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A scoping review of the research supporting coaching practice in women's football – as the game grows the research strives to keep up

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ABSTRACT

The aim of this study was to scope the available peer-reviewed literature on competitive women's football, identifying and mapping the current research on supporting coaching practice in women's football. The study reviewed all women's football-related studies scoped by Okholm Kryger et al. (2021) for their relevance to coaching in women's football. Additionally, an updated search was performed from PubMed (1966–2023), PsycINFO (1967–2023), Web of Science (1900–2023), Scopus (1788–2023), SPORTDiscus (1892–2023) on 7 December 2023. The author, journal, title, and abstract of all included studies were scoped. Information extracted during the scoping process included: the population, playing level, age group, environment, study type, and geographical location of the research. A total of 373 articles were scoped. The publication topic most frequently researched was Performance Analysis – Physical (20%), followed by Performance Analysis – Technical/Tactical (18%) and Maturation/Talent Identification (13%). Most studies were focused on coaching senior players ($n = 207$, 55%) and elite football ($n = 189$, 51%). Despite the volume of research growing each year, it is noticeable that there are gaps in the research. Five topics only had a single figure number of articles (Teaching and Learning Strategies, Coach Education/Development, Socio-Cultural Experience's of Coaching, Coaching Philosophy, and Responsibilities/Role in Football). At present given there is a particular emphasis on certain playing levels, playing populations, and research topics, there is a dearth of information in certain areas. As such, researchers should work to ensure there is greater thematic depth as well as an increased volume of research in women's football.

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KEYWORDS

Female; girls; ladies; soccer; coach

Introduction

Women's football has seen rapid growth in recent years, with increasing investment and media coverage leading to the rising professionalisation of the game (Welford 2015) around the world. With this rising popularity, more people are watching and playing women's football than ever before (UEFA 2017) and this has contributed to the Fédération Internationale de Football Association (FIFA) identifying it as the single biggest opportunity for growth in football (FIFA). Despite such advancements and the opportunities which appear to be on the horizon for women's football, the future is not clear with growing calls for even more investment to placate the stagnation of women's football (FIFPRO 2020). As such, calls have been made for investment and support for players to be increased if current players and future players are to meet their potential (The Fédération Internationale des Associations de Footballeurs Professionnels [FIFPro] World Players Union) (FIFPRO 2020). In order to support the development of women's football, The FIFA Women's Football Strategy in 2018 identified three key objectives: Grow participation of

women playing soccer, enhance the commercial value of the game, and build the foundations of the women's football ecosystem by modernising the management of the game (FIFA 2018). In order to achieve these objectives, FIFA recognises the critical impact that coaches play and cite recruitment and development of coaches as being essential to enhancing women's football (FIFA 2021). Additionally, it is significant to note that attempts are being made to ensure coaches are educated with content and examples drawn from both the men's and women's game (UEFA 2021).

In a similar manner to the recent development seen in player development and the professionalisation of women's football, coaching in women's football is experiencing a shift toward professionalisation with clubs and organisations being encouraged to adopt more formal business-like approaches to the facilitation and delivery of coaching programmes (International Council for Coaching Excellence ICCE, Association of Summer Olympic International Federations ASOIF 2013; Taylor and Garratt 2010). Meanwhile, coaching roles within elite sporting environments are becoming more

complex with additional responsibilities such as leading multidisciplinary teams of practitioners (Drust and Green 2013; Steel et al. 2013). The complexity of the role of the coach has been further enhanced for coaches who work in elite sporting environments (e.g., national team coaches and coaches of teams within elite national leagues such as the England Women's Super League, the National Women's Soccer League in the USA, and the Liga F in Spain) who are increasingly working as the head of a multidisciplinary teams which include roles such as a sport psychologist, strength and conditioning coach, sports medicine and performance analyst as well as assistant coaches (Drust and Green 2013; Steel et al. 2013). Although it should be noted that the innovation of a coach leading a multidisciplinary team may not be new in environments such as elite men's football, it is a developing factor for coaches who work outside of the very pinnacle of sport. While leading a multidisciplinary team may primarily be the responsibility of coaches in the upper tiers of elite women's football, it is important to note that coaching practice, regardless of playing level, should be informed by various areas of knowledge. These include pedagogy, psychology, skill acquisition, and physiology (Collins et al. 2022; Taylor et al. 2023). Despite the convergences seen between the professionalisation of coaching and of women's football as a sport, coaching within women's football has received limited attention in comparison to coaching in men's football from sport scholars around the world. Research in the field of sport coaching is growing (Gilbert and Trudel 2004; Griffo et al. 2019; McCullick et al. 2009), and the role of the coach is recognized as complex, requiring the integration of multiple skill sets and areas of knowledge (Cushion 2007; Lyle and Cushion 2007). Therefore, further investigation into coaching within women's football seems both important and timely.

