Physical Education, Health and Social Sciences

https://journal-of-social-education.org E-ISSN: 2958-5996

P-ISSN: 2958-5988

Factors Influencing Badminton Performance and Player Development in Khyber Pakhtunkhwa, Pakistan: Challenges, Opportunities, and Strategies for Sustainable Growth

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DOI: https://doi.org/10.63163/jpehss.v4i1.1746

Abstract

Badminton is a game that involves competition and demands physical fitness, technical skill, tactical awareness, psychological preparation and proper institutional support. However, the development of badminton in Khyber Pakhtunkhwa (KP), Pakistan, could be hindered by a lack of sports infrastructure, financial resources, skilled coaches, and competitive opportunities. The aim of this study is to look at the different factors affecting badminton performance and player development within KP. Major issues was identified and recommendations made to ensure sustainable development. It is recommended to use cross-sectional descriptive and correlational quantitative research design. The sampling method used in this study is multistage sampling, which includes 200 samples consisting of 150 badminton players, 30 coaches and 20 sports administrators. The data are designed to be gathered through a structured questionnaire where the following areas of sports infrastructure, coaching quality, financial and institutional support, competition exposure, physical and psychological preparation, talent identification and player development are explored. Responses was summarized using descriptive statistics such as frequencies, percentages, means and standard deviations and may be analysed using appropriate inferential statistics to look at relationships between relevant variables. Overall, it is hoped that the study was provide evidence-specific information that was help to clarify the barriers and opportunities for badminton development in the province. The results can help to develop policies and guidelines for the development of training facilities, coaching programmes, opportunities for competition, sports-science support and pathways for talent identification. There is potential for more coordination between sports departments, education providers, badminton organisations, clubs and other stakeholders to lead to an even more inclusive and sustainable player-development system. The study could also assist in any work done to increase access to the game of badminton for women and for athletes from under-represented districts. In the end, the research aims to give a scientific basis to improve the participation and performance of badminton in Khyber Pakhtunkhwa.

Keywords: Badminton, Player Development, Sports Performance, Coaching, Sports Facilities, Talent Identification, KP, Pakistan.

Introduction

Badminton is a sport of the racket, which is both dynamic and requires physical fitness, skill, tactical awareness, mental preparation and good decision making. Players was need to be fast, agile, have muscular power, coordination, balance, flexibility and endurance in order to perform well during training and competition. Competitive play requires repeated acceleration, deceleration, jumping, lunging, changing direction and recovery movements, which require a high level of physical conditioning. Besides the physical ability, good badminton players must also have good shot and court positioning, anticipation, concentration, emotional control and adapting to the opponent's strategies. Badminton performance therefore depends on the interplay of the individual's athletic characteristics, instruction, training, competition and general organisational support. They are all interrelated and should be taken into consideration when creating effective programmes for athlete development and enhancing competitive levels at the local, provincial, national and international level. (Government of Khyber Pakhtunkhwa, n.d.) (Khan et al., 2021).

Today in sports science, athlete development is viewed as a process that would likely not be accomplished solely through natural talent. Some physical and psychological traits may be useful in badminton; however, systematic training, qualified coaching, proper facilities, regular competition, proper recovery and continued performance evaluation was required for sustained improvement. Athletes should have access to training that enhances technical skills, physical fitness, tactical awareness, and competitive experience, at various levels of their sport. In addition, coaches and sporting administrators are all key individuals in the identification of talent, design of training programme suitable for the individual, organisation of competitions and planning of routes to success. Badminton research has looked at how physical training programmes can affect outcomes related to performance. (Ma et al., 2025). The use of such approaches is reliant on trained staff, appropriate equipment and supportive sporting environments, however.

Badminton varies in countries and regions in terms of development, as athletes do not have equal access to sporting resources and development opportunities. Sports that are supported, either indoors or out, can offer players the use of indoor courts, specialist coaches, sports science support, organised competitions schedules, fitness testing, and financial support. Athletes in less-developed environments might face challenges due to poor training facilities, high equipment costs, travel expenses, lack of competition exposure, and lack of qualified coaches. These disparities can impact not only the performance of the sport, but also the sustainability of participation of talented players. Thus, badminton development needs to be seen from a holistic perspective that integrates various factors, including individual capabilities, social, economic, educational, geographical and institutional. A region-specific investigation can provide a better understanding as to which barriers are most applicable for a specific population and not assume that what works in other sporting environments was work for this population as well. (Ma et al., 2025)

