations during the pandemic. For example, women had to take more care of their families, given the increased time spent at home, including childcare, education, and care of the elderly; however, financial and work worries also affected perceived stress levels (Bucciarelli et al., 2022). COVID-19 affected those sectors where women were most active at work, including manufacturing and retail (Bucciarelli et al., 2022). Exacerbating the situation were the effects of the virus including fatigue, shortness of breath, muscle aches and others still being studied (Torjesen, 2021). To overcome these vulnerable emotional states, many have taken comfort in food, leading to weight gain, and worsening of healthy habits (Di Renzo et al., 2020), resulting in a drop in self-esteem. Interventions are needed to prevent and improve the wellbeing of the population, especially women.

Outdoor activity in green spaces has proven to be an effective proposal to improve physical and mental (Russo et al., 2020; 2021ab) wellbeing. Using green spaces to reduce the effects of the pandemic is a primary initiative of the WHO agenda (Spencer et al., 2020). Ecological/green exercise can produce greater health benefits than indoor training (Shanahan et al., 2016), including improved humor, self-esteem, physical fitness, and reduced stress, anxiety, and depression; not to mention that many consider outdoor activity to be more beneficial and safer (D'Elia & D'Isanto, 2021; Raiola & Aliberti, 2021; Raiola & Di Domenico, 2021). Walking outdoors is a popular PA but without supplementary exercises, it only improves cardiorespiratory fitness, with no effect on other physical parameters (Takeshima et al., 2007). Therefore, it would be helpful to have a PA that allows for the improvement of each component of fitness to avoid additional training sessions. Among the activities that are becoming more popular is the Nordic Walking (NW), a practice born in Finland, from the need of Finnish skiers to continue their training even when there is no snow on the ground. The adjective "Nordic" simply refers to its origin country and the terrain used for training is linear and stable to perform steady walking. NW consists of walking using two poles to recruit the upper limbs for a total body workout (Kukkonen-Harjula et al., 2007). Compared to traditional walking, there was a higher energy expenditure, oxygen consumption and heart rate, without increasing the perceived physical effort (Church et al., 2002). The beneficial effects can be extended to both healthy people and those with diseases, including cardiovascular, respiratory, diabetes, obese people, those with muscular pain, as well as being a primary and secondary preventive tool (Tschantz et al., 2013). In the middle-aged population, it improved body composition, endurance, strength and reduced stress and anxiety (Grigoletto et al., 2022). Thus, NW could be the ideal ecological activity to promote wellbeing, by a sports science graduate (Raiola, 2019bc) with specific expertise in exercise for health and training in NW technique.

Motivation is a key concept to determine and understand the reasons for leisure time and the intention to practice a particular activity (Wu et al., 2022). The push-pull model strategy can be useful to identify the subject's choice to practice PA. According to this motivational framework, we can identify two types of motivational factors: push and pull (Wu et al., 2022). Push factors are defined as desires that motivate a subject to adopt a certain behavior (Antara & Prameswari, 2018), or to take an initiative, including adherence to PA. They are linked to intrinsic motivation. The main motivations in the adult population can be socialization (Aliberti et al., 2022), achievement of a goal or for pure pleasure (Brunet & Sabiston, 2011), to have more autonomy (Miller & Iris, 2002), for escape from boredom and everyday life (Wu et al., 2022), to slimming/muscle toning and to improve general wellbeing. Pull factors are conditions that attract a subject to undertake a PA course (Antara & Prameswari, 2018). They are linked to extrinsic motivation. In other words, they are attractive factors that make the subject prefer participating in a particular activity over another, including the affordability of the course, including access to low-cost or free courses, organization, specific training methods, including purely prescriptive teaching method or heuristic learning, which is much freer, and finally hygiene/safety given their emphasis during the pandemic period. Consequently, this model can be applied to understand the decision-making process of the adult population in choosing the type of PA.

Based on this background, the aim of the study was to investigate the adult women's motivations to practice PA post-COVID-19, the relationship among the variables analyzed, and their perceptions about the intention to practice NW in the future, to improve their physical, social, and mental wellbeing. The intent was to explore the most important factors to consider when offering an exercise program to entice people to practice PA on an ongoing basis to prevent or reduce health problems related to physical inactivity.

