DOI 10.26773/smj.251002

SportMont

ORIGINAL SCIENTIFIC PAPER

Physical Fitness of Police Force Applicants: Trends from 2010 to 2023

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Abstract

Physical fitness plays a critical role in the selection process for police service due to the demanding nature of law enforcement duties. The aim of this study was to analyze long-term trends in selected physical abilities of male police applicants over a 13-year period. The research sample consisted of 254 male applicants (mean age 28.99±6.34 years), divided according to year of assessment: 2010 (n=68), 2014 (n=97), 2017 (n=21), 2019 (n=14), 2021 (n=28), and 2023 (n=16). The following tests were used to assess physical fitness: 50-meter sprint, sit-ups, standing long jump, 1000-meter run, overhead medicine ball throw, and push-ups. The median was used as the primary measure of central tendency in all analyses. The Kruskal-Wallis ANOVA and Bonferroni-corrected Mann-Whitney U were used for inferential analysis. A significant decline in muscular endurance of the upper limbs was observed between 2014 and 2019 ($p<0.001$), while upper body explosive strength showed progressive improvement from 2010 to 2023 ($p<0.001$). Speed performance decreased significantly in 2014 compared to 2010 ($p<0.001$), with partial recovery in later years. No statistically significant trends were observed in core strength and endurance lower limb explosive power or aerobic endurance, suggesting relative stability in these abilities over time. The results highlight the need for a detailed assessment of physical fitness trends among police applicants, with an emphasis on factors that may influence their performance across different time periods.

Keywords: *security forces, physical assessment, conditioning ability*

Introduction

Physical fitness is a fundamental requirement for individuals aspiring to join the security forces, including the police, fire and rescue services, and the armed forces. These professions require high levels of strength, endurance, speed and agility, enabling personnel to respond effectively to physically and mentally demanding situations (Dawes et al., 2016; Marins et al., 2019). The assessment of physical fitness plays a crucial role in the selection and training of recruits, ensuring that they have the necessary skills to perform their duties efficiently (Massuça, Santos, & Monteiro, 2023). Despite its importance, research on long-term changes in the physical fitness of police applicants remains limited.

While many studies confirm that components such as aerobic capacity, muscular endurance, and explosive strength are essential for operational performance and injury prevention (Janković & Dopsaj, 2022; Orr et al., 2021; Robinson et al., 2018; Zulfiqar et al., 2021), these findings have primarily focused on active-duty officers rather than applicants. Recent findings suggest that physical fitness among applicants may be affected by multiple factors, including training methods, selection criteria, and broader societal shifts in physical activity levels (Marins et al., 2019). In addition, the selection process and its duration vary depending on the specific requirements of specialized units; however, each selection process is characterized by high levels of physical activity (Farina et al., 2020; Hunt, Orr, & Billing, 2013).

Fitness tests are an integral part of the selection process for security forces or serve as entry assessments for specialized units, play a crucial role in assessing the physical fitness of applicants. Properly administered, they allow for the identification of applicants' predispositions to meet the physical

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demands of service and ensure that only those with adequate physical preparedness progress to subsequent stages of training. Although various test batteries and diagnostic protocols are routinely employed to evaluate the physical and motor fitness of applicants to security forces, their potential for examining long-term trends across applicant cohorts remains underexplored (Massuça, Santos, & Monteiro, 2022, 2023; Zulfiqar et al., 2021). Zulfiquar et al. (2021), in their critical literature review, evaluated the most commonly used fitness tests for law enforcement officers. The authors emphasized the importance of a comprehensive fitness test battery, highlighting the 2.4 km run, push-ups, and sit-ups as the most widely used and predictive tests, correlating strongly with academy graduation success and occupational performance.

While some studies have focused on the fitness levels of active-duty officers, less attention has been given to long-term trends in the physical preparedness of police applicants. Research on the physical fitness of active police officers over extended periods is relatively extensive. A study by Dawes et al. (2023) examined differences in the physical fitness of police officers over a five-year period, considering gender as a variable. The findings indicated changes in fitness measurements among officers over time. On the other hand, research focusing on long-term trends in the physical preparedness of police applicants is more limited. Existing studies often concentrate on short-term training programs or assess physical fitness during academy training, while longitudinal tracking of fitness trends among applicants remains rare. For example, a study by Massuça and Rasteira (2023) evaluated the impact of a 12-week training program on police officers' physical fitness, but their work did not capture broader applicant trends.