Consequently, the current study aims to identify and map the contemporary literature available in supporting coaching practice in women's football. In doing so, this scoping review aims to build on work from Okholm Kryger et al. (2022), who carried out a review of the literature available in women's football and highlighted that the principle topics of publication were in medicine (injury), strength and conditioning and physiology. While previous scoping reviews have focused on specific elements of coaching, such as coach burnout (Olusoga et al. 2019) or team dynamics (Hague et al. 2021), thus far, none have scoped the range of studies available investigating aspects of coaching in women's football (for example, studies focusing on performance analysis, talent identification and teaching and learning strategies). This study therefore aims to scope all available peer-reviewed literature on coaching in women's football, at any competitive level and in each FIFA language (English, French, German, and Spanish). Subsequently, this scoping exercise seeks to understand the breath, or lack thereof, of academic literature on coaching in women's football and will allow limitations to be identified and recommendations for future research topics to be highlighted.

Methods

In building on the work of Okholm Kryger et al. (2022) and the scoping review of studies on women's football, the Open Science Framework (osf.io/gp7fb) was pre-registered as the

protocol for this scoping review. The study used both the best practise guidelines for scoping reviews by Levac et al. (2010) and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist (Tricco et al. 2018). The first search was conducted on 15 December 2019 and scoped for articles on women's football (Okholm Kryger et al. 2022). Outputs from the original search were then collected and an updated search was carried out on the 7 December 2023 scoping solely for coaching in women's football themed articles.

Study selection

Following the database searches, all retrieved studies were downloaded to Mendeley (Elsevier, Amsterdam, Netherlands), where they were cross-referenced, and any study duplicates were deleted. Independent screening then took place of the titles and abstracts in light of the pre-established inclusion/exclusion criteria (Table 1) in Rayyan QCRI (Qatar Computing Research Institute, Doha, Qatar) by five reviewers (CM, NE, AB, ND and SE). Reviewers met at the start, midpoint and late stages of the reviewing process to discuss uncertainties related to study selection and to refine the inclusion/exclusion criteria (Table 1) where needed, as suggested by Levac et al. (2010). An independent reviewer not involved in the initial reviewing process (KK) was consulted to resolve discussions. If the title/abstract did not identify the language of the publication and/or type of football played, post-hoc full-text checks were performed. Additionally, the journals in which the articles were published were evaluated after the search to ensure studies were all subject to a peer-review process.

Data extraction

The author, title, journal, and abstract of all included studies were exported from Rayyan QCRI into an Excel Spreadsheet (Microsoft, Albuquerque, New Mexico). The reviewers independently extracted, where possible, the population, playing level, age group, environment, study type and geographical location of the research from the title and abstract. Furthermore, inductive analysis was performed by the reviewers to identify the publication topic(s). The topics used to categorise the publication topic(s) were developed through an inductive research approach. This process was based on the inductive category development process outlined by Dowling, Leopkey and Smith (2018) in their scoping review on governance in sport. This approach allowed not only for the identification of patterns in the published literature to take place but also highlighted if/where there were any gaps evident in the literature. The publication topics were developed through an inductive and iterative process in which the deliberate choice was made to not use a pre-existing framework from within the sport coaching literature as it was believed this would have limited the findings of the study. Additionally, there was a concerted effort to scope the widest possible number of articles pertaining to coaching in women's football which meant some overlapping topics which merge into coaching were included (e.g., talent identification). This reflects the broad role coaches play in women's football where it is not uncommon for coaches to hold additional

Table 1. Operational definitions of the terms used to classify the coaching research topic.