Material & methods

Participants and data collection

The study design was descriptive and correlational. Participants were adults women from 30 years old (maturity) and over, recruited through convenience sampling. A structured questionnaire was formulated, based on a thorough literature review, consisting of three sections. The first section contained questions about demographic characteristics. The second one comprised push-pull motivation factors that could influence the adherence to PA practice: all items were measured on a 7-point Likert-type scale, ranging from 1 (extremely unimportant) to 7 (extremely important). The third section consisted of questions aimed to verify the intention to practice NW in the future. A detailed description is shown in **Table 1**.

Table 1. Items of the questionnaire

Section	Questions
1. Demographic characteristics	Gender Age Province BMI perception Do you work? What is your PA level? What is the reason for your physical inactivity?
2. Push – pull motivation to PA practice	2.1 How important do you consider the following push factors from 1 to 7? Social wellbeing A1) Creating meaningful relationships A2) Interacting with people A3) Including myself in society Physical wellbeing B1) Improving physical fitness (slimming/toning) B2) To be autonomous by becoming more agile to perform activities of daily living B3) Challenge myself Mental wellbeing C1) To reduce stress and anxiety, depression C2) For a break from daily routine C3) For pleasure and passion 2.2 How important do you consider the following pull factors from 1 to 7? D1) Hygiene / safety D2) Accessibility / proximity D3) Affordability D4) Organisation D5) Teaching methods
3. Intention to practice NW in the future	Do you prefer indoor or outdoor activities? Would you be interested in hiking activities such as NW? What teaching method do you prefer?

The questionnaire was prepared with Google Forms and disseminated on social media. Before starting it, participants were informed about the research purposes and informed consent was obtained. At the end, people were asked to leave their contact details so that they could be contacted in the future, either to take part in future activity or to repeat the questionnaire in order to calculate its reliability.

Questionnaire procedure – Validity and reliability

Validity refers to the fact that an instrument measures exactly what it purports to measure (Souza et al., 2017). Face and content validity were assessed. To assess face validity, related to the conciseness of the items of the instrument concerning clarity, brevity, and completeness (Sangoseni et al., 2013), a group of questionnaire construction experts, was involved to adapt the questionnaire structure as they saw fit. To assess content validity, related to the degree to which items reflect all aspects of the construct (Haynes et al., 1995), a group of sports science experts were involved in order to assess whether the questions correctly captured the topic. Only items with content validity index (CVI) greater than 0.78 were included in the final instrument. Reliability is the ability to reproduce a result consistently across time and space or from different observers (Souza et al., 2017). Stability was calculated through a test–retest with a sample of 30 subjects and the calculation of the intraclass correlation coefficient (ICC) (Terwee et al., 2007), while internal consistency through Cronbach's α coefficient.

Statistical Analysis

To validate the questionnaire, first it was assessed the internal consistency through Cronbach's α and associated 95% confidence intervals (CI). A Cronbach's α of 1 indicated perfect reliability, with a cut-off of 0.70 indicating an acceptable internal consistency (Cronbach, 1951). Then, the test–retest reliability was assessed, by administering the questionnaire after 20 days to a sub-sample of 30 subjects who agreed to be contacted again about the study. The ICC was interpreted using the criteria suggested by Portney & Watkins (2009) as poor reliability ($ICC \leq 0.50$), moderate reliability ($ICC 0.50–0.75$), good reliability ($ICC 0.75–0.90$), and excellent reliability ($ICC \geq 0.90$).