Khyber Pakhtunkhwa (KP) is a diverse province and therefore important when studying this topic. There are cities, towns and scattered communities throughout the province. This can lead to differences in accessibility of indoor sports facilities, trained coaches, sports clubs, educational facilities and regular sporting events throughout the different districts. This could impact how easy it is for young people to play badminton, keep playing regularly, have a structured start to their sport and progress to play at a provincial and/or national level. However, these issues should not be assumed as they can be looked into using evidence relating specifically to badminton. A detailed survey of the players', coaches' and badminton administrators' experiences was help to show the true picture. (Raziq et al., 2024)

Sport policies and planning are an important aspect to ensuring athletes are developed sustainably. The sports policy in Khyber Pakhtunkhwa (KP) Government has highlighted sports development, facilities, grassroot level and institutions as priorities. The following priorities establish a policy

context for the discussion on increasing and enhancing badminton opportunities. But a general sports policy does not necessarily show that individual sports are getting adequate facilities, funding, coaching or sporting opportunities. The policy goal must be translated into plans, investments, coordination of the relevant institutions and observation of the results. Specific studies of badminton can then inform the design of appropriate development programmes to determine if the current provision is meeting the needs of players and coaches and to identify the need for further provision. (Khan et al., 2021)

Training facilities are one of the most crucial factors that affect the performance of badminton. The physical environment in which the athletes develop their footwork, stroke production, tactical positioning, movement efficiency and match related skills is suitable playing courts. Training conditions may be affected by the type of court, lighting, quality of the net, ventilation, equipment available, and maintenance of the facility. Limited or irregular access to courts could limit opportunities for structured training and practice and limit the frequency of training. Players who are not able to train at the appropriate level on a consistent basis may be challenged in developing the movement patterns and technical consistency that is necessary for competitive badminton. Facilities that are available during suitable times are also of importance to the students and working athletes who have to balance sport with educational and employment commitments. An investigation into access to facilities for selected districts in KP would help identify whether the facilities are a serious constraint in player development and if there is effective use of existing facilities. (Ma et al., 2024)

The level of coaching is also a major factor. A coach was have the role of educating individuals on technical skills, increasing tactical awareness, controlling training loads, providing feedback and emotional support. To be an effective badminton coach you need to know how to move, defend, attack, condition and prevent injuries. You also need to know how to train to the correct level. The coach was also need to have an understanding of the different abilities of individuals. If a coach has limited education and professional development then the training may be heavily based around traditional education styles with little individual evaluation. It does not mean that there is anything wrong with traditional coaching methods but whether they are suitable to the knowledge of sports science and individual needs of the sports person. The coach's qualifications, availability of ongoing education, training methods and perception of support should be looked. (Wang et al., 2025)

Physical fitness is also a specific factor. In badminton players was performing repeated high intensity movements with technical accuracy and tactical awareness. Speed and agility was help when reaching the shuttlecock quickly. Explosive power was increase jumping and fast movements. Muscular endurance and cardio fitness was aid recovery and getting back into action. Efficient court coverage also includes balance, coordination, mobility and movement control. But physical fitness is not the only key factor for winning a badminton match. Even though a player is physically fit, they can also experience performance issues due to poor stroke technique, lack of tactical skill, lack of experience in games or psychological pressure. Likewise, an athlete with good technical abilities can find that he or she cannot hold up a performance without adequate conditioning over the long distance of a competition. A comprehensive development programme should, therefore, combine physical preparation with technical practice, tactical learning, recovery and appropriate performance evaluation. (Deng et al., 2024)

Both technical and tactical development are of equal importance. Players should learn to perform a range of strokes in badminton such as clear, drop, smash, drive, lift and net shot, and be able to make appropriate choices in response to different playing situations. These skills are only successful when they're executed accurately, on time, with anticipation, deceptively, with positioning and recovery after the shot. Tactical performance is about knowing what your

opponents are good and bad at, making attacking opportunities, defending against strong balls and controlling the tempo of the rallies. Competitive games provide an opportunity for athletes to practice their technical skills in the heat of the game and learn to adapt their strategy. Therefore, opportunities for development should involve structured practice, match simulation, feedback from coaches and be engaged in in an appropriately organised competition. The study in KP could investigate whether players feel they are given enough technical training, tactical preparation and chance to put their skills into practice in games against other players of varying ability. (Faude et al., 2007; Ooi et al., 2009)