	Coaching topic	Descriptor
Coaching Occupation	Coach Education and Development	Assessment of or reflection on official coaching education or additional learning strategies towards the development and enhancement of expertise by coaches.
	Career Opportunities, Barriers, Pathways	Descriptions of the career advancement/development prospects afforded to coaches concerning opportunity and challenges.
	Coaching Knowledge, Attitude, Behaviour	Assessment of coaches' knowledge, attitude towards or behaviour around a set topic.
	Coaching Philosophy	Coaches' values and approaches represented by coaching behaviours and actions.
	Responsibilities and Role in Football	Definition of coaching role, responsibilities, and hence, skill sets required.
	Socio-Cultural Experiences of Coaches	Insights into coaches or observers of coaches' perceived experiences.
Performance Analysis	Physical	Systematic observations of physical training or match play demands to provide feedback to enhance performance and improve decision-making. Primarily delivered through internal and external workload measures.
	Technical/Tactical	Systematic observations of technical and tactical elements to provide feedback to enhance performance and improve training or match play decision-making. Primarily delivered through video analysis systems post-event, biomechanical and computerised notation systems and/or the use of in-event systems.
Player Development	Psychological	The education or reflection on psychological interventions, including, but not limited to, team and player-specific development strategies in leadership, motivation, self-confidence and stress and anxiety coping.
	Physical	The education or reflection on physical interventions, including, but not limited to, team and player-specific development strategies. These do not include physical conditioning normative testing, physical conditioning interventions, or validation of physical conditioning protocols as this is covered in Okholm Kryger et al. (Cushion 2007).
	Tactical	The education or reflection on broad strategies and decision-making by teams within a match environment including the identification of patterns of play, key events, location of events and the players involved. These may involve declarative tactical knowledge, procedural tactical knowledge, procedural tactical knowledge in the cognitive domain and procedural tactical knowledge in the motor/practical domain.
	Technical	The education or reflection on technique considering the mechanical efficiency and motor/practical detail of football-specific skills carried out by players.
	Teaching and learning Strategies	The socially and organisationally bounded learning process in training and performance including the creation and management of the environment and interactions that bring this to life.
	Training Planning	The pre-determination of practice, that captures the sequencing, level and nature of activity needed to achieve performance goals. Commonly composed on micro, meso or macro scale.
	Inter Coach-Player Relationship	Situational analyses where a coach and athlete's feelings, thoughts, and behaviours are inter-related.
	Maturation & Talent Identification	The process of recognising key factors of the current young footballer that help in predicting maturation and success over time and hence their potential of becoming elite players.

responsibilities beyond those of coaches operating in men's football who may find their responsibilities more refined and focused on the technical/tactical aspects coaching alone. The inductive process which led to the creation of the list of publication topics incorporated a critical discussion within the research team which includes individuals who have a range of practical, research, and teaching experiences in the broad space of coaching in women's football. As such, the list of publication topics used to categorise the literature was refined and amended to reflect the in-depth discussions which took place, and which allowed for the broadest possible scoping of articles within the expansive topic of coaching in women's football across participation spectrums. Definitions for publication topics were taken from common terminology from UEFA, FIFA, and The FA as well as academic research into the role of the coach (Lyle and Cushion 2007) and the knowledge of a coach (North 2017). Reviewers (CM, NE, AB, ND, SE, and KK) met at the beginning to analyse 20 (5% of the sample) articles and discuss challenges and uncertainties related to criteria and

definitions used. This led to refinements being made, where needed, to the extraction strategies as suggested by Levac et al. (2010). Standardisation of level of play and player age grouping followed the definitions applied by Okholm Kryger et al. (Tables 2 and 3; Okholm Kryger et al. 2022).

Data charting

The data were compiled in a single Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA), and data were plotted with Tableau (Mountain View, Seattle, WA) using line charts (e.g., publication year), and bar charts for categorical data (e.g., topic, geographical location). Categorical data of topic, population, playing level, age group, environment, and geographical location were also assessed using multilevel content evaluation, which was charted using bar charts (e.g., topic/publication year, population/topic). It should be noted that for multilevel content evaluation, studies could have been assessed as being

Table 2. Explanation of level of play grouping applied.

Level of play	Descriptor
Recreational	Any amateur recreational but competitive level of women's football
College	Player competing for a university or college
High Level	Highly skilled but below best national or international level
Elite	Highest level of women's football. Represented as national team and best national league.
Highly trained grouped as high level; High performance grouped as high level; Professional grouped as elite; Semi-professional grouped as high level; Second or third best division grouped as high level.	

