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Position-Specific Physical Demands at FIFA World Cup 2022: A Descriptive Match-Analysis Study

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ABSTRACT

This study provides a descriptive analysis of the position-specific physical demands of elite football players during the FIFA World Cup 2022. Using full-game match reports from official FIFA website, the physical outputs of 947 players (N=947), including defenders, midfielders, forwards, and goalkeepers, were observed across selected performance indicators such as total distance coverage, total distance of speed zone, sprinting frequency, and top speed of running. The results revealed notable variations in physical demands based on player positions. Midfielders indicated the highest distance coverage (11,163.42 m), balancing offensive and defensive roles, while forwards performed the highest number of sprints (51.77) and recorded the highest top speeds (32.00 km/h) compared to other playing positions. Defenders showed moderate distance coverage (10,135.47 m) with bursts of high intensity running speed, and goalkeepers covered the lowest distance (4,845.20 m), relying on short, explosive movements. These findings provide valuable insights for designing position-specific training programs to optimise performance and reduce injury risks. Future studies should explore how tactical strategies and match contexts influence these physical demands in order to improve physical performance of the football players.

1. INTRODUCTION

Football has become one of the most famous sports across the world, especially in Europe, where millions of people of all ages enjoy the game. The physical demands of modern football matches are varied whereby players perform unpredictable movements, especially during tactical and technical actions (Leifsson et al., 2024). Game analysis can be an effective way to quantify such activities in order to evaluate players' performance (Bradley & Ade, 2018). This can eventually be used by football coaches or trainers to provide valuable insights and help in the development of football training programs (Lobo-Triviño et al., 2024). In addition, analysing various tournaments can help to develop relevant benchmarks across selected physical indicators (Allen et al., 2024; Modric et al., 2025).

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Modern micro-technology such as Global Positioning System (GPS) has been commonly used to accurately measure and analyse both team and individual loads in professional footballers. GPS has statistically proven to be a valid and reliable method of assessing positional demands although commonly used to measure maximum and average outputs across 90-minutes of football matches (Scott et al., 2016). Many authors have documented the match demands of high-level domestic leagues (Barnes et al., 2014; Lago-Peñas et al., 2023) across the world, as well as several European tournaments (Di Salvo et al., 2010). However, there is still limited evidence on the match demands from international football tournaments such as FIFA World Cup (Bradley, 2024). Studies performed to date with modern football have commonly used freely available data that had limited indicators, positional granularity and were conducted on outdated FIFA World Cup Brazil 2014 (da Mota et al., 2016). Therefore, there is a pressing need for a current study to analyse FIFA World Cup Qatar 2022 which was officially approved by FIFA that included all indicators based on all participate players. This could provide a more accurate data based on the current physical demands of international modern football. Since physical demands varied significantly between and within players according to positional role (Bush et al., 2015), it is crucial to create a profiling benchmark especially in recent football tournaments.

In practical terms, running loads have been crucial for different playing positions to helps better individualisation training loads. For example, Amani, (2019) found that midfielders cover the highest total distances compared to the other playing positions. Moreover, midfielders have been reported to have the highest endurance capacity due to their involvement in both attacking and defending plays (Altmann et al., 2020). This knowledge regarding position-specific running profiles can help in determining suitability of players for specific positions (Samolis et al., 2025). Finally, coaching staff able to create better training program during microcycle by knowing position-specific physical demands especially in terms of running profiles. Playing position such as forwards, have been proved to show highest sprints per match compared to the other positions (Katanic et al., 2025). Previous studies also highlight the importance of analyzing players movement in various speed zones (Bradley et al., 2009; Di Mascio & Bradley, 2013; Di Salvo et al., 2009). According to Oliva-Lozano et al., (2023), maximal sprint velocity are mostly dominate by forwards and defenders. In contrast, defenders and goalkeepers are not engaged in high-speed zones (Di Salvo et al., 2007). Therefore, it is important to perform profiling physical demands of each playing position in football. Knowing the physical demands of each position can assist coaches and practitioners to design training programs based on the requirements needed to each position.

A detailed description of this competition would also establish baseline from which performance changes can be monitored in the future football. This is vital given the pressing needs of modern physical demands in both domestic and international football tournaments. Therefore, this study aims to descriptively profile position-specific physical demands during the FIFA World Cup Qatar 2022.

2. LITERATURE REVIEW

The physical demands among elite football game have been widely studied, with several evidence have highlighted that these demands showing significant difference based on playing position. Understanding and examining these differences is important in order to optimise training programs and improving players' in-game performance. This literature review examines key areas which are relevant to the objective of this study, including total distance coverage, total distance in each speed zones, high speed runs and top speed across playing positions in football.