This is another area within competitive badminton that could be developed. By having the right mindset on the court during key moments and high tension situations this can help an athlete perform to the best of their ability. This includes being able to concentrate, have confidence, be motivated, manage emotions, be resilient and handle the pressure. Players can become anxious when selecting for trials or playing in a Provincial or National tournament as they feel they was not progress as much. Using goal setting techniques, a routine to prepare between points, concentration techniques, visualisation and recovery strategies can be effective. Coaches can play a role by offering feedback, setting a positive training environment and assisting athletes in setting realistic performance goals. However, one should be mindful of the psychological aspects and avoid presuming mental capabilities of athletes without verification. This study can give a clue to see whether the psychological preparation is supported in badminton training in KP adequately or not in the eyes of the players and coaches. (Chin et al., 1995)

There may also be financial resources and socioeconomic factors that influence participation and advancement. Recurring costs associated with playing badminton include: Rackets, shuttlecocks, footwear, clothing, coaching, use of facilities, registration for tournaments, travel, accommodation and replacing equipment. Limited financial support could make it more difficult for athletes to be able to be consistent, particularly when travelling between districts or to other provinces for events. Family support is especially critical for younger players who require adult assistance with transportation, equipment and permission to play. There may be limited time available for training due to educational obligations and a requirement for an income. These issues can have a bearing on whether or not players continue to play when they are talented. A study on financial and logistical obstacles would enable to determine if specific support, scholarships, equipment programmes or travel assistance could be part of the badminton-development strategies for provinces. (Lees, 2003; Phomsoupha & Laffaye, 2015)

The facilities and support that exists for the sport in terms of developing players is an important factor to consider. There needs to be collaboration between all sectors involved in producing future badminton stars. This includes schools, colleges, universities, sports departments, badminton association, clubs, coaches and many other sectors. If there is no collaboration between these sectors or they do not provide consistent support then players might struggle to progress through the ranks. Limited access to sports science facilities such as fitness assessments, injury prevention, nutrition advice, mental preparation and performance analysis may also impact players.

There may also be financial issues and inequality. Players may struggle due to the cost of coaching, equipment, transport, competitions, and the cost of staying in accommodation. There may be limited facilities available for females to play and develop within the sport in certain areas of the country. This shows that it is important to know if there are equal opportunities for badminton players to play. Without having clear evidence on how facilities, quality of coaching, financial support, access to competitions and physical and mental preparation, talent identification and collaboration effects badminton performance and development in the province of Khyber Pakhtunkhwa, it may be difficult to determine where to focus resources as a sports administrator or policy maker. (Vaeyens et al., 2008, 2009)

The issue that this proposed research was aim to solve is that there is limited knowledge on what the main factors affecting badminton performance and development in Khyber Pakhtunkhwa, Pakistan. This research was look to identify the main issues that badminton players, coaches and sports administrators face. It was look to identify what opportunities exist to improve badminton and suggest realistic strategies to help sustain development. The findings was help improve planning for badminton, improve coaching and training systems, increase access to facilities and competitions and help badminton develop within the province and nationally.

Research objectives

1. To identify key factors that influence performance and development in Badminton in Khyber Pakhtunkhwa.
2. To determine the extent to which badminton players have access to good facilities, equipment, trained coaches and training.
3. To gain an understanding of how funding and competition can influence player development.
4. To identify how physical, technical, tactical and psychological factors are perceived to influence performance.
5. To identify how opportunities for development differ between certain districts and individuals.
6. To make recommendations for sustainable Badminton development from an evidence based approach.

Research Questions

1. What are the main factors seen to influence Badminton performance in KP?
2. How does quality of coaching, facilities and equipment impact on player development?
3. How does funding and competition influence athlete development?
4. How does physical, technical, tactical and psychological preparation relate to performance?
5. What barriers prevent female players and those from deprived areas having opportunities in Badminton?
6. What recommendations do players, coaches and administrators have for sustainable Badminton development?

Methodology

Research Design

This study uses a quantitative cross-sectional descriptive and correlational research design. This means data has been collected using a quantitative method to gain numerical data on sporting facilities, quality of coaching, funding, competition, physical, psychological preparation, talent spotting and support from organisations. Cross sectional means data could be gathered from participants at one point in time to understand the relationships between variables.