Table 3. Explanation of player age grouping applied.

Age group	Descriptor
Pre-senior	Players below the age of 16.
Senior	Players competing in senior football are 16 years or older.
Veteran	Players clearly stated as playing at an age-restricted level beyond senior.
Retired	Players no longer competing.

Adolescent grouped as both pre-senior and senior; Championship/Cup/Top Leagues grouped as senior; College/University grouped as senior; High school (Y12–17) hence grouped as both pre-senior and senior; Junior can refer to junior/senior football team or high school/college junior hence not identified (N/A); National team (incl. Olympics) grouped as senior; Professional and semi-professional grouped as senior; Scholastic not identified (N/A); Youth grouped as both pre-senior and senior.

members of multiple topics, population, playing level, age group, environment, and/or geographical locations.

Results

The combined search of the five mentioned databases yielded 2,376 returns from PubMed, 301 returns from PsycINFO, 5,035 returns from Web of Science, 4,088 returns from Scopus, and 2,271 returns from SPORTDiscus (Figure 1). After removal of duplicates, 7,671 titles and abstracts were screened (Figure 1). A total of 279 studies remained after the title and abstract screening. After checking for duplicates from the original search, a total of 247 studies were included. These were added to the 189 originally scoped articles from Okholm Kryger et al. (2022), summing to a total of 373 articles scoped for this study (Figure 1).

Research attention growth

It was evident that research attention in coaching in women's football is growing rapidly. This growth is particularly apparent in the decade between 2012 and 2022, where rises can be seen from single figure publications prior to 2012 then increasing to a peak in 2022 with 90 studies being published (Figure 2).

Research attention has diversified across research topics (Figure 3) with time. The earliest studies carried out in the 1990s focused on aspects of coaching in women's football such as Player Development – Technical, Player Development – Mental and Inter Coach-Player Relationship. More recently, research has captured a range of topics with studies classified as Performance Analysis – Technical/Tactical and Performance Analysis – Physical garnering an upward trajectory in the amount of research taking place each year.

Populations and geographical locations

The majority of studies included content for coaching senior players ($n = 255$, 68%), whilst 24% ($n = 88$) included pre-senior content and 21% ($n = 78$) did not identify the age group focus. Most studies focused on elite football ($n = 198$, 53%), whilst 8% ($n = 28$) focused on high-level football, 12% ($n = 43$) on college/university football, 11% ($n = 40$) on recreational football, and 19% ($n = 72$) did not declare the level of play.

From a geographical location perspective, 12% ($n = 45$) assessed data from elite international tournaments hosted by FIFA or IOC; meanwhile, 38% ($n = 81$) were conducted within the Union of European Football Associations (UEFA)

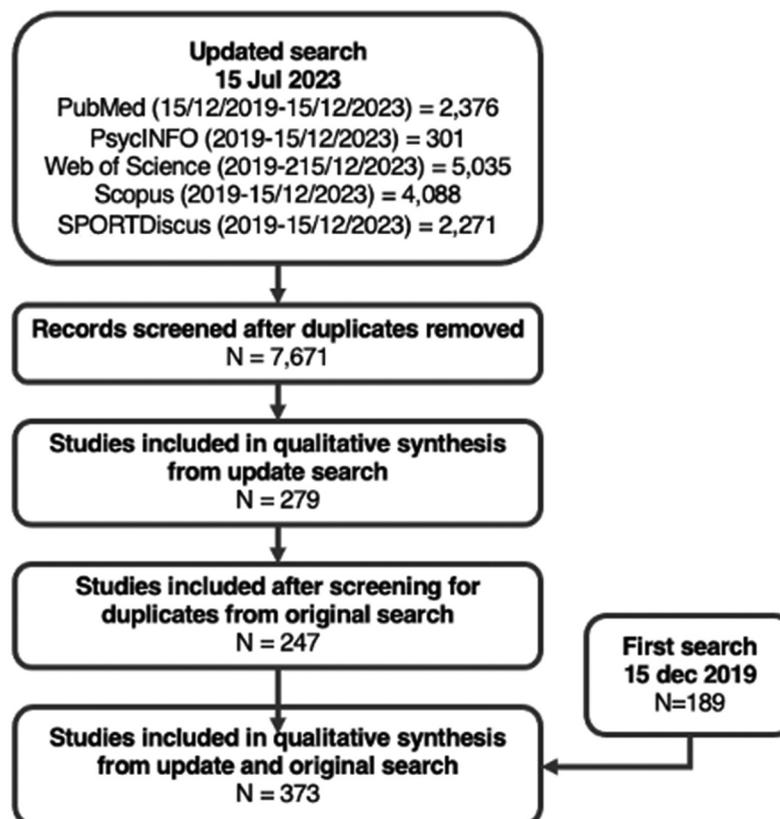


Figure 1. Flow diagram.