2.1 Total Distance Coverage

Previous studies have showed that total distance covered during a match was significantly difference across playing positions. Midfielders were reported to have highest total distance coverage, with distance covered often exceeding 10,000 meters per game. Previous studies indicated that midfielders have the highest total distance coverage per game compared to other playing positions such as defenders, forwards and obviously, goalkeepers (Aşçi et al., 2024; Bradley, 2024). This highlighted that midfielders required high stamina and endurance to sustain and play in football match. However, Bradley, (2024) and Ventura et al., (2024)

observed that defenders also covered substantial total distance coverage in football match. This means total distance covered in football match based on playing position are still debated and future studies need to be done to aid football conditioning and provide information for coaches and practitioners.

2.2 Speed Zones and High-Intensity Running

Previous studies also emphasise that analysing various speed zones in football game is crucial in understanding physical demands based on playing positions in football. Studies by Aşçi et al., (2024) and Michailidis et al., (2024) found that forwards have the highest speed zones (>25.2 km/h) compared to other playing positions. Forwards also performed better in moderate speed-zones but are more prominent in high-speed zones (Oliva-Lozano et al., 2020). However there are also studies found that defenders demonstrate high speed zones in leading domestic league (La Liga and English Premier League) compared to other playing position (Gregson et al., 2010; Oliva-Lozano et al., 2020). In terms of moderate speed zones, both defenders and midfielders are active in moderate speed zones (14.4 – 19.7 km/h) (Lebediev et al., 2019; Samolis et al., 2025). These results of previous studies also highlighted that analysing the physical demands on various speed zones in order to give information regarding speed zones in current football tournaments.

2.3 Sprinting, Acceleration and Top Speed

Sprinting and top speed activities also varies based on playing positions, with midfielders and forwards dominating this key performance compared to other positions. Di Salvo et al., (2010) found that midfielders performed more high sprinting per match compared to forwards and defenders. Moreover, midfielders also engage in high-intensity accelerations and decelerations compared to other playing positions (Modric et al., 2020; Oliva-Lozano et al., 2020). However, forwards have consistently show maximum number of running speeds compared to other playing positions. A study proved that forwards have top running speeds (33.03 ± 1.35 km/h) compared to defenders (32.72 ± 1.32 km/h) and midfielders (32.08 ± 1.63 km/h). Ben Hassen et al., (2023) also found that forwards performed shortest sprint times (4.5 ± 1.4 s for 30 meters) and higher velocities (8.8 ± 0.4 m/s) compared to other positions.

2.4 Implications for Training and Performance

Due to the distinct physical demands based on playing positions, designing and developing training interventions are essential in order to optimise football players' performance. Therefore, the current study suggests that football training should emphasise both position-specific and technical-skills training to enhance physical performance of football players. As Mäkinemi et al., (2023) argue that understanding of position-specific physical demands is crucial in order to apply systematic approach towards training that reflects the physical demands based on playing position.

3. METHOD

3.1 Study Design

This study used a descriptive research design to provide the physical demands of different positions football players in the FIFA World Cup 2022. The primary focus was to objectively measure and compare physical demands of football players based on their playing position by quantifying the physical performance from the official FIFA website. This approach has been widely used in sports science (performance analysis), in order to provide an accurate and detailed breakdown of player movements and activities during match play. The use of descriptive approach was needed for benchmarking purpose, as it provides normative reference values for position-specific physical demands in modern football competition.

3.2 Population and Sampling

The data were collected from 64 matches in the FIFA World Cup 2022 from group stages until knockout phase. A total of 947 football players ($n = 947$) from 32 national teams participated in this tournament. Players were divided into four positional groups: goalkeepers (GK), defenders (DF), midfielders (MF) and

forwards (FW). Full-game reports data were analysed to ensure a complete analysis of physical demands for each football match, including all phases of play. All players were included in this analysis, regardless of whether they completed the full match, and performance data of substituted players were also included for the periods they played on the field.

The data of this study were sourced from the official FIFA Training Centre website (<https://www.fifatrainingcentre.com>), which also provides detailed full match analyses of all World Cup matches.

3.3 Data Collection

The data collected was based on full match reports of each game in FIFA World Cup 2022. This study has systematically analysed and recorded physical performance of each player based on the following key physical demands indicators.

Bulleted lists may be included and should look like this:

- (i) Total distance covered (measured in meters)
- (ii) Total distance in various speed zones, such as zone 1 (0-7 km/h), zone 2 (7-15 km/h), zone 3 (15-20 km/h), zone 4 (20-25 km/h) and zone 5 (>25 km/h).
- (iii) Sprint frequency, indicating the number of sprints performed during a match.
- (iv) Maximum running speed, calculated as the top speed of each player during a match

3.4 Data Analysis

The data collected from full match reports were analysed using descriptive statistics to summarise and compare the physical performance of players across different playing positions. Descriptive analysis was used to report the data collected from trusted FIFA website. All statistical analyses were conducted using IBM SPSS Statistics (Version 29.0, IBM Corp, Armonk, NY, USA). The mean and standard deviation were calculated based on playing position (goalkeepers, defenders, midfielders and forwards).