This lack of longitudinal research underscores the need to systematically monitor applicant fitness over time to identify potential declines or shifts in physical preparedness. Such insights could inform more adaptive and effective recruitment and training strategies. Accordingly, this study aims to analyze long-term trends in the physical performance of police applicants and to determine which specific fitness components have changed significantly over time.

Methods

Participants

The research sample included 254 applicants to the police force, stratified by years of participation in the diagnostic (2010: n=68; 2014: n=97; 2017: n=21; 2019: n=14; 2021: n=28; 2023: n=16). The mean age of applicants was 28.99±6.34 years. Only male applicants were included in the study to maintain sample homogeneity.

Procedures

The selected fitness tests were established by the Ministry of the Interior and are defined by national legislation and municipal police regulations as mandatory components of the official recruitment process for the Police Force of the Slovak Republic. These standardized tests are designed to evaluate key physical abilities that are essential for performing basic law enforcement tasks. The testing was conducted under controlled conditions and administered by trained professionals following official protocols.

The 50-meter sprint test (seconds): assesses anaerobic power and acceleration. The participant starts in a standing position at the starting line. Upon the starting signal, the participant sprints at maximum effort to cover the 50-meter distance. The time taken to complete the sprint is recorded in seconds.

The sit-up test (reps): evaluates abdominal muscle strength and endurance. The participant lies on a mat with their feet 30 cm apart, knees bent at a 90-degree angle, and hands placed behind the neck. A partner holds the participant's feet to prevent them from lifting off the ground. Upon the start signal, the participant performs sit-ups, ensuring that their elbows touch their knees during the upward movement and that their back fully returns to the mat during the downward movement. The total number of correctly performed sit-ups within 120 seconds is recorded.

The standing long jump test (meters): measures the explosive power of the lower body. The participant stands behind a marked starting line with their feet shoulder-width apart. From a standing position, they bend their knees, swing their arms backward, and then jump forward as far as possible, landing on both feet. The test is performed twice, and the longest jump is recorded to the nearest centimeter.

The push-up test (reps): assesses upper body muscular endurance. The participant performs as many correct push-ups as possible within 2 minutes, maintaining a straight body alignment, lowering the chest approximately 5 cm above the ground, and fully extending the arms. The total count of properly executed repetitions is recorded, with brief rest in the upper position permitted.

The overhead medicine ball throw (meters): assesses upper body explosive power. The test is performed from an upright stance with feet slightly apart behind a designated line. The participant holds a 2 kg medicine ball with both hands and executes the throw by engaging the core and swinging the arms in a dynamic motion from behind the head. The objective is to achieve maximum throwing distance. Two attempts are allowed, with the best result recorded.

The 1000-meter run test (minutes): evaluates aerobic endurance and mid-distance performance. The test begins with a standing start following the command "START." The objective is to complete the 1000-meter distance in the shortest possible time. Participants may temporarily stop if necessary, but any interruptions are included in the total recorded time.

Bioethical Committee

The study was conducted according the guidelines of the declaration of Helsinki. The study was approved by the Bioethics Committee at the Regional Medical Chamber (No.287/KBL/OIL/2020).

Statistical analysis

The Shapiro-Wilk test was used to verify the normal distribution of the data. Due to the non-normal distribution of the data, the median was used as a measure of central tendency and the interquartile range as a measure of variability in the exploratory analysis of the observed parameters. To enhance interpretability, we also reported means and standard deviations (SD) for each variable. The Kruskal-Wallis H test (Kruskal-Wallis ANOVA) was used for inferential analysis. The significance of the measurements was assessed at a significance level of a=0.05. The eta-squared coefficient (η^2) was used to assess the substantive (practical) significance of differences in the scores across the studied categories. The following thresholds were applied for interpretation: $\eta^2<0.06$ indicates a small effect, η^2 between 0.06 and 0.14 indicates a medium ef-

fect, and $\eta^2 \geq 0.14$ indicates a large effect. Significance of within-group differences was assessed using the Mann-Whitney U test at a significance level of α=0.008, adjusted for Bonferroni correction to control for Type I error due to multiple comparisons. For substantive significance, the test was supplemented with Pearson's correlation coefficient (r) assessed: r=0.10, small effect; r=0.30, medium effect; r=0.50, large effect. The obtained data were processed by statistical analysis using SPSS Statistics 27.0 software (IBM, Armonk, USA).