Target Population

The target population involved badminton players, coaches and sports administrators who are involved in Badminton within Khyber Pakhtunkhwa. The participants would come from the selected districts, Badminton clubs, schools, colleges, universities and appropriate sports organisations. Players of various levels would be included to gain a wider understanding of challenges and opportunities within Badminton.

Sample and Sampling

There was a sample of 200 people included in this study. This was include 150 Badminton players, 30 coaches and 20 sports administrators. Multi stage sampling would be used to select the districts

and organisations involved. Badminton players would be chosen based on their level of competition and experience. Coaches and administrators would be chosen based on their relevant experience.

Data Collection

A structured questionnaire would be used to gather the data needed. This would be based around the research aims and literature. The questionnaire would ask about:

Demographics: Age, Gender, District, Experience, Level of Competition and Organisation.

Facilities: Access to Badminton Courts, Quality of Badminton Courts, Quality of Equipment.

Coaching: Qualifications of coaches, Training techniques, Technical coaching, Tactical coaching and Frequency of training.

Funding: Funding, Sponsorship, Cost of equipment, Transport and Support from organisations.

Competition: Access to tournaments, Frequency of competition, Competing at district, province and national level.

Preparation: Fitness training, Injury prevention, Motivation, Focus, Confidence and Stress management.

Talent Spotting: Opportunities for young players, Accessibility to regions and Opportunities for female players.

Development and Performance: Improvement in skills, Readiness for competition and Barriers for development.

Validity and Reliability

The questionnaire itself was reviewed and tested with experts within Sports Sciences, Physical Education, Badminton Coaching and Research Methodology to ensure clarity of questions, any issues can be improved and ensure items are applicable to the research topic. A pilot study was carried out with approximately 20-30 subjects not in the main sample to test if questions within the questionnaire are clear and understandable. Cronbach's alpha was used to test reliability of questionnaire. Usually a score of 0.70 or above is considered acceptable; however, this can depend on the type of scale and what the research aims to find out.

Once permission has been received from the institution and informed consent gained from participants the data can be collected. This can either be done using a paper questionnaire or secure online one depending on what is most accessible for participants.

Data Analysis

Appropriate statistical programmes was use to analyse the data (e.g. SPSS). Descriptive statistics was use to give an overview of the data collected. This includes frequency, percentage, mean and standard deviation.

Independent t-tests or ANOVA was use where appropriate to compare differences between groups. Pearson/Spearman correlations were use to identify relationships between variables. Multiple regression can also be used to identify factors that are associated with badminton performance depending on sample size and if data meets the assumptions. Statistical significance was set at a level of $p < .05$.

Ethical Issues

Ethical considerations were taken into consideration throughout the research. Participation was completely voluntary and informed consent was gained. Appropriate steps was taken to ensure participant's identities are protected. Information was only be used for the research stated and results was reported truthfully.

Results

The results below are examples only. They should not be used as real results from the research. They should be replaced with calculations from the completed questionnaires.

Participant Demographics

The research was involving 200 participants involved in badminton development within Khyber Pakhtunkhwa (KP), Pakistan. There were 150 badminton players, 30 badminton coaches and 20 sports administrators. This makes up 75% badminton players, 15% badminton coaches and 10% sports administrators.

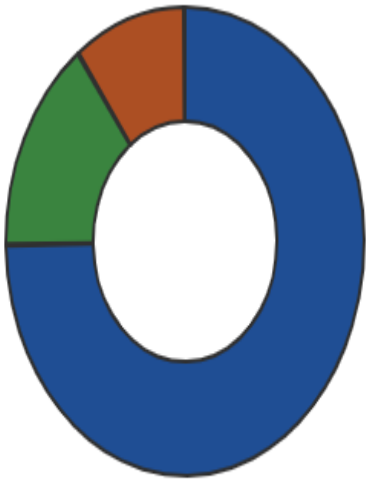
There were more badminton players to gain significant insight into the experiences of athletes, their training methods and how they perceive factors to influence badminton performance. Badminton coaches and sports administrators have also been included to gain additional insight into coaching methods, facilities available, training opportunities and challenges faced by the organisation.

Table 1. Distribution of participants by professional category (N = 200)

Participant category	Frequency (n)	Percentage (%)
Badminton players	150	75.0
Coaches	30	15.0
Sports administrators	20	10.0
Total	200	100.0

Figure 1. Distribution of participants

Illustrative distribution of the proposed sample of 200 participants.