4. FINDING & DISCUSSION

4.1 Result

The findings of this study in the FIFA World Cup 2022 indicated insightful data on the unique physical demands placed on different player positions. Table 1 shows physical demands indicators that include total distance covered, total distance in various speed zones (walking, jogging, moderate-speed, high-speed, and sprinting), and top speed.

Table 1. Descriptive Profiling of Physical Demands by Playing Position in FIFA World Cup

Indicators	GK	DF	FW	MF
Total Distance (m)	4845.20 ± 694.11	10135.47 ± 1,045.85	10001.72 ± 1304.53	11163.42 ± 1,418.99
Zone 1: 0-7 km/h (m)	3720.36 ± 514.40	3868.06 ± 529.17	3771.03 ± 710.08	3626.83 ± 566.05
Zone 2: 7-15 km/h (m)	929.87 ± 253.82	4305.46 ± 631.63	3999.88 ± 862.17	5017.80 ± 943.70
Zone 3: 15-20 km/h (m)	137.98 ± 60.30	1195.72 ± 273.29	1319.69 ± 343.69	1660.50 ± 397.27
Zone 4: 20-25 km/h (m)	42.82 ± 30.75	547.30 ± 181.65	647.01 ± 183.20	662.42 ± 178.50
Zone 5: >25 km/h (m)	14.09 ± 16.51	210.87 ± 133.01	260.20 ± 133.82	190.94 ± 109.56
Sprints (Zone 5) (n)	4.25 ± 2.31	43.73 ± 13.66	51.77 ± 13.48	50.20 ± 12.27
High-Speed Runs (Zone 4) (n)	16.91 ± 6.28	109.56 ± 22.49	118.49 ± 26.35	141.95 ± 27.93
Top Speed (km/h)	26.53 ± 2.46	31.43 ± 1.80	32.00 ± 1.96	30.86 ± 1.80

km/h: kilometres per hour; m; meter; n: number

Midfielders covered the most total distance, averaging 11,163.42 meters surpassing defenders and forwards. While goalkeepers covered significantly less distance compared to other playing positions.

Analysis across speed zones highlighted that defenders are more active at very low speeds (0-7 km/h), whereas midfielders dominated moderate-to-high intensity running velocity (7-25 km/h). In Zone 3 (15-20 km/h) and Zone 4 (20-25 km/h), midfielders again dominated, covering 1,660.50 meters and 662.42 meters, respectively. Forward clearly covers the highest speed zone (>25 km/h) with an average of 260.20 meters.

In terms of dynamic efforts, forwards completed the highest number of sprints with midfielders closely following, while defenders performed fewer sprints, and goalkeepers, as expected, had the lowest sprints. High-speed runs were clearly dominated by midfielders and followed by forwards and defenders while goalkeepers were the least engaged in high-speed runs.

Regarding peak velocity, forwards achieved the highest top speeds with defenders and midfielders were slightly lower, and goalkeepers recorded the slowest top speeds.

These results showed clear position-specific differences in physical demands, highlighting the different movement profiles and intensity patterns associated with each position on the pitch.

4.2 Discussion

This study provides key insights into the physical demands experienced by different playing positions in the FIFA World Cup 2022. The result indicated that each positional group plays different roles in terms of total distance coverage, speed zones, sprinting frequency, and top speed. The findings of this study provide new perspectives and insights on physical demands based on position-specific in modern football.

Based on the results, midfielders have recorded the highest total distance coverage ($M = 11163.42$ m) compared to other playing positions. This might be explained because of their role as the link between attacking and defending phase (Bloomfield et al., 2007). Another reasonable explanation is midfielders need superior aerobic endurance to cover the most areas on the football field (Metaxas, 2021). In contrast, defenders ($M = 10135.47$ meters) and forwards ($M = 10001.72$ meters) showed lower distance coverage due to the other reasons. Goalkeepers, as expected, covered the lowest distance coverage ($M = 4,845.20$ meters), which also aligns with previous findings that goalkeepers' movements are restricted to a limited area of the field near the goal area (Di Salvo et al., 2008).

The result of speed zones further indicated the positional differences in physical demands. Midfielders excelled in Zone 2 (7-15 km/h), Zone 3 (15-20 km/h) and Zone 4 (20-25 km/h), covering the most distance in these moderate-speed zones. This reflects the findings of Bortnik et al., (2024), who identified midfielders as the most active position in terms of sustained running. This indicated their role in managing transitions between attacking and defending, controlling midfield play and also dictating the game's tempo (Forcher et al., 2023). The high distance covered by midfielders at moderate speeds indicated their continuous movement across both halves of the pitch to support both defensive and offensive phases of play.