Results

Analysis of the physical performance levels of the police officer applicants revealed statistically significant differences with a large effect size in the 50 meter sprint, push-ups and medicine ball throw. In contrast, no statistically significant differences were found for sit-ups, standing long jump or 1000 meter run (Table 1).

The intergroup analysis revealed significant differences between certain years, although these changes did not al-

Table 1. Summary of Univariate Analysis Results of Physical Fitness Indicators in Police Officers

Parameter	Year	Mean ± SD	Med ± QD	Kruskal-Wallis ANOVA			Post-hoc test
				X^2	p	η^2	
50-m sprint time (sec)	2010	7.45±0.41	7.39±0.30	23.232	<0.001*	0.095†	2010 vs. 2014
	2014	7.82±0.55	7.71±0.04				
	2017	7.44±0.51	7.44±0.42				
	2019	7.65±0.58	7.70±0.29				
	2021	7.61±0.52	7.63±0.35				
	2023	7.47±0.51	7.33±0.36				
Push-ups (reps)	2010	55.24±11.74	60.00±8.50	12.844	0.025*	0.052	2014 vs. 2019
	2014	52.71±13.93	56.00±9.00				
	2017	48.77±11.18	50.50±11.38				
	2019	47.07±13.34	49.50±9.63				
	2021	52.21±8.40	55.50±7.00				
	2023	49.75±11.36	53.50±8.25				
Sit-ups (reps)	2010	59.79±11.25	58.50±9.25	9.406	0.094	0.038	
	2014	55.84±13.61	57.00±13.00				
	2017	52.14±14.94	53.50±10.00				
	2019	53.57±16.33	56.00± 8.25				
	2021	49.07±16.21	51.50±11.00				
	2023	56.69±13.71	57.00±8.63				
Standing long jump (m)	2010	2.20±0.14	2.20±0.10	2.761	0.737	0.011	
	2014	2.21±0.19	2.24±0.12				
	2017	2.21±0.18	2.22±0.07				
	2019	2.19±0.15	2.18±0.13				
	2021	2.22±0.13	2.26±0.07				
	2023	2.20±0.14	2.21±0.06				
Overhead medicine ball throw (m)	2010	8.23±1.32	8.15±1.06	100.725	<0.001*	0.414‡	2010 vs. 2014, 2017, 2019, 2021, 2023 2014 vs. 2017, 2019, 2021, 2023
	2014	9.21±1.45	9.12±1.03				
	2017	11.22±1.52	10.78±1.14				
	2019	12.18±1.71	11.96±1.51				
	2021	10.51±1.52	10.60±0.99				
	2023	11.32±1.27	11.45±0.53				
1000-metre run (min)	2010	4.29±0.39	4.33±0.18	1.101	0.954	0.005	
	2014	4.26±0.45	4.26±0.18				
	2017	4.22±0.51	4.33±0.22				
	2019	4.22±0.55	4.30±0.14				
	2021	4.22±0.57	4.31±0.43				
	2023	4.15±0.58	4.27±0.26				

Note. SD: standard deviation; Med: median; QD: quartile deviation; X^2: test criterion; p: statistical significance; η^2: Eta Squared; *: statistically significant difference; †: medium effect size; ‡: large effect size

ways follow a linear trend over time. For the 50-metre sprint, performance was significantly worse in 2014 than in 2010 ($p<0.001$), with no such differences observed in chronologically adjacent years. For push-ups, a significant decrease was observed between 2014 and 2019 ($p<0.001$). The medicine ball throw showed the most pronounced differences, with significant improvements observed in all assessed years ($p<0.001$), particularly between 2014 and 2023, where the change was most pronounced.

Inter-annual distributions of performance in all assessed physical fitness tests are additionally illustrated using boxplots (Figure 1 A-F), which facilitate visual comparison of central tendency, dispersion, and outliers across the study period. Based on the comparison of mean values, certain physical performance parameters, such as upper body strength and throwing dynamics, showed improvements over the years, while others, particularly upper body muscular endurance, showed a significant decline.