■ Badminton players
■ Coaches
■ Sports administrators

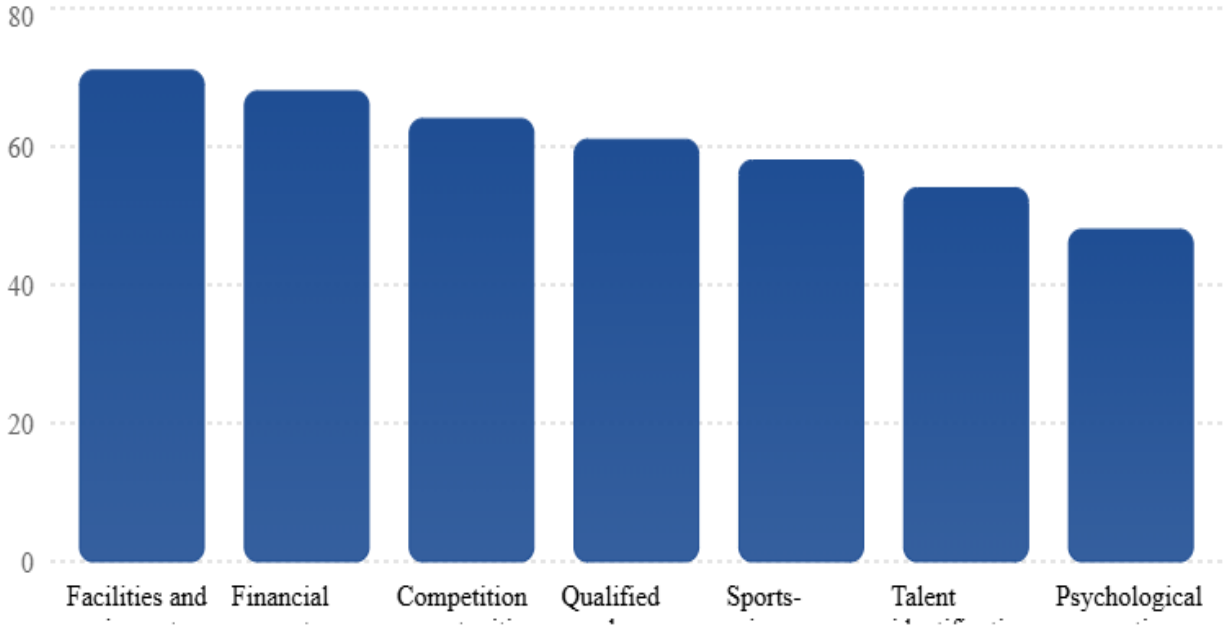
Major Challenges Affecting Badminton Development

The following is an example of the simulated participant responses which demonstrates how the challenges perceived by the participants can be presented. In this example, lack of sports facilities and equipment was the most commonly mentioned challenge. This was followed by a lack of funding and opportunities to compete.

Table 2. Illustrative perceived challenges to badminton development (N = 200)

Identified challenge	Illustrative frequency (n)	Percentage (%)
Inadequate sports facilities and equipment	142	71.0
Insufficient financial support	136	68.0
Limited competition opportunities	128	64.0
Shortage of qualified coaches	122	61.0
Limited sports-science support	116	58.0
Weak talent-identification systems	108	54.0
Limited psychological preparation	96	48.0