Descriptive statistics were used to summarize data as mean (M) and standard deviation (SD). Given the qualitative nature of data, Spearman correlations' (r_s) was performed to test relationship between age and

motivational factors. To interpret the magnitude of the correlation coefficients, the following criteria were used: trivial ($r_s \leq 0.1$), small ($r_s = 0.1 - 0.3$), moderate ($r_s = 0.3 - 0.5$), large ($r_s = 0.5 - 0.7$), very large ($r_s = 0.7 - 0.9$) and almost perfect ($r_s \geq 0.9$) (Hopkins et al., 2009). Fisher exact test was used to test relationship between physical inactivity and other nominal variables. Cramer V was used to measure the strength of the association, interpreted using the following criteria: small ($V = 0.10$), medium ($V = 0.30$), large ($V > 0.50$). Significance was set at $p < 0.05$. Data analyses were performed using the Statistical Package for Social Science software (IBM SPSS Statistics for Windows, version 26.0, IBM, SPSS Inc., Armonk, NY, USA).

Results

The internal consistency of the push motivation (Cronbach's α coefficient [95% CI] 0.80 [0.63–0.90]; $p < 0.00$) and pull motivation items (Cronbach's α coefficient [95% CI] 0.77 [0.60–0.87]; $p < 0.00$) were acceptable. The test–retest reliability ranged from moderate to excellent. Among the push motivational factors to practice PA, the importance of feeling included in society (A3; 5.86 ± 0.86) was found to be the most important for adult women, while among the pull motivational factors the most important were hygiene and safety (D1; 7.00 ± 0.00). A detailed description is shown in **Table 2**.

Table 2. Data quality check and descriptive statistics

Push-pull motivation Variable	Cronbach's α	Test–Retest Reliability		Descriptive statistics	
		ICC (95%CI)	p	M	SD
A1	0.80 (0.63 - 0.90)	0.82 (0.63–0.91)	<0.00	5.83	0.89
A2		0.94 (0.88–0.97)	<0.00	5.85	0.85
A3		0.88 (0.76–0.94)	<0.00	5.86	0.86
B1		0.79 (0.57–0.90)	<0.00	5.80	0.90
B2		0.96 (0.91–0.98)	<0.00	4.57	1.45
B3		0.93 (0.86–0.96)	<0.00	4.92	1.11
C1		0.70 (0.37–0.85)	<0.00	5.75	0.73
C2	0.77 (0.60 - 0.87)	0.86 (0.74–0.92)	<0.00	5.72	0.45
C3		0.97 (0.95–0.98)	<0.00	4.77	0.52
D1		0.87 (0.78–0.92)	<0.00	7.00	0.00
D2		0.85 (0.68–0.92)	<0.00	6.83	0.38
D3		0.65 (0.28–0.83)	<0.00	6.78	0.41
D4		0.96 (0.93–0.98)	<0.00	5.48	0.53
D5		0.91 (0.83–0.96)	<0.00	5.57	0.68

65 adult women answered the questionnaire (age, $M \pm SD$, 50.07 ± 7.85 years old). Most of them were overweight and inactive, due to boredom from the repetition of the exercises and from fear of COVID-19 infection. However, most preferred outdoor activities over indoor ones; indeed, they would be willing to practice NW as long as it worked on the creative and social aspect as well as the physical one. A detailed description of the participants' answers to section 1 and 3 of the questionnaire is given in **Table 3**.

Table 3. Participants' answers to section 1 and 3

Demographic characteristics and intention to practice NW in future			
		N	%
Gender	Female	65	100
Province	Salerno	65	100
BMI	Normal	20	30.8
	Obese	3	4.6
	Overweight	42	64.6
Are you work?	No	34	52.3
	Yes	31	47.7
What is your PA level?	< 150 min x week	10	15.4
	Inactive	55	84.6
What is the motivation to your physical inactivity?	Boredom of repeated exercises	29	44.6
	Fear of infection	16	24.6
	Health problems	8	12.3
	Lack of free time	8	12.3
	Other	4	6.2
Do you prefer indoor or outdoor activity?	Indoor	2	3.1
	Outdoor	63	96.9
Would you be interested in hiking activities such as NW?	No	3	4.6
	Yes	62	95.4
Which teaching methods do you prefer?	Creativity and social exercises, beyond the physical ones	52	80
	Exercise repetition and perfecting technique	13	20

