A COMPREHENSIVE ANALYSIS OF PERFORMANCE SWIMMING DROPOUT IN ROMANIA

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Abstract. *The purpose of this study is to determine the fluctuation in the number of swimmers participating in the national competitive system between 2012 and 2021. Additionally, the paper aims to identify the age group with the highest dropout rate. We conducted a thorough analysis of the Romanian Swimming and Modern Pentathlon Federation's databases within the Ministry of Sports for the years 2012 to 2021. This analysis focused on the number of annually registered swimmers and participants in the national competitive system across the following age categories: children, cadets/juniors/youth, and seniors. The study reveals a decline in the number of participants in swimming competitions, particularly among senior athletes. This decline can be attributed to a complex interplay of factors, including the impact of the COVID-19 pandemic, academic pressures, lack of support and resources, and evolving interests and priorities. These factors collectively contribute to the challenge of retaining athletes in the sport as they progress from junior to senior swimming categories. The global impact of the COVID-19 pandemic has had profound consequences for communities worldwide, prompting extensive restrictions across various sectors, including sports. Notably, major decisions by international governing such as FINA (International Swimming Federation) have resulted in the postponement or cancellation of significant swimming events. Additionally, the unprecedented decision by the World Health Organization (WHO) and the International Olympic Committee (IOC) to postpone the Tokyo 2020 Summer Olympics to July 23 - August 8, 2021, reflects the severity of the situation.*

Keywords*: swimming, abandonment, performance sports, COVID-19 pandemic.*

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Introduction

Competitive swimming is a physically demanding and mentally challenging sport that requires dedication, discipline, and rigorous training. Athletes in this sport invest countless hours in the pool, striving for excellence and seeking to achieve their personal and professional goals. Yet, like any sport, competitive swimming faces unique challenges, including the risk of athlete dropout and the impact of external factors such as the COVID-19 pandemic.

Special studies (Ormsbee & Arciero, 2012.) show that 35-42 days of swimming cessation for healthy young people (boys and girls) attending college, who maintained a light exercise program, resulted in a 1.3% increase in body weight, a 12.2% increase in body fat, a 7.7%

decrease in maximum oxygen consumption, and a 7% decrease in resting metabolic rate, with no significant changes in blood lipids or mood.

An important information on the dropout rate in swimming refers to the high volume of swimming, this being one of the factors that determine the monotony and reduce the pleasure of participating in training. This highlights the importance of cognitive restructuring to help athletes stay motivated and focused on their long-term goals. Furthermore, it is necessary to know the risks associated with high-intensity training, particularly in young athletes and the need for personalized training programs to reduce the likelihood of injuries, overtraining or burnout (Feijen et al., 2020).

Research conducted by Perez et al. (2021) on the effect of the pandemic on the daily and weekly training volume of athletes showed that long-distance swimmers (800 m and 1500 m freestyle) were the most affected. Middle-distance swimmers, particularly those competing in the 200 m events, were affected to a lesser extent, while sprinters actually improved their performance. This finding supports the authors' conception that a qualitative approach to training is more beneficial than focusing on quantity.

Demarie et al. (2022) conducted a comparative study on the impact of the COVID-19 pandemic, following the rules imposed in the 2019-2020 competition year, on the results of swimmers participating in the 100 m and 200 m backstroke and freestyle events at the Rio de Janeiro (2016) and Tokyo (2021) Summer Olympics. The analysis of the data, regarding the times, records and the difference between the time of the winners and the last place in the finals, showed that the athletes' performances continued in an ascending trend, and the quarantine period did not affect the quality and form of the sport. Unlike team sports, where fans play an important role, in the Tokyo swimming competition, the lack of support from the stands did not affect the quality of the swimming performances.

A collaborative research endeavour led by multiple experts (Haddad et al., 2021) offered recommendations for swimmer training during quarantine or home isolation. These recommendations aimed at sustaining an optimal level of fitness and provided various approaches, including some high-cost methods that might not be viable in certain regions. These included the use of portable swimming pools for backyard installation, flume pools, simulators, or ergonomic trainers.