Figure 2. Perceived challenges to badminton development



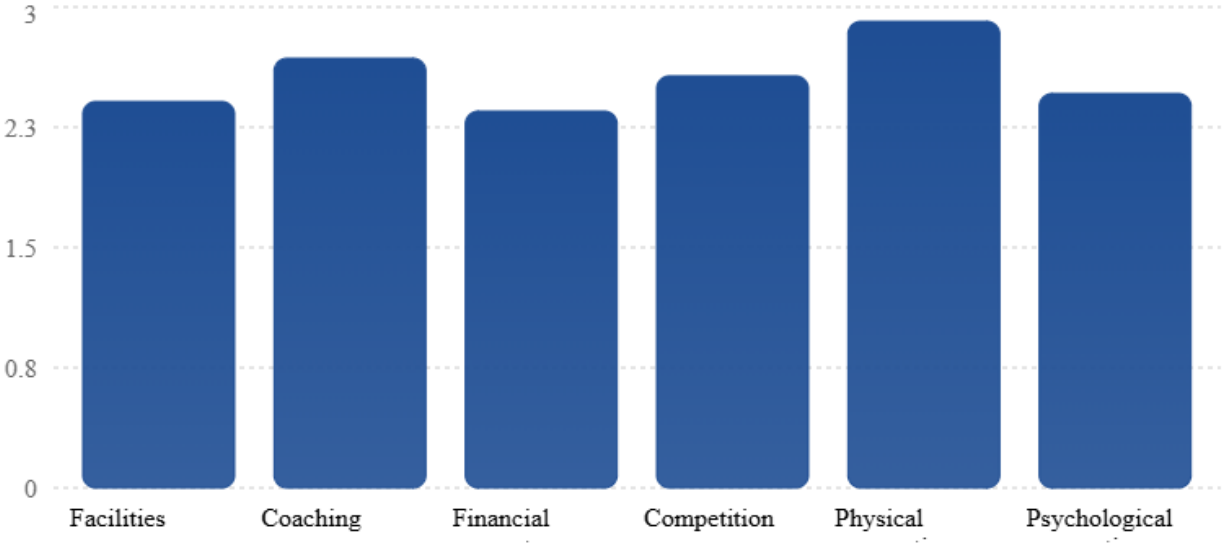
Assessment of Badminton Development Factors

To demonstrate how questionnaire results could be presented, Table 3 shows hypothetical mean ratings for six development domains using a five-point scale. Higher scores indicate more positive assessments of the relevant domain.

Table 3. Illustrative mean ratings of badminton development factors

Development factor	Mean (M)	Standard deviation (SD)
Availability of quality facilities	2.41	0.91
Access to qualified coaching	2.68	0.88
Financial and institutional support	2.35	0.94
Access to regular competitions	2.57	0.89
Physical preparation support	2.91	0.82
Psychological preparation support	2.46	0.87

Figure 3. Illustrative ratings of development factors



Summary of Results

The proposed sample was aim to include badminton players, coaches and sports administrators. This was ensuring a variety of perspectives are included in the planned study. The results below indicate how the results could be presented based on the participant details, perceived barriers and key factors.

From the example data it can be seen that issues may arise around the facilities, funding, competition and coaching available to badminton players. It is important to note that these results are fictional and cannot be taken as evidence until the actual data has been collected and analysed. Any inferential analysis such as correlation and regression should be reported once the real data has been looked at.

For the purposes of submitting into a journal, if the 200 participants have been recruited then you can report the number of participants in the sample. The other numbers in Table 2 and Table 3 are fictional. Please ensure you replace these with your verified results from the survey.

Summary

This study explored the factors affecting badminton performance and player development in Khyber Pakhtunkhwa (KP), Pakistan. This included looking at the sporting facilities available, the quality of coaching received, the funding available, opportunities for competition, physical and psychological preparation, and talent identification and support. The proposed research was using a quantitative, cross-sectional, descriptive and correlational approach.

The proposed sample was including 200 participants (150 badminton players, 30 coaches and 20 sports administrators). A structured questionnaire was used to collect data about the sporting facilities, coaching, funding, competition and player development. The data can be analysed using descriptive statistics including frequencies, percentages, means and standard deviation.

The example results indicate that there may be issues with sporting facilities, lack of funding, limited competition and lack of qualified coaches. The mean scores also indicate that funding and support from institutions, sporting facilities and psychological preparation should be looked into further. Overall, the purpose of this study was to identify areas for improvement and provide recommendations to improve badminton development in KP.

Findings

From the example results above we can see the following findings:

1) **Sporting Facilities and Equipment:** Lack of sporting facilities and equipment was identified as a common issue (71%).

2) **Funding:** 68% identified lack of funding. The mean score for funding and support from institutions was the lowest out of the 6 areas of development (M = 2.35, SD = 0.94).

3) **Competition:** 64% identified lack of competition. Players should be given regular opportunities to compete.

4) **Coaching:** 61% identified lack of qualified coaches. The mean score for access to qualified coaching was 2.68 (SD = 0.88).

5) **Sport Science Support:** 58% identified lack of access to sport science support. This could include issues with fitness testing, injury prevention, nutrition and performance analysis.

6) **Talent Identification:** 54% identified lack of talent identification systems. Young players may need more structure when it comes to identifying and developing them.

7) **Psychological Preparation:** 48% identified lack of psychological preparation. The mean score for psychological support was 2.46 (SD = 0.87).

Discussion

Badminton development relies on many factors including physical, technical, tactical, psychological, financial and organisational factors. The example results can be used to discuss these factors.