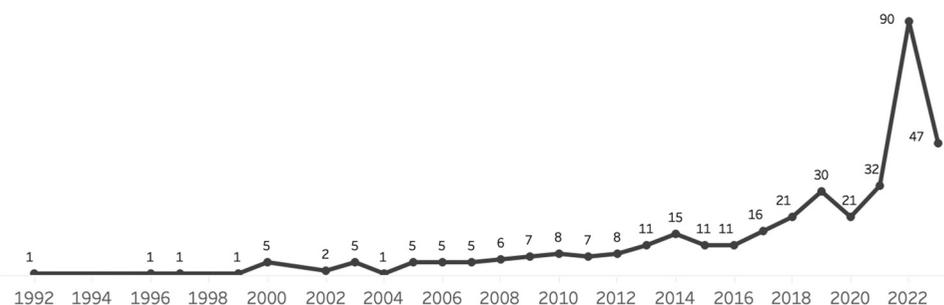


Figure 2. Number of studies per year of publication.



Figure 3. Number of studies per year of publication per coaching in women’s football topic.

confederation area (Figure 4). Of the research that took place within the UEFA confederation area, 54% (n = 93) of the research attention was spread over five countries as well as 19 studies assessing multiple UEFA-registered countries (Figure 4). UEFA was followed by the Confederation of North, Central America and Caribbean Association Football (Concacaf) with 14% (n = 53) of which the majority focused on the USA (92%, n = 49). Less attention has been given to the Asian Football Confederation (AFC; 5%, n = 20) and the South American Football Confederation (CONMEBOL; 5%, n = 18) and Confederation of African Football (CAF; <2%, n = 6). No studies

were tracked to originate from within Oceania Football Confederation (OFC; n = 0; Figure 4).

Coaching topic focus

The retrieved studies covered an array of topics within coaching in women’s football (Figure 5). The topic with the largest number of studies was Performance Analysis – Physical (20%, n = 73) followed by Performance Analysis – Technical/Tactical (18%, n = 67), and Maturation and Talent Identification (13%, n = 50). These three topics covered 51% of all studies, emphasising a

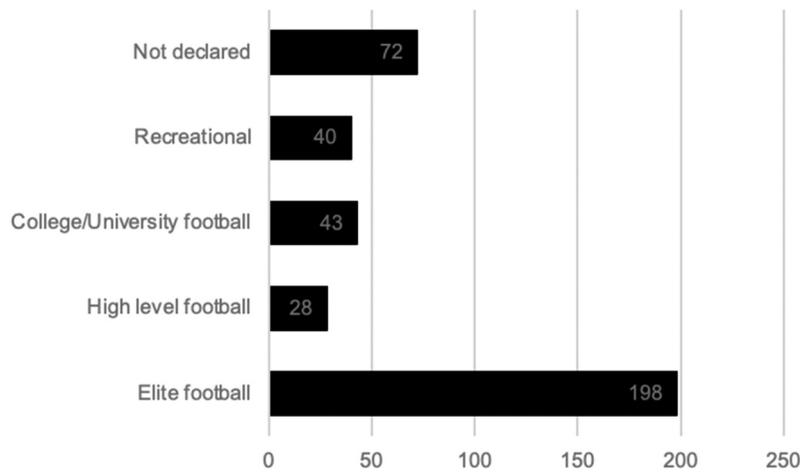


Figure 4. Number of studies per confederation/location.