In comparison, forwards exhibited higher movement demands in Zone 5 (>25 km/h), supporting the hypothesis that forwards frequently engage in high-speed sprints to penetrate defensive lines (Cotteret et al., 2025). This result is consistent with previous findings Ferro et al., (2014), which highlighted that forwards often perform explosive sprints in short bursts to create goal-scoring opportunities. Defenders also recorded significant activity in the higher speed zones, which indicated the demands of defenders to track back quickly and defend against counterattacks and to match the pace of fast-moving opponents. This findings were supported by Morgans, Mandorino, et al., (2025), which reported that defenders often engage in high-speed running during critical defensive phases of play.

Sprinting patterns and high-speed runs also highlighted that each playing position are specialised for different physical demands. Forwards recorded the highest number of sprints ($M = 51.77$), which shows their dependence on explosive speed to exploit on attacking opportunities. This finding is consistent with

previous study that indicates forwards frequently perform short bursts of high-intensity efforts to either create space or challenge defenders for goal-scoring opportunities (Schulze et al., 2022). Midfielders also engaged in a high number of sprints ($M = 50.20$), because of their involvement in both attacking and defending transitions, indicating their need for balanced physical capabilities across the field.

The relatively lower number of sprints among defenders ($M = 43.73$) reflects their focus on maintaining defensive structure rather than engaging in frequent bursts of speed (Sarmiento et al., 2024). This showed that defenders prioritized positioning over sprinting, although engaged in several high-speed runs during critical defensive phases. Goalkeepers recorded the lowest number of sprints ($M = 4.25$), which supported by previous studies that indicated goalkeepers rarely perform high intensity runs, as their positional role is limited to short, explosive movements within the penalty area (Malone et al., 2018; White et al., 2020).

Similarly, the high-speed run data aligns with these patterns, with forwards and midfielders showing the greatest engagement in these efforts. Midfielders led in high-speed runs ($M = 141.95$), reflecting their broad positional coverage and constant involvement in high-intensity phases of play, while forwards followed closely ($M = 118.49$). These findings reflect those of Barrera et al. (2021), who found that midfielders and forwards typically accumulate the highest number of high-speed efforts due to their involvement in both attacking and defensive sequences.

Top speed data highlights the importance of pace, particularly for forwards. Forwards in this study achieved the highest top speeds ($M = 32.00$ km/h), which supported by Coso et al., (2020), demonstrating that pace is critical for forwards to outmaneuver defenders and create goal-scoring opportunities. Defenders, who recorded a high top speed as well ($M = 31.43$ km/h), must accelerate quickly to track fast-paced forwards, which emphasised the importance of speed in defensive roles (Coso et al., 2020).

Midfielders recorded slightly lower top speeds ($M = 30.86$ km/h), which consistently align with their positional role in covering the ground over longer periods rather than engaging in short, explosive efforts. This finding was supported by previous study showing that midfielders tend to balance endurance with speed and maintaining consistent running over longer distances (Metaxas, 2021). Goalkeepers also recorded lowest top speeds ($M = 26.53$ km/h), further highlighting the reduced physical demands of their role compared to outfield players.

Despite the valuable insights gained from the study, it is important to note several limitations in this study. First, the analysis of this study was based on secondary data obtained from official FIFA Training Centre website match reports, which constraints the data collection procedures, accuracy of measurement and variable selection. As the data reports were limited to publicly available performance indicators, potential relevant variables such as contextual variables (e.g., match status, tactical strategies), individual physiological parameters and training load data could not be assessed. Therefore, while the results provide valuable insight into position-specific physical demands among elite football such FIFA World Cup, readers should interpret within the restriction of secondary data analysis.

5. CONCLUSION

Understanding the differences in physical demands across different playing positions is essential for practitioners. This study outlines the different physical demands associated with specific playing positions in the FIFA World Cup 2022, offering significant insight for coaches and trainers to develop effective training strategies. Future research could explore how tactical strategies can influence these physical demands, providing deeper insights into modern football game.

In summary, this study reaffirms the importance of investigating physical demands across position-specific approach in modern football game. Therefore, designing and developing training programs to match specific physical demands of each player's position is important for maximising players' performance and reducing the risk of injury.

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CONFLICT OF INTEREST STATEMENT

There is no conflict of interest among the authors of this article.

AUTHORS' CONTRIBUTIONS

Wan Muhammad Afiq Wan Jahari and Dr Norlaila Azura Kosni jointly conceptualised the research idea, led the data collection process and were primarily responsible for drafting and revising the manuscript. Dr Nurul Diyana Sanuddin, Kalam Azad Isa and Mohd Azharul Azemi provided critical input in the development and refinement of the study design and methodology. Kalam Azad Isa also performed the statistical analyses and assisted in interpreting the results. All authors reviewed and approved the final version of manuscript.

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