A statistically significant correlation emerged between age and some push-pull motivational factors. Specifically, a very strong positive correlation emerged between age and interest to create meaningful relationships through PA practice ($r_s=0.74$, $p=0.00$) and age and interest to include oneself in society ($r_s=0.71$, $p=0.00$). A very strong negative correlation was found between age and interest to decrease the level of stress, anxiety and depression ($r_s=-0.72$; $p=0.00$). A strong positive correlation was found between age and interest to interact with other people ($r_s=0.66$, $p=0.00$) and between age and interest to be autonomous ($r_s=0.67$, $p=0.00$). A strong negative correlation emerged between age and interest to improve physically ($r_s=-0.60$, $p=0.00$). Finally, a moderate correlation emerged between age and accessibility ($r_s=0.30$, $p=0.00$). A detailed description is shown in **Table 4**

Table 4. Spearmans' correlation

		Correlation						
		A1	A2	A3	B1	B2	C1	D2
Age	r_s	0.74	0.66	0.71	-0.60	0.67	-0.72	0.30
	Sig. (two tails)	0.00	0.00	0.00	0.00	0.00	0.00	0.01

Fisher exact test found a significant strong association between reason for inactivity and teaching method preferred ($p=0.00$; $V=0.72$). A detailed description is shown in Table 5.

Table 5. Association between inactivity and teaching methods

		Reason for inactivity					Chi Square (Fisher)		Cramer
		Boredom	Fear of infection	Health problems	Lack of free time	Other	Value	Sig.	V
Which teaching methods do you prefer?	Creativity and social exercises, beyond the physical ones	29	12	8	1	2	30.57	0.00	0.72
	Exercise repetition and perfecting technique	0	4	0	7	2			

Dicussion

First of all, the present study showed that our results were reliable. The aim of the study was to investigate the motivations of adult women to take part in PA course. Before this, it is important to describe the characteristics of the sample recruited, comprising 65 women aged between 35 to 60 years old, with an average age of 50, from the province of Salerno (Campania, Italy). About 64.6% perceived themselves to be overweight, a very worrying data, probably due to incorrect habits adopted during the lockdown, including poor diet, sedentariness and physical inactivity (Flanagan et al., 2021). Only 30.8% perceived themselves to be normal weight. 52.3% were not engaged in work activities, so this could imply more free time available to practice PA. However, 84.6% stated that they were completely inactive, in contrast to 15.4% who did not reach 150 minutes of moderate to vigorous intensity PA per week. The main reason for this inactivity was the boredom (44.6%), caused by the repetitiveness of the exercises, which can be traced back to the prescriptive teaching method (Raiola, 2012), based on the repetition of the exercise from the instructor's demonstration in order to stabilize the motor program (Raiola, 2013; 2014; 2017). According to various studies (Aliberti, 2022; Raiola et al., 2022), the strenght point of this approach was the refinement of a motor task, while the limit was the perception of boredom, on the part of those performing the exercises, due to the repetition of the motor task. On the other hand, 24.6% stated that they were inactive due to the fear of contagion, given the historical period. However, outdoor activity was found to limit contagion. Almost all of the respondents (96.9%) stated that they preferred outdoor activity over indoor. This is very important, as outdoor practice could solve both the problem of fear of contagion and take advantage of the benefits of nature. 96.4% would be willing to take part in NW lessons in future, also suitable for those with health problems (12.3%), and the teaching method they would prefer was one based on heuristic learning (80%), rather than prescriptive teaching (20%). From Fisher's test, a relationship emerged between the reason for physical inactivity and the preferred teaching method for a future NW course: specifically, the subjects who were inactive due to boredom stated that they preferred a teaching method, aimed

to develop socialization and creativity, over the physical aspect, which was based on heuristic learning, unlike those who were inactive due to lack of time who mainly preferred repeated exercises. Heuristic learning is a method based on discovery through the use of educational practices: techniques borrowed from psychology (brainstorming, cooperative learning, video.tutorials, circle time...), alteration of the environment and rules. It also seems to be an effective method to improve life skills in students (D'Isanto et al., 2022; Raiola et al., 2022). This strategy seems to overcome the limitation of boredom caused by the repetition of exercises, not to mention that the aim of PA in the adult population is not to improve performance but rather wellbeing at various levels. However, studies are needed to prove its effectiveness in the adult population.