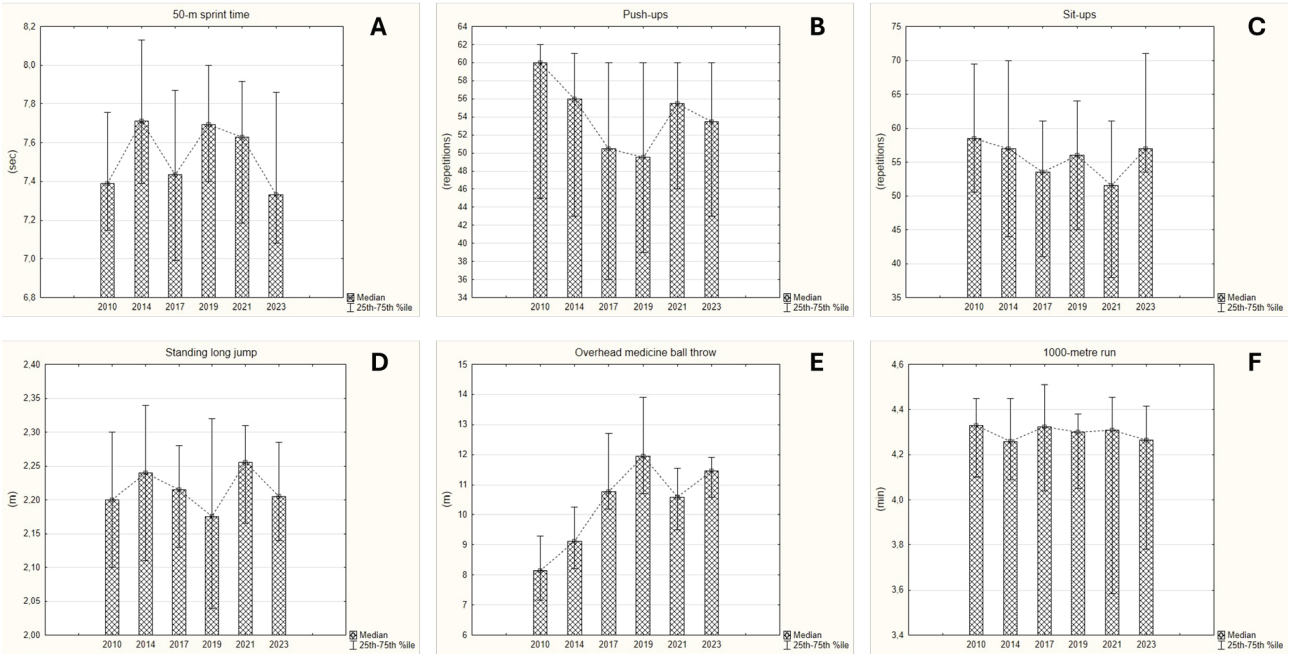

FIGURE 1. Changes of Physical Fitness Indicators in Police Officers.

Discussion

The findings of this study provide valuable insights into the physical fitness trends of police force applicants over the period from 2010 to 2023. The results highlight significant improvements in explosive strength and throwing dynamics, while indicating a decline in upper body muscular endurance. These trends suggest possible shifts in training practices, recruitment standards, or lifestyle factors affecting applicants' physical performance.

Performance in the 50m sprint showed considerable variation from year to year, with a significant decline in 2014 followed by a partial recovery in subsequent years. This non-linear trend could be attributed to changes in training focus. Previous studies have suggested that sprinter performance is influenced by factors such as muscle composition, neuromuscular coordination and overall fitness (Dal Pupo et al., 2013; Takahashi et al., 2024; Vellucci & Beaudette, 2023), which may have fluctuated from year to year in the candidates. Similar trends were observed by Lockie et al. (2020), who found that sprint performance in police recruits was closely related to overall physical fitness and academy graduation success.

The number of push-ups performed by applicants declined significantly between 2014 and 2019, indicating a decline in upper body muscular endurance. This decline may reflect a shift in physical training strategies, with an increasing emphasis on power-based rather than endurance-based conditioning. The observed trend is consistent with the findings of Dawes et al. (2016), who reported that lower levels of muscular endurance were associated with reduced job performance in male police officers, highlighting the occupational relevance of this fitness component. In further support of these findings, a study by Rezende et al. (2022) observed a significant annual decline in push-up performance over a five-year period among officers from the Environmental Protection Military Police, the Special Police Operations Battalion. Interestingly, the same study found improvements in push-up performance among a group of urban and border police officers. These contrasting results highlight the differential impact of occupational demands on physical fitness across different law enforcement specializations. Given that muscular endurance is essential for prolonged physical activity and sustained effort during field operations, its decline in police recruits raises concerns about their readiness for job-specific tasks. These findings highlight the need to re-evaluate the balance between strength and endurance training in applicant preparation programs to ensure that recruits develop the necessary physical attributes to meet the diverse demands of law enforcement duties.