AFC	AFC	1
	AUSTRALIA	11
	CHINA	1
	INDONESIA	1
	JAPAN	2
	MALAYSIA	1
	SOUTH KOREA	3
CAF	CAF	1
	NIGERIA	1
	RWANDA	1
	SOUTH AFRICA	2
Concacaf	Concacaf	1
	CANADA	3
	USA	49
CONMEBOL	CONMEBOL	2
	BRAZIL	15
	CHILE	1
UEFA	BULGARIA	1
	DENMARK	6
	ENGLAND	19
	FINLAND	3
	FRANCE	5
	GERMANY	11
	GREECE	1
	HUNGARY	1
	ICELAND	1
	ISRAEL	1
	ITALY	2
	LUXEMBOURG	1
	NETHERLANDS	1
	NORTHERN IRELAND	2
	NORWAY	15
	POLAND	1
	PORTUGAL	5
	ROMANIA	3
	SCOTLAND	2
	SPAIN	26
SWEDEN	10	
SWITZERLAND	1	
TURKEY	1	
UEFA	19	
WALES	1	
FIFA	WORLD CUP	43
IOC	OLYMPIC GAMES	2
UNKNOWN	UNKNOWN	120

Figure 5. Coaching topics addressed in scoping review.

discrepancy in the research attention between topics. In contrast, coaching occupation focused research on Coaching Occupation – Coaching Philosophy ($n=1$) and Coaching Occupation – Responsibilities/Role ($n=1$) covered less than 1% of studies. The overarching topic of Coaching Occupation (Career Opportunities, Barrier, Pathway; Coaching Knowledge, Attitude and Behaviour; Coach Education/Development; Coaching Philosophy; Responsibilities/Role in Football; Socio-cultural Experiences of Coaches) was covered by 16% ($n=60$) of the studies, while Performance Analysis (Physical and Technical/Tactical) has 38% ($n=140$) of the studies and Player Development (Tactical, Mental, Physical and Technical) has 29% ($n=108$). As such, this scoping review highlights that there is a lack of studies which may be of particular relevance in terms of coaching as an occupation in women's football. Additionally, there is a lack of research focused on Inter Coach-Player Relationships (5%, $n=17$), Training Planning (6%, $n=23$), and Teaching and Learning Strategies (1%, $n=5$).

Discussion

The aim of this study was to scope all available peer-reviewed literature on coaching in women's football, at any competitive level. This review sought to highlight the volume of academic literature, the limitations in the scope of studies, and recommend future research topics to be discussed. Based on the systematic search that was carried out, 373 studies were extracted, and the analysis highlighted 16 topics. The number of articles included within the scoping review reflected a lower number than was included within the broader scoping review on women's football from Okholm Kryger et al. (2022; $N=1,634$) but was significantly higher than previous reviews on the sub-areas of women's football (e.g., social sciences, humanities and management disciplines, $N=117$ studies [24] and match-play characteristics, $n=69$ studies [26]).



Figure 6. Coaching topic breakdown in scoped articles.

Topics covered in the literature

The studies identified 16 topics, ranging from Performance Analysis – Physical to Player Development – Tactical, Training Planning, Coach-Player Relationship, and Teaching Strategies (Figure 6). Notably, three topics – (i) Performance Analysis – Physical, (ii) Performance Analysis – Technical/Tactical, and (iii) Maturation and Talent Identification – accounted for over 50% of the studies. These areas reflect essential knowledge for coaches, as outlined by Abraham and Collins (2011), and highlight the importance of the broad knowledge needed for coach development (Taylor et al. 2023). Five topics had fewer than ten articles (Coach Education/Development $N=9$, Socio-Cultural Experiences $N=6$, Teaching Strategies $N=5$, Coaching Philosophy $N=1$, Responsibilities/Role in Football $N=1$), pointing to significant gaps in research. Regionally, most research came from UEFA (38%) and Concacaf (14%), while AFC, CONMEBOL, and OFC had minimal representation (0%–5%), revealing a lack of research in specific geographical areas. Literature primarily focused on senior women’s football and elite levels, with limited exploration into girls’ and recreational football, despite these areas offering significant participation opportunities and potential for research growth. This uneven distribution indicates a clear need for more comprehensive studies to take place in underrepresented regions and playing levels, offering rich avenues for future exploration. These gaps not only highlight the current limitations in coaching research in women’s football but also underscore the importance of expanding studies in less represented contexts. Such research could ensure a broader understanding of coaching dynamics and challenges across various levels of the women’s football landscape being developed.