Given the cost and feasibility constraints in our country, most athletes had to rely on more traditional and affordable training techniques. These methods focused on countering the effects of deconditioning and reducing muscle atrophy, incorporating activities like running and cycling, land-based exercises with elastic bands and stretchers, circuit training, yoga routines, plyometrics, isometrics, stretching, and breathing exercises. Additionally, athletes focused on cultivating psychological techniques through visualization and motivation exercises to maintain their competitive edge.

Factors such as busy school schedules, lack of swimming pools in the vicinity of the house or inability to adapt to the physical and mental effort, the insufficient time to participate in other age appropriate activities may causes crisis-specific symptoms, such as low self-esteem, emotional discomfort (doubts, anxiety, fear), increased sensitivity to failure, and may influence athletes to retire prematurely from competitive sports (Predoiu, 2016; Monteiro et al., 2017).

In recent years, Romanian swimming competitions for juniors, youth, and seniors, have seen an extremely low number of senior participants (see Figure 1). The decreasing number of swimmers reaching the senior age is a cause for concern for federations, clubs, sports associations, and coaches, particularly due to the increasing average age of Olympic, World, and European finalists, with only minor exceptions where younger athletes reach the finals.

The findings of Knechtle et al. (2016) indicate that female swimming champions, with an average age of approximately 21 years, were about 2 years younger than their male counterparts, who had an average age of around 23 years, across all strokes and distances at the world-class level. Champions in longer races (200m and over) were younger, averaging around 20-22 years, compared to those in shorter races (50m and 100m), who averaged around 22-24 years, but the age of champions remained relatively stable over time in most strokes and distances. A similar study conducted by Mallett et al., (2021) provides insights into the age and physical attributes of female (average age: 22.7 ± 3.6 years) and male (average age: 23.2 ± 3.3 years) world-class swimmers, highlighting variations based on factors such as race distance, stroke, and specialization. The comparison with data from the 1990s adds a temporal perspective, and the distinctions between freestyle and butterfly swimmers contribute to a nuanced understanding of the physical profiles within elite swimming.

Methodology

Purpose of the study

The *purpose* of this study is to analyse the fluctuation in the number of swimmers participating in the national competitive system between 2012 and 2021. Additionally, the paper aims to identify the age group with the highest dropout rate and assess the impact of the COVID-19 pandemic on the performance of athletes in this sport.

Hypothesis

There are significant differences in the number of swimmers who participated in competitions between 2012-2021.

Participants and Procedure

Starting in October 2022 and continuing until January 2023, we conducted a thorough analysis of the databases of the Romanian Swimming and Modern Pentathlon Federation within the Ministry of Sports between the years 2012-2021. This analysis aimed to identify the number of annually registered swimmers and participants in the national competitive system across the following age categories: children, cadets/juniors/youth, and seniors.

Results

Despite the rising popularity of swimming, the number of performance swimmers has been decreasing year by year, affecting also the number of cadets, juniors and youth in

particular after 2019, when the COVID-19 pandemic began and the authorities imposed various restrictions for the health protection of the population (Figure 1).

We observed that the average annual number of senior athletes who participated in the national competitions has steadily decreased since 2012 from 67 to 24 in 2021, the annual average number of young/junior swimmers increased until 2019, but in 2020 reached a historical minimum of 218. Additionally, the average annual number of children/kids has steadily decreased from 782 in 2012 to 207 in 2021, due to the pandemic period and the imposed isolation measures.

As they grow, some of the athletes may shift towards other activities or interests, and the pressure of academic results, particularly the high school entrance exams, poses a real challenge for some young athletes. They have to cope with high academic demands such as attending classes, completing assignments/projects, and passing exams while pursuing their training objectives and recommended sports competitions for juniors.