Regarding motivational factors, we can observe that the push factors, which motivate the subject to undertake a PA course, were primarily related to improved social wellbeing. Indeed, adult women considered PA very important in order to feel included in society, to create meaningful relationships or simply to interact with others. Socialization was an aspect that had been lacking during the COVID-19 period and PA can be the tool to promote it. However, it should be remembered that PA alone is not able to promote wellbeing at various levels. It requires proper planning, scheduling and periodization of activities and the adoption of specific teaching methods (D' Isanto et al., 2022), proposed by a competent and adequately trained instructor. Subsequently, the adults considered the aspect of mental wellbeing to be very important, especially the reduction of stress, anxiety and depression, which increased during the pandemic, breaks from daily routine and enjoyment and fun. Finally, the last aspect was related to the physical sphere, including improving physical fitness, being autonomous and challenging oneself. Regarding pull factors, 100% of the women agreed that hygiene and safety were the first features that attracted their interest when choosing a PA course to attend, followed by accessibility and proximity to their home, price and finally teaching methods and organization. All these factors should be taken into consideration when proposing a PA course for this age group and gender in future.

Significant correlations emerged between age and push-pull factors. Firstly, two very strong positive and one very strong negative correlation emerged: as age increased, the perceived importance related to the creation of meaningful relationships and inclusion in society increased, while as age decreased, there was a greater perceived importance related to the reduction of anxiety, stress, and depression. Secondly, two strong positive and one strong negative correlation emerged: as age increased, the perception of importance related to interaction with others and importance related to developing one's autonomy increased, while as age decreased, the perception of importance related to improving physical fitness decreased. Thirdly, a moderate positive correlation emerged: as age increased, the perceived importance related to the accessibility and proximity of a future PA course increased. In summary, it emerged that younger women considered the benefits of PA in reducing stress, anxiety and depression and improving physical fitness to be more important. Older women were more interested in the creation of meaningful relationships, interactions with others, inclusion in society, development of their autonomy and accessibility. To stimulate interest in PA courses, coaches should consider the type of motivation and age.

The limitation of the study was the sample size, underlining the need to repeat the questionnaire on a larger sample. The strength was the reliability of the questionnaire and thus reliability of the results, which were useful for promoting future outdoor courses (Raiola, 2019a; 2020ab) to improve the wellbeing of the adult population, taking into consideration the motivational factors according to age and gender.

Conclusions

The study emphasized the importance of motivational push-pull factors towards PA practice intention to promote physical, social, and mental wellbeing of adult women post-COVID-19 pandemic. Based on age, women had different needs to be met through PA. Younger women perceived a greater need to improve mental wellbeing, including reduction of anxiety, stress and depression, and physical wellbeing, including slimming/toning. As the women grew older, their need for socialization, inclusion in society and autonomy in daily life increased. The problem of physical inactivity, mainly due to boredom from the repetition of exercises and fear of contagion, emerged, besides the overweight problem. It is necessary to implement a teaching method different from the prescriptive one and heuristic learning could be a possible solution. Since most preferred to practice outdoor activities, including NW, through a method that stimulated socialization and creativity as well as the physical, future studies should focus on implementing an original and innovative protocol. The utility of the study is to provide more information to wellness instructors to attract potential customers to participate in activities.

Conflicts of interest - The authors declared no conflicts of interest.

References

- Aliberti, S. (2022). A comparison between ecological-dynamic and cognitive approach to improve accuracy in basketball shot. *Studia Sportiva*, 16(1), 6-12.
- Aliberti, S., & Raiola, G. (2021). Effects of Line Dancing on Mental Health in Seniors after COVID-19 Pandemic. *Education Sciences*, 11(11), 677.