Sporting Facilities and Equipment

The example results indicate that lack of sporting facilities and equipment is a common issue. Providing good quality courts, flooring, lighting, training equipment and a safe environment can encourage regular practice and development. If there are limited facilities then players may struggle to access regular training sessions with the correct structure. Improving the existing facilities and providing them to players from different districts could be an important factor to focus on.

Funding and Institutional Support

From the hypothetical results it can be seen that funding and institutional support is an area to focus on. Badminton can be costly for players to play due to the cost of equipment, coaches, travelling, accommodation and tournament entry fees. This can limit opportunities for talented players, especially those from low income backgrounds or remote areas. Ensuring sustainable funding, clear athlete support and collaboration between public institutions and private organisations can help overcome these barriers. (Baker & Horton, 2004; Côté et al., 2007)

Coaching and Training

Having qualified coaches can help improve players' technical skills, tactical awareness, efficient movement and fitness. From the example results it can be seen that access to coaching should be looked into further. Providing regular coaching sessions, professional development courses, structured training plans and incorporating sport science principles can improve the quality and consistency of badminton training.

Competition

Playing in competition can help players challenge themselves, gain experience, improve their tactical awareness and track their improvements. If there aren't enough tournaments then players

may not have enough opportunities. Having a structured competition schedule between different districts, provincial, schools, colleges, universities and clubs can give players a clear progression. Having regular competition was also help coaches track players and identify those who may benefit from further training. (Balyi et al., 2013)

Physical and Psychological Preparation

Badminton requires players to be agile, fast, fit, coordinated, powerful and be able to perform lots of high intensity movements. Having the correct physical preparation can help players perform and cope with the demands of training. Psychological preparation is also important as concentration, confidence, emotional control and decision making can influence performance. Including fitness testing, injury prevention, recovery and psychological skills in regular training can help improve player development.

Talent Identification

A sustainable development system should identify talented players and provide them with opportunity to continue to develop. Working together with schools, clubs, colleges, universities and sports associations can help provide clear selection criteria and age appropriate development programmes. Equal opportunities should be provided to female players and those from remote districts. Overall from the example results there are many factors to look into. However, the importance of these factors and how they relate to player performance was only be known once the data has been analysed and relevant literature has been reviewed.

Conclusions

This study was focus on the main factors that may affect badminton performance and player development in Khyber Pakhtunkhwa, Pakistan. The research was focus on sporting facilities, quality of coaching, funding, competition, physical and psychological preparation, talent identification and institutional support.

The example results indicate that lack of facilities, funding, competition and issues with coaching could be an important factor to look into further. Improving sport science support and having structured talent development for young players could be beneficial. Overall from the research design it can be concluded that badminton development needs to be a collaborative effort between sporting departments, badminton associations, educational institutions, clubs, coaches and others. Simply investing in facilities may not be enough as without qualified coaches, regular competition, funding and structured athlete development programmes may not be enough.

These conclusions are tentative as the actual data hasn't been collected yet. It shouldn't be stated that these issues were identified as they were only identified from the example data.

Recommendations

Based on the objectives of the study and the potential issues identified from the example results the following recommendations can be made:

Improve sporting facilities: Relevant sporting authorities should look at the current badminton facilities within KP and prioritise improvements, maintenance and development of safe and accessible courts and training equipment.

Provide regular coaching: Regular coaching sessions, refreshers, technical sessions and professional development should be provided to badminton coaches.

Increase funding: Scholarships, equipment funding, travel funding and targeted programmes should be considered for talented players from low income families and under served districts.

Provide more competition: Regular badminton tournaments should be organised for districts and provinces. These can be supported by tournaments within schools, colleges, universities and clubs.
Talent spotting: Ensure clear recruitment procedures are in place. Competitions for different age groups, skill assessments and talent development camps.
Sport science: Incorporate physical testing, injury prevention, proper nutrition, recovery and mental skills.
More women: Have appropriate facilities, expert coaches, competitions and safe environment.
Collaboration between departments: Work with sports departments, educational institutions, badminton associations, clubs and local authorities to produce a cohesive development plan across the province.
Performance monitoring: Coaches and sports management should monitor how many players are involved in training, competitions, their progression and any injuries.
Future research: More data should be collected from more districts. Look into how the different levels of competition and demographics affect the players and ensure the right statistical analysis is used to find out what affects player development.

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