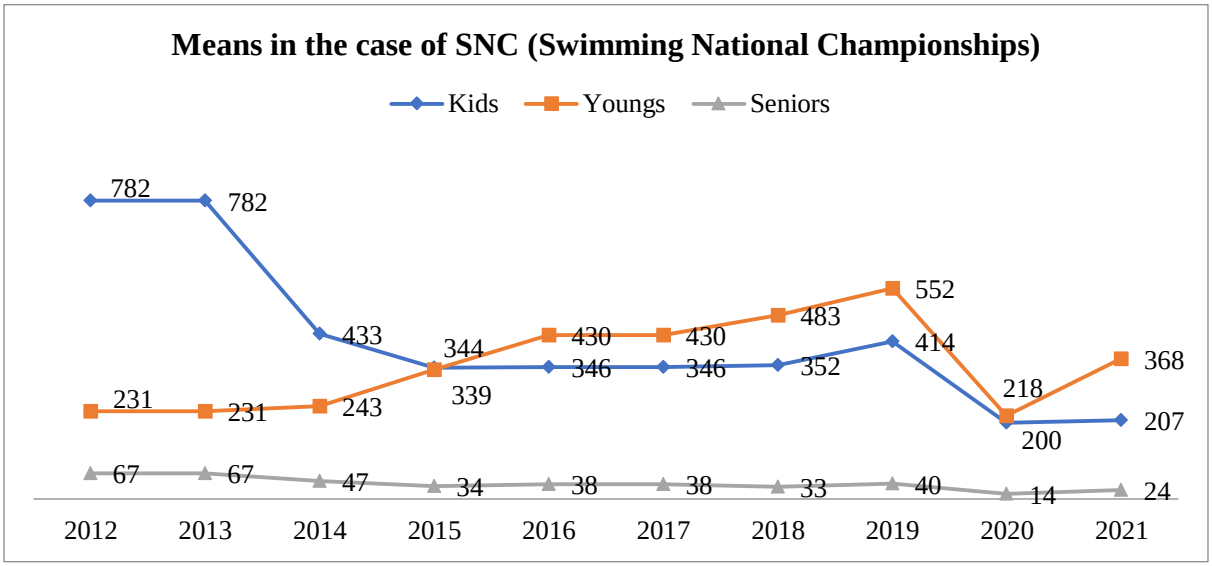

Figure 1. Annual averages of participants in the national competitions, by categories of swimmers

Often, athletes need to participate frequently in competitions or centralized training camps, leading to long periods of absence from school. Additionally, the intense training and competition schedule can be physically and mentally exhausting, affecting their academic performance and learning potential. In addition to these aspects, athletes also face the pressure of choosing between a sports career and an academic one, with some athletes needing to decide whether to continue their sports career or pursue higher education or a professional career. This decision can be challenging and significantly impact the future of the young athlete.

Over the period spanning from 2012 to 2021, there has been a noticeable rise in the rate of swimmers discontinuing their involvement in competitive swimming upon transitioning to the senior category. This transitional stage can be challenging in a swimmer's career, and the decision to retire from competitive sports can be influenced by a complex set of factors, including medical issues, the stress and demands of training, and limited achievements in competitions.

The senior category has the lowest number of athletes participating in competitions due to a multitude of factors, including:

- Athletes' developmental process: swimming is a sport that requires long-term and consistent development, and swimmers usually start competing at a young age, even as early as 5 or 7 years old. Therefore, some swimmers who started competing at a young age may eventually drop out for various reasons, such as lack of performance, health issues, or changing interests and priorities.
- Pressure from the education system: in Romania, the educational system is highly competitive, and students need to allocate a lot of time and energy for learning and achieving good results. This can make it difficult to maintain an intense training schedule with up to 11 specific training sessions per week and participation in competitions.
- Lack of support and resources: swimming often lacks adequate support from local authorities, sports clubs, and/or federations, and swimmers are required to rely on their own resources to cover training costs, equipment, recovery, scientific measurements, and travel to competitions. This can make it challenging for less privileged swimmers to participate in nationally or internationally organized competitions.
- Other interests and priorities: swimming requires a constant and long-term commitment, and not all swimmers are willing or able to fully dedicate themselves to it in the long run. As athletes reach older ages, they may focus more on other interests and priorities, such as their career, family, or other sports and leisure activities.

The Anova test shows that there are significant differences between the number of athletes in the 3 categories (kids, juniors and seniors) who participated in competitions between 2012-2021 ($F = 19.25$, $p < 0.001$). The Eta coefficient demonstrates that 68.4% of variance in the case of the dependent variable is explained by the categorical/ nominal variable.