- Aliberti, S., Rago, V., D'Elia, F., & Raiola, G. (2022). Questionnaire of inclusion in Paralympic dance: validation and pilot study. *Sport Sciences for Health*, 18, 1339–1347.
- Almeida, M., Shrestha, A. D., Stojanac, D., & Miller, L. J. (2020). The impact of the COVID-19 pandemic on women's mental health. *Archives of Women's Mental Health*, 23(6), 741-748.
- Antara, M., & Prameswari, Y. A. (2018). Push and pull factors of tourists visit the tourism destination of Bali, Indonesia. *Journal of Tourism and Hospitality Management*, 6(1), 112-120.
- Bansal, P., Chaudhary, A., Soni, R. K., Sharma, S., Gupta, V. K., & Kaushal, P. (2015). Depression and anxiety among middle-aged women: A community-based study. *Journal of Family Medicine and Primary Care*, 4(4), 576–581.
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*, 395(10227), 912-920.
- Brunet, J., & Sabiston, C. M. (2011). Exploring motivation for physical activity across the adult lifespan. *Psychology of Sport and Exercise*, 12(2), 99-105.
- Bucciarelli, V., Nasi, M., Bianco, F., Seferovic, J., Ivkovic, V., Gallina, S., & Mattioli, A. V. (2022). Depression pandemic and cardiovascular risk in the COVID-19 era and long COVID syndrome: Gender makes a difference. *Trends in Cardiovascular Medicine*, 32(1), 12.
- Church, T. S., Earnest, C. P., & Morss, G. M. (2002). Field testing of physiological responses associated with Nordic Walking. *Research Quarterly for Exercise and Sport*, 73(3), 296-300.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.
- Cybulska, A. M., Szkup, M., Schneider-Matyka, D., Skonieczna-Żydecka, K., Kaczmarczyk, M., Jurczak, A., Wieder-Huszla, S., Karakiewicz, B., & Grochans, E. (2020). Depressive symptoms among middle-aged women-understanding the cause. *Brain Sciences*, 11(1), 26.
- D' Isanto, T., Di Domenico, F., Aliberti, S., D'Elia, F., & Raiola, G. (2022). Criticisms and perspectives of heuristic learning in physical education. *Pedagogy of Physical Culture and Sports*, 26(2), 93-100.
- D' Elia, F., & D' Isanto, T. (2021). Outdoor movement education in primary school during COVID-19 pandemic in the synthetic perceptions of primary school university training student. *Journal of Human Sport and Exercise*, 16(3), 1522-1537.
- Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., ... & De Lorenzo, A. (2020). Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. *Journal of Translational Medicine*, 18(1), 1-15.
- Flanagan, E. W., Beyl, R. A., Fearnbach, S. N., Altazan, A. D., Martin, C. K., & Redman, L. M. (2021). The impact of COVID-19 stay-at-home orders on health behaviors in adults. *Obesity*, 29(2), 438-445.
- Giallonardo, V., Sampaogna, G., Del Vecchio, V., Luciano, M., Albert, U., Carmassi, C., ... & Fiorillo, A. (2020). The impact of quarantine and physical distancing following COVID-19 on mental health: study protocol of a multicentric Italian population trial. *Frontiers in Psychiatry*, 11, 533.
- Grigoletto, A., Mauro, M., Oppio, A., Greco, G., Fischetti, F., Cataldi, S., & Toselli, S. (2022). Effects of Nordic Walking training on anthropometric, body composition and functional parameters in the middle-aged population. *International Journal of Environmental Research and Public Health*, 19(12), 7433.
- Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. *The Lancet Global Health*, 6(10), e1077-e1086.
- Haynes, S. N., Richard, D., & Kubany, E. S. (1995). Content validity in psychological assessment: A functional approach to concepts and methods. *Psychological Assessment*, 7(3), 238.
- Hopkins, W., Marshall, S., Batterham, A., & Hanin, J. (2009). Progressive statistics for studies in sports medicine and exercise science. *Medicine+ Science in Sports+ Exercise*, 41(1), 3-13.
- ISTAT. (2018). ISTAT report. Chapter 3. Population, networks and social relations. <https://www.istat.it/storage/rapporto-annuale/2018/capitolo3.pdf> (accessed on 17 November 2022).
- Kukkonen-Harjula, K., Hillokoski, H., Mänttari, A., Pasanen, M., Parkkari, J., Suni, J., ... & Laukkanen, R. (2007). Self-guided brisk walking training with or without poles: a randomized-controlled trial in middle-aged women. *Scandinavian Journal of Medicine & Science in Sports*, 17(4), 316-323.
- Miller, A. M., & Iris, M. (2002). Health promotion attitudes and strategies in older adults. *Health Education & Behavior*, 29(2), 249-267.
- Portney, L. G., & Watkins, M. P. (2009). *Foundations of clinical research: applications to practice* (Vol. 892). Upper Saddle River, NJ: Pearson/Prentice Hall.
- Raiola, G. (2012). Motor learning and didactics into physical education and sport documents in middle school-first cycle of education in Italy. *Journal of Physical Education and Sport*, 12(2), 157-163.
- Raiola, G. (2013). Body knowledge and motor skills. *Knowledge Cultures*, 1(6), 64-72.
- Raiola, G. (2014). Motor control and learning skills according to cognitive and ecological dynamic approach in a vision on behaviorism, cognitive, Gestalt and phenomenology theories. *Mediterranean Journal of Social Sciences*, 5(15), 504-504.