The overhead medicine ball throw demonstrated the most pronounced improvements across the observed period (2010–2023), indicating a progressive enhancement in upper body explosive strength. Increased explosive strength may have a positive impact on essential law enforcement capabilities such as load manipulation, effective response in high-stress physical situations, and the ability to restrain individuals, as also highlighted by Orr et al. (2022) in their study of tactical police task performance. This trend may reflect a growing em-

phasis on strength training within preparatory programs for police applicants. Similarly, Gonzales et al. (2024) observed significant improvements in upper-body power over a 16-year period among police recruits, supporting the hypothesis of a shift in training priorities toward upper body strength development. Unlike in their study, which focused on academy outcomes, our findings suggest that the trend may already be evident among applicants, possibly reflecting a growing emphasis on maximal strength training in general populations preparing for tactical careers.

No statistically significant changes were observed in sit-ups, standing long jump, or the 1000-meter run. While these results suggest relative temporal stability in core strength, lower body power, and aerobic endurance among applicants, any interpretation should be made with caution due to the lack of statistical significance. Therefore, no definitive conclusions regarding trends in these parameters can be drawn from the present data. Despite widespread reports of global declines in aerobic fitness, our results showed no statistically significant changes in 1000-meter run performance across the observed years, suggesting relative stability in aerobic endurance among applicants. This finding contrasts with international trends; for example, Lamoureux et al. (2019) documented a significant decrease in cardiorespiratory fitness in over 2.5 million adults from 1967 to 2016. The stability in this study may reflect a self-selection effect, where applicants prepare specifically for police service, thus maintaining a minimum aerobic standard. However, the lack of improvement still warrants attention, and future assessments might benefit from more operationally relevant endurance tests.

Based on these findings, several practical considerations arise that are relevant for recruitment and training development. The observed trends in physical performance among police applicants carry direct implications for recruitment procedures and structured preparatory programs. Given the significant decline in upper body muscular endurance, it is advisable that preacademy training frameworks place greater emphasis on endurance-oriented conditioning. Conversely, the consistent improvement in upper body explosive strength suggests that current strength-focused approaches may be effective, though they should be complemented with training elements that address broader physical competency. These findings also support a potential revision of the applicant fitness assessment protocols. Incorporating additional evaluations such as agility testing, load-bearing simulations, or operationally relevant obstacle courses which could enhance the predictive validity of selection batteries with respect to real life law enforcement demands. Responsible recruitment authorities may consider conducting periodic evaluations of applicant performance data to ensure that selection standards remain aligned with evolving operational requirements and applicant profiles.

It should be noted that our study has some limitations. The research sample consisted exclusively of male applicants, which limits the generalizability of the results to the female population. Future studies should include female applicants to provide a more comprehensive perspective on the physical fitness of all candidates for police service. The study assessed only the physical performance of applicants prior to their entry into the police force. It did not include data on active police officers, which prevents insight into how their physical fitness evolves during service. Current tests assess basic physical abilities but do not take into account the specific requirements of the police service (e.g. load handling, agility, reaction time). It is recommended that testing be supplemented with simulated operational situations.

Conclusions

This longitudinal analysis revealed critical shifts in the physical profile of police force applicants between 2010 and 2023, particularly an increase in upper body power and a decline in muscular endurance. These findings emphasize the need to adapt recruitment protocols and training curricula to ensure adequate preparation for operational tasks. In light of these trends, we recommend the inclusion of task-specific tests (e.g., agility, load carriage) in the recruitment battery and the implementation of pre-selection training programs focusing on muscular endurance. Future studies should also address current limitations such as gender exclusivity, small sample sizes in some years, and lack of field-specific performance indicators. A multimodal fitness battery, better tailored to law enforcement duties, is suggested for future evaluations.

Acknowledgements

The research was funded by the EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia under the project No. 09I03-03-V05-00006.

Conflict of Interest

The authors declare that there is no conflict of interest.

Received: 04 June 2024 | **Accepted:** 06 July 2025 | **Published:** 01 October 2025

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