Table 1. *The Tukey post-hoc test (kids vs. juniors vs. senior swimmers*)

					95% Confidence Interval	
(I) How much		Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Kids	Juniors	68.200*	26.2194	.037	3.562	132.838
	Seniors	380.300*	26.2194	.000	315.662	444.938
Juniors	Kids	-68.200*	26.2194	.037	-132.838	-3.562
	Seniors	312.100*	26.2194	.000	247.462	376.738
Seniors	Kids	-380.300*	26.2194	.000	-444.938	-315.662
	Juniors	-312.100*	26.2194	.000	-376.738	-247.462

Note. * The mean difference is significant at the .05 level.

The Tukey Post-hoc test was applied to calculate the difference between groups. The number of children is higher by 380.3 than the number of seniors with a very high degree of significance ($p < 0.001$). As swimmers advance from the children category through juniors, and then to seniors, there are notable variations in the factors affecting the abandonment rate.

The number of juniors is higher by 312.1 than the number of seniors who participated in competitions between 2012-2021 with a very high degree of significance ($p < 0.001$). This suggests that there are distinct differences in the dependent variable between these two age

groups, potentially reflecting changes in factors contributing to the abandonment rate as swimmers progress into the senior category. The number of children is higher by 68.2 than the number of juniors (p = 0.037). It implies that there is a noticeable change in the dependent variable as swimmers transition from the kid's category to the junior's category, potentially indicating a shift in factors influencing the abandonment rate as swimmers grow older.

The differences in the number of athletes who participated in competitions between 2012-2021 can be easily seen in Figure 2 (analysis on all categories by year, and analysis from one category to another).

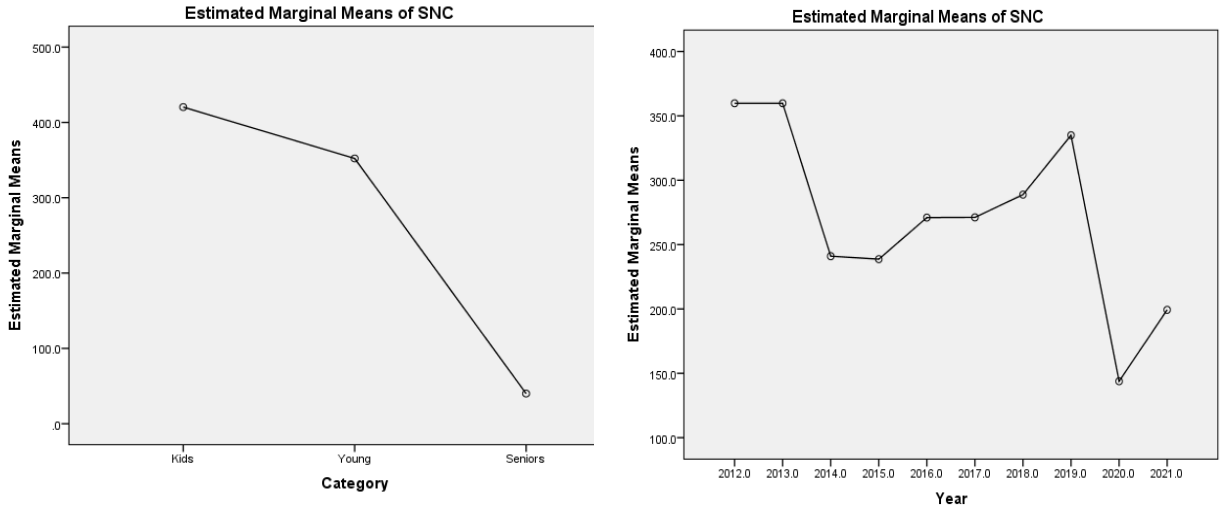

Figure 2. (a) Analysis from one category to another; (b) Analysis on all categories by year

In summary, the Tukey test has shown that there are statistically significant differences in the behaviour of the kids, juniors, and seniors' groups, which could be linked to the abandonment rate. In Romania, starting in March 2020, all competitions organized by the Bucharest Municipal Swimming Association were cancelled. This decision was set to be reviewed in 2022, with the intention of restarting the competitions as soon as possible. Table 2 highlights the swimming competitions held between 2019 and 2021 by the Romanian Swimming and Modern Pentathlon Federation.