Topics receiving less research attention

This scoping review revealed that there were disparities in the research attention across various topics. While there is a growing body of literature on the broad subject of coaching in women’s football, a gap exists in key areas that may be

essential for the development of effective coaching practices. The topics with the lowest number of articles were Coach Education/Development, Socio-Cultural Experiences of Coaching, Teaching and Learning Strategies, Coaching Philosophy, and Responsibilities/Role in Football. Together, these five topics represented a small fraction of the total research on coaching in women’s football, revealing significant gaps in literature.

The lack of studies in Coach Education/Development could be highlighted as being particularly concerning, given the importance of effective coach training for enhancing the quality of coaching in women’s football. As noted, the studies on coach education in women’s football are limited ($n=9$), underscoring a gap in research that could help improve the development of tailored coach education programmes for this context. Given the increasing professionalisation of women’s football (Welford 2015; FIFA), understanding the effectiveness of various coach education models and their adaptability to the specific needs of female athletes is critical. Research in this area could lead to the development of coach education programmes that are specifically designed for coaches working in women’s football, which may improve coaching quality at all levels (UEFA 2017).

The topics of Socio-Cultural Experiences of Coaching as well as Teaching and Learning Strategies remain underexplored in contrast to other areas. Understanding how cultural attitudes, gender norms, and societal expectations impact coaches’ working in women’s football may be important for creating more inclusive and supportive coaching environments. Investigating the specific challenges coaches in women’s football face could provide valuable insights into how to support and retain individuals in coaching roles (FIFA 2018; FIFPRO 2020). Likewise, the pedagogical strategies used to coach in women’s football is somewhat underexamined. Understanding the most effective teaching methods for female players, particularly in how they learn and process information, could benefit the development of more effective coaching techniques (McCullick et al. 2009; Steel et al. 2013). Finally, the almost total absence of research on Coaching Philosophy and Responsibilities/Role in Football (each with $n=1$) is of

note. A coach's philosophy and understanding of their role within a specific environment can directly influence how coach behaves within a given environment (Gilbert and Trudel 2004; Lyle and Cushion 2007). As such, increasing the amount of research in these areas could provide a deeper understanding of how coaches' values, beliefs, and roles shape team dynamics and player development. It would also help to define what constitutes the responsibilities and scope of a coach's role in women's football, clarifying if/how these elements differ from those in male football or other sports (Cushion 2007; Taylor et al. 2023).

These gaps in research could be argued to not only hinder the development of coaching in women's football but also limit our understanding of how coaching practices can be optimised for female players. The limited research in these areas underscores the need for further studies to explore these gaps. Given the increasing investment in women's football (Okholm Kryger et al. 2022; UEFA 2017), it is important to address these gaps and expand research to ensure that coaches are equipped with the knowledge and skills needed to meet the unique challenges of coaching in this field.

Application of literature to coaches practice – the problems

The role of the coach is well established as being complex and multi-faceted (Lyle and Cushion 2007), similarly the knowledge of a coach appears to be broad and wide ranging (North 2017). Meanwhile strong administrative skills, the need for extensive technical and tactical knowledge as well as an expansive pedagogical knowledge have all been highlighted as prominent features of applied coaching practice which can help a coach become more effective (Borrie and Knowles 1998; Martens 2012). Furthermore, previous research has highlighted the importance of coaches possessing a range of knowledge including sport-specific knowledge, pedagogical knowledge, and the 'ologies (e.g., psychology, physiology, sociology biomechanics and nutrition) (Abraham et al. 2006). However, this scoping review has emphasised that there is a lack of research across a broad range of topics associated with coaching in women's football. In particular, there appears to be a lack of studies on the areas of coaching knowledge that have been highlighted as being significant by North (North 2017) including a lack of studies which focus on learning, planning and process, self as well as social content (North 2017). Within this scoping review, these areas of knowledge have been captured under the topics of Training Planning (6% $N=23$), Coaching Occupation – Socio-Cultural Experiences of Coaches (<2% $N=6$), Teaching and Learning Strategies (1% $N=5$) and Coaching Occupation – Responsibilities/Role in Football (<1% $N=1$). While it would be naive to suggest that this scoping review is representative of the knowledge of coaches in women's football, given the recent calls for further research to take place into women's football (Okholm Kryger et al. 2022) and the increasing professionalisation of coaches, highlighting a lack of empirical research across the different types of coaching knowledge within literature appears pertinent. Furthermore, this lack of literature within certain parameters of coaching knowledge is perhaps concerning given the

significance of a research practice gap which in this instance appears to show there is a lack of empirical research across the range of knowledge a coach is expected to possess. If coach education is to become guided to a greater extent by contemporary research, then acknowledgment needs to be made to the lack of literature available across the spectrum of coaching knowledge.