- Raiola, G. (2017). Motor learning and teaching method. *Journal of Physical Education and Sport*, 17, 2239-2243.
- Raiola, G. (2019a). Survey on exercise and sport sciences in Italy. *Journal of Human Sport and Exercise*, 14(4), 1163-1168.
- Raiola, G. (2019b). Comparison of exercise and sport sciences epistemology between european research council structure panel and Italian academic system. *Sport Science*, 12(1), 112-120.
- Raiola, G. (2019c). Complex study for an epistemology of Exercise and sport sciences: a) keyconcepts of both ERC subpanels and CUN keywords; b) Physical training and sport methodology sciences academic disciplines in pedagogy recruitment sector and biomedical one: a correlations study. *Journal of Physical Education and Sport*, 19, 1748-1754.
- Raiola, G. (2020a). The movement and sport science in Italy towards the european research council. *Physical Culture and Sport*, 86(1), 37-48.
- Raiola, G. (2020b). Proposal of rearrangement of physical training and sport sciences methodology academic disciplines in Italian university body. *Sport Science*, 14(1), 43-47.
- Raiola, G., & Aliberti, S. (2021). Outdoor sports and physical activity during social distancing by sports sciences and exercise course students at the University of Salerno. *Journal of Physical Education & Sport*, 21(1), 612-617.
- Raiola, G., & Di Domenico, F. (2021). Physical and sports activity during the COVID-19 pandemic. *Journal of Physical Education and Sport*, 21(1), 477-482.
- Raiola, G., Aliberti, S., Esposito, G., Altavilla, G., D'Isanto, T., & D'Elia, F. (2020). How has the practice of physical activity changed during the covid-19 quarantine? a preliminary survey. *Teoriã ta Metodika Fiziãhnogo Vihovannã*, 20(4), 242-247.
- Raiola, G., D'Isanto, T., Di Domenico, F., & D'Elia, F. (2022). Effect of teaching methods on motor efficiency, perceptions and awareness in children. *International Journal of Environmental Research and Public Health*, 19(16), 10287.
- Rossi, R., Socci, V., Pacitti, F., Mensi, S., Di Marco, A., Siracusano, A., & Di Lorenzo, G. (2020a). Mental health outcomes among healthcare workers and the general population during the COVID-19 in Italy. *Frontiers in Psychology*, 11, 608986.
- Rossi, R., Socci, V., Talevi, D., Mensi, S., Niolu, C., Pacitti, F., ... & Di Lorenzo, G. (2020b). COVID-19 pandemic and lockdown measures impact on mental health among the general population in Italy. *Frontiers in Psychiatry*, 11, 790.
- Russo, G., Castagnoli, M. S., Babini, A., & Ceciliani, A. (2020). A post COVID lockdown pilot study on the effect of physical activity intensity on cognitive functions of children aged 6-8 years old. *Journal of Human Sport and Exercise*, 15(4), 1140-1151.
- Russo, G., Nigro, F., Raiola, G., & Ceciliani, A. (2021a). The effect of physical fitness and physical activity level on memory storage of Italian pre-adolescent secondary school students. *Trends in Sport Sciences*, 28(3), 195-202.
- Russo, G., Ottoboni, G., Tessari, A., & Ceciliani, A. (2021b). The positive impact of physical activity on working memory abilities: Evidence from a large Italian pre-adolescent sample. *Journal of Human Sport and Exercise*, 16(2), 277-288.
- Sangoseni, O., Hellman, M., & Hill, C. (2013). Development and validation of a questionnaire to assess the effect of online learning on behaviors, attitudes, and clinical practices of physical therapists in the United States regarding evidenced-based clinical practice. *Internet Journal of Allied Health Sciences and Practice*, 11(2), 7.
- Shanahan, D. F., Franco, L., Lin, B. B., Gaston, K. J., & Fuller, R. A. (2016). The benefits of natural environments for physical activity. *Sports Medicine*, 46(7), 989-995.
- Smorti, M., Ponti, L., & Pancetti, F. (2019). A comprehensive analysis of post-partum depression risk factors: the role of socio-demographic, individual, relational, and delivery characteristics. *Frontiers in Public Health*, 7, 295.
- Solomou, I., & Constantinidou, F. (2020). Prevalence and predictors of anxiety and depression symptoms during the COVID-19 pandemic and compliance with precautionary measures: age and sex matter. *International Journal of Environmental Research and Public Health*, 17(14), 4924.
- Souza, A. C. D., Alexandre, N. M. C., & Guirardello, E. D. B. (2017). Propriedades psicométricas na avaliação de instrumentos: avaliação da confiabilidade e da validade. *Epidemiologia e Serviços de Saúde*, 26, 649-659.
- Spencer, L. H., Lynch, M., Lawrence, C. L., & Edwards, R. T. (2020). A scoping review of how income affects accessing local green space to engage in outdoor physical activity to improve well-being: implications for post-covid-19. *International Journal of Environmental Research and Public Health*, 17(24), 9313.
- Takeshima, N., Rogers, N. L., Rogers, M. E., Islam, M. M., Koizumi, D., & Lee, S. (2007). Functional fitness gain varies in older adults depending on exercise mode. *Medicine and Science in Sports and Exercise*, 39(11), 2036-2043.