Table 2. *Swimming competitions held in 2019-2021 by the Romanian swimming and modern pentathlon federation*

2019	**2020**	**2021**
Children age 10-11 :	**Children age 10-11 :**	**Children age 10-11 :**
• National Championship, regional stage, Bucharest; Oradea; Bacău • National Championship, Brașov • National Championship Poliatlon, Pitești	• National Championship, Bucharest, Lia Manoliu	• National Championship Poliatlon, Bacău

Table 2. *Swimming competitions held in 2019-2021 by the Romanian swimming and modern pentathlon federation - continue*

2019	2020	2021
Cadets age 12-14 :	**Cadets age 12-14**	**Cadets age 12-14 :**
• National Championship regional stage, Izvorani; Baia Mare; Bacău • National Championship, Târgoviște • Romanian Cup, Pitești	• National Championship, Bucharest Lia Manoliu	• National Championship, Bucharest • Romanian Cup, Brașov
Seniors, Youths, Juniors:	**Seniors,Youths,Juniors**	**Seniors, Youths, Juniors:**
• National Championship in long course 50m, Bacău • International Championship of Romania, București • National Championship short course 25m, seniors, youths, juniors	• National Championship long course 50m, Bucharest, Lia Manoliu	• Romanian Cup 2021, Male / Female Târgoviște • National Championship, long course 50m. Female / Male, Bucharest • National Championship Open Water, jun/youth/seniors/masters, Constanța • National Championship short course 25 m, Miercurea Ciuc

According to F.R.N.P.M. (Romanian Swimming and Modern Pentathlon Federation) in 2020, only 3 swimming competitions took place, the National Championship in the 50m pool – addressed to seniors, youth and juniors (30.09-03.10.2020), The National Championship for children 10-11 years old (9-11.10.2020), and the National Championship for Cadets 12-14 years old (22-29.11.2020). Another important aspect is the number of competitions targeted at specific age categories. In 2019, there were 5 competitions for children aged 10-11 years, 5 competitions for cadets aged 12-14 years, and 3 championships for seniors, youth, and juniors. In 2020, the federation managed, with great difficulty, to organize one competition for each age category. In 2021, under legal regulations to reduce epidemiological risk, separate championships were organized for women and men, specifically: 1 championship for children, 2 for cadets, and 4 for seniors, youth, and juniors (Table 2).

Within private clubs, the activity takes place in rented spaces, and the pandemic measures made it impossible to practice the sport and implicitly the material gain to pay for these facilities. There are situations in which the clubs have had to change their location or even close their professional swimming activity. Furthermore, the pandemic's impact included a period of quarantine and isolation starting in March 2020, during which all sports facilities were closed. Swimmers were forced to adapt to training at home. Notably, members of the national team, comprising top young swimmers and seniors, were able to train in a controlled environment at the Sydney 2000 sports facility in Izvorani, under daily medical supervision. Athletes from clubs with their own swimming pools followed local regulations and swiftly resumed water-based training. However, state-run clubs had to wait for specific ordinances and guidelines before resuming their training in water.

Among established athletes, the absence of specific water training extended to two months. During this period, they engaged in alternative training routines, including outdoor workouts and the use of swimming simulators. Robert Glință, as described by Digi24, in 2021, in "The Secret of Robert Glință, the Golden Swimmer of Romania" emphasized the benefits of land-based training, such as running, uphill running (which was challenging), and muscle

hypertrophy exercises. When swimming pools reopened, he exhibited outstanding aerobic capacity, facilitating a swift return to his performance levels prior to the lockdown.

The losses were felt among the children (Figure 1), who had to stay at home for a long time and with the gradual return to outdoor physical activity made them focus on more accessible sports, thus giving up swimming. For instance, Sprint Team 88 Csikzereda, a private club (from Miercurea Ciuc, a Romanian sports club), experienced substantial athlete attrition. During the initial phase of the pandemic, out of 118 registered athletes, only 18 resumed training when water activities were allowed to recommence. In the following year, they were able to re-enroll just 23 athletes. In contrast, the Army Sports Club "STEAUA" Bucharest, a state-run club, managed to maintain the physical conditioning of its high-performance athletes through non-specific exercises conducted at home or outdoors, leveraging technology and live training sessions. In the initiation and selection groups, there are no conclusive data to support the abandonment of swimming, due to pandemic restrictions.