Implications for future research

This study recognised the amount of literature categorised as coaching within women's football is limited with some topics more dominant in the research landscape in contrast to others. As such, Performance Analysis – Physical, Performance Analysis – Technical/Tactical and Maturation/Talent Identification had over 50% of the studies scoped in this review. Although the amount of literature on coaching in women's football appears to be generally increasing annually, the depth and breadth of this research is questionable when considered across research topics, competitive levels, age groups and geographic locations. Previous studies have focused more generally on identifying the range of literature available in women's football (Okholm Kryger et al. 2022) or on specific elements of coaching such as coach burnout (Olusoga et al. 2019) or team dynamics (Hague et al. 2021). In contrast, this study aimed to scope all available peer-reviewed literature in English, French, German, and Spanish, on coaching in women's football at any competitive level. As such, an increased understanding of the amount of academic literature on coaching in women's football has been developed. However, given the increasing popularity, investment in and professionalisation of women's football (Welford 2015), this scoping review appears to be a pertinent place to offer a call to action to expand the research carried out in coaching in women's football. We aim to contribute to this research agenda by coordinating a research project in coaching in women's football relating specifically to identifying the research needs and interests of coaches in women's football. Utilising qualitative research methods with academics and practitioners both operating in and researching women's football, this research will further allow gaps in contemporary literature to be identified, as well as an action plan for future research to be developed.

Strengths and limitations

Our scoping review followed the PRISMA-SR Checklist (Tricco et al. 2018) as well as the recommended best practice guidelines for scoping reviews by Levac et al. (2010). Our study searched five databases and scoped for peer-reviewed studies written in four languages. Yet, it must be acknowledged that studies not retrievable from these databases are not included in this study. Additionally, studies not identifying the sport and/or the sex of the athletes were excluded during the screening process. A large proportion of studies also lacked clarification on playing level and age group assessed in the study. The authors manually classified the studies into topics, which although screened by three independent reviewers may have introduced bias. Finally, it was not possible to identify the geographical origin of all the studies published and caution should therefore be made when generalising across cultures.

Conclusion

This study was the first to scope all available peer-reviewed literature in English, French, German, and Spanish, specifically on coaching in women's football at any competitive level. A total of 373 studies were included and analysis highlighted 16 topics. The number of articles included within the scoping review was significantly lower than the number which was included within the broader scoping review on women's football from Okholm Kryger et al.'s study (Okholm Kryger et al. 2022) ($n = 1634$). However, despite the appearance of their being a range of topics covered in the articles, it is significant that three topics (Performance Analysis – Physical, Performance Analysis Technical/Tactical, and Maturation/Talent Identification) had over half of the studies included within the scoping review. In contrast, five topics only had a single figure number of articles (Coaching Occupation – Coach Education/Development, Coaching Occupation – Socio-Cultural Experiences of Coaching, Teaching and Learning Strategies, Coaching Occupation – Coaching Philosophy and Coaching Occupation – Responsibilities/Role in Football). Subsequently, this scoping exercise emphasises both the range of research on women's football and also the lack of depth of academic literature on coaching in women's football. Consequently, with the volume of research growing year on year, the research agenda needs to respond to the gaps in research to ensure that there is a depth of research across the different aspects of knowledge it is anticipated coaches require.

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Data availability statement

Data available on request from the authors and will be provided via the data repository Figshare <https://figshare.com/s/bf74406f1988f785f2ab>.

Author contribution statement

AMcC and KK conceived the original idea. CM, AB, NE, AMcC, and KK developed the original idea. CM, AB, NE, ND, SE, and KK CM supported the paper scoping and data extraction process. CM composed the initial manuscript draft. CM, AB, NE, ND, SE, AMcC, and KK provided comments on and contributed towards the writing of the initial manuscript draft. CM, AB, NE, ND, SE, AMcC, and KK provided comments on and contributed towards the writing and editing of the final manuscript draft.

Ethics statement

No ethics were required due to the nature of the study undertaken being a scoping review of published literature only.

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