-
- Terwee, C. B., Bot, S. D., de Boer, M. R., van der Windt, D. A., Knol, D. L., Dekker, J., ... & de Vet, H. C. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology*, 60(1), 34-42.
- Torjesen, I. (2021). Covid-19: Middle aged women face greater risk of debilitating long term symptoms. *BMJ (Clinical Research Ed.)*, 372, n829.
- Toselli, S., Bragonzoni, L., Grigoletto, A., Masini, A., Marini, S., Barone, G., ... & Dallolio, L. (2022). Effect of a park-based physical activity intervention on psychological wellbeing at the time of COVID-19. *International Journal of Environmental Research and Public Health*, 19(10), 6028.
- Tschentscher, M., Niederseer, D., & Niebauer, J. (2013). Health benefits of Nordic Walking: a systematic review. *American Journal of Preventive Medicine*, 44(1), 76-84.
- WHO. (1952). Constitution of the World Health Organization. Handbook of basic documents (5th ed., pp. 3-20). Ginebra: Palais des Nations.
- WHO. (2020). *Mental Health and COVID-19*. Available online at: <http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/novel-coronavirus-2019-ncov-technical-guidance-OLD/coronavirus-disease-covid-19-outbreak-technical-guidance-europe-OLD/mental-health-and-covid-19> (accessed on 17 November 2022).
- Wu, Y., Kinoshita, K., Zhang, Y., Kagami, R., & Sato, S. (2022). Influence of COVID-19 crisis on motivation and hiking intention of gen z in China: perceived risk and coping appraisal as moderators. *International Journal of Environmental Research and Public Health*, 19(8), 4612.
- Zaccagni, L., Toselli, S., & Barbieri, D. (2021). Physical activity during COVID-19 lockdown in Italy: A systematic review. *International Journal of Environmental Research and Public Health*, 18(12), 6416.