Discussion and Conclusions

Specialized literature provides a wide array of perspectives and theories concerning the factors contributing to sports activity discontinuation, encompassing both general sports engagement and sports performance at a competitive level. Some researchers and experts suggest that a correlation exists between various psychological states like depression and overtraining syndrome, and the decision to withdraw from sports. (Monteiro et al., 2017; Kreher & Schwartz, 2012). Conversely, another school of thought suggests that peer pressure and negative influences from friends and teammates can increase the rate of dropout (Monteiro et al., 2017). Irrespective of the viewpoint, it remains essential to delve into a comprehensive theoretical framework to gain a deeper understanding of the adverse experiences entwined with sports performance. Furthermore, several studies highlight key factors influencing early retirement and sports dropout among young athletes, including strained relationships with coaches, injuries resulting from exhaustion, parental pressures to pursue alternative careers, and a diminished sense of enjoyment and excitement during training, often attributed to the daily routine and monotony inherent in preparation (Petlichkoff, 2016).

In Romania, dropout is not seen as a common failure of the system due to the lack of infrastructure, clubs lacking a coherent strategy for supporting athletes, poor organization in terms of phased performance training, and excessively demanding requirements. Instead, it is viewed as a validation for coaches that the swimmer who chooses to retire does not have the necessary qualities to pursue the sport at a performance level. There are undoubtedly enough reasons to support these claims, as not everyone is destined for the elite level. However, not all athletes deserve exclusion from sports performance, especially when the main reasons for dropout are correlated with negative training experiences, pressures, unrealistic goals from coaches and parents, and not least, injuries linked to the exhaustion. When we correlate this with the human need for socialization and belonging, according to Maslow's hierarchy of needs (Taormina & Gao, 2013) we understand why the environment in which young people engage in sports is important and how easily they can influence each other.

We can say that for the elite athletes, participants in the Tokyo Olympics, World and European championships, the year of pandemic restrictions was an opportunity to improve

training through individualized programs that led to better performance, with clubs and federations providing them with the best conditions.

Through our research, we have identified adolescence as the stage with the highest rate of dropout and/or premature retirement from sports performance thus confirming the hypothesis of the current study. Adolescence is a period of transition between childhood and adulthood, characterized by profound changes at the physical, psychological, and functional levels, and it varies from individual to individual depending on a multitude of factors, such as genetic, nutritional, lifestyle, social and cultural environment, as well as individual factors such as personality and temperament of the adolescent.

Children, cadets and juniors were the most affected in that period of restrictions and isolation in the pandemic with COVID-19, being forced to be limited to land training, non-specific, for a longer period of time (over 2 months).

Based on the presented data and global research, there is a compelling need to undertake a comprehensive study on the impact of the COVID-19 pandemic in Romania. This study should specifically focus on young age groups, children and cadets, engaged in organized swimming activities. The objective would be to analyse and compare the factors influencing dropout rates in these age categories, and to develop a prevention protocol aimed at mitigating the identified negative effects.

In a modern society with increasing, diverse, and complex demands, the coach must have a solid training that allows them to constantly adapt their activities to the specific needs and requirements of the athletes. They need to innovate and find new and creative solutions to help athletes improve their performance. The daily routine and monotony of training, being among the main factors that create motivational problems for athletes, means that the coach's responsibility goes beyond physical preparation and the development of technical and tactical skills. The role of a coach extends far beyond physical preparation and skill development. They significantly influence the mental development and motivation of athletes, encouraging them to push their boundaries and achieve their goals. A coach is expected to embody roles as a leader, role model, mentor, and friend to their athletes. They should inspire and guide athletes towards achieving peak performance, foster a positive training environment, offer constructive feedback, teach emotional management skills, and help athletes navigate competitive stress.

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Data Availability Statement: Data can be made available upon request to the contact author.

Conflicts of Interest: The authors declare no conflicts of interest.

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