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Perspectives on the role of nutrition in influencing academy soccer player development and performance: A qualitative case study of key stakeholders from an English category one soccer academy

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ABSTRACT

This study aimed to explore player and stakeholder perceptions of the role of nutrition in influencing the development of male academy soccer players. Semi-structured interviews (28 ± 13 mins in length) were conducted with 31 participants from an English category one academy, including players (Youth Development Phase, YDP: $n = 6$; Professional Development Phase, PDP: $n = 4$), parents/guardians ($n = 10$), coaches ($n = 3$), sport scientists ($n = 3$), physiotherapists ($n = 3$), and catering ($n = 2$). Via reflexive thematic analysis, data demonstrate an apparent lack of understanding and awareness on the role of nutrition in influencing player development, especially in relation to growth, maturation and reducing injury risk. Players highlighted the influence of their parents on their dietary behaviours, whilst parents also called for education to better support their sons. Notably, players and stakeholders perceived that the daily schedule of an academy soccer player presents as "too busy to eat", especially in relation to before school, and before and after training. The results demonstrate the necessity for the co-creation of player and stakeholder specific nutrition education programmes as an initial step towards positively impacting the nutrition culture associated with the academy soccer environment.

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Dietary behaviours; youth football; nutritionist; parental influences

Introduction

The purpose of a soccer academy is to develop the technical, tactical, physical and psychosocial capabilities of young players (Wrigley et al., 2012). The ultimate aim is to produce players to represent their respective first-team squad and/or to potentially profit from their sale (Elferink-Gemser et al., 2012). In this way, academy players are exposed to a formalised and structured coaching programme where players progress through distinct development phases as they transition through the academy pathway. Within the English academy system, such phases are referred to as the foundation phase (FP: under 9–11 years old), youth development phase (YDP: under 12–16 years old) and professional development phase (PDP: under 17–23 years old). In relation to physical development (Hannon, Coleman, et al., 2021), reported (across three different soccer academies) that the overall training load progressively increases as academy players transition through the academy pathway. Moreover, players may experience similar absolute loading patterns (e.g., total weekly duration of activity and distance covered) as adult players from the English Premier League (EPL), albeit at a time when they are not yet biologically mature (Anderson et al., 2016; Brownlee et al., 2018; Hannon, Coleman, et al., 2021; Stables et al., 2023).

To support such high training volumes alongside the energetic cost of growth and maturation, it is becoming increasingly recognised that nutrition should be a key component of an academy player's developmental programme. Indeed, in using the gold standard doubly water method, recent literature has reported that individual players across the academy pathway (i.e., from U12 to U18) may present with an absolute total daily energy expenditure (i.e., 3000–5000 kcal.day^{-1}) that is comparable to (or exceeds) (Hannon et al., 2021; Stables et al., 2023) previous observations from adult players of the EPL (Anderson et al., 2017). In addition, Stables et al. (2023) also recently demonstrated that academy players (within the U13 age group) typically expend 750 kcal.d^{-1} more than age matched soccer players playing at "grassroots" standard.

Despite such high training volumes and energetic demands, however, it is often reported that academy players "under-fuel" (Naughton et al., 2016), especially in relation to the acute period before, during and after training sessions (Stables et al., 2022). Although the negative outcomes associated with "under-fuelling" are often considered from a performance perspective, a more concerning outcome for adolescent athletes is the potential impact upon growth and maturation with a specific risk to skeletal structures. Indeed, players who consistently present with chronically low energy availability (LEA, often defined as < 30 kcal·kg FFM^{-1}·day^{-1}) (Loucks & Thuma, 2003) may experience negative symptoms associated with relative energy deficiency in sport (RED-S) syndrome (Mountjoy et al., 2018). Symptoms may present as reductions in skeletal bone accrual, increased risk of stress fractures, delayed sexual maturation, impaired growth and maturation of tissues and organs, and suppression of the immune system (Loucks et al.,

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2011), all of which can be detrimental to long-term player development. In this regard, we also reported that the most prevalent injury occurring in academy players during periods of peak height velocity (from England, Europe and South America) was growth related injuries in the anatomical location of the knee, lower back, sacrum and pelvis (Hall et al., 2022).

The exact reasons underpinning the prevalence of sub-optimal dietary practices in academy soccer players are not yet clear. Across a variety of sports, Bentley et al. (2021) investigated the barriers and enablers of elite athletes' adherence to nutritional guidance, reporting the importance of food planning skills and a good working relationship between the athlete and nutritionists, as well motivational factors such as the desire to enhance performance and maintain an appearance appropriate for the athletic persona. However, much of the existing literature on youth soccer nutrition has been explored via quantitative methods that do not necessarily examine contextually rich accounts of the lived experiences of adolescents in high-performance settings. This approach may be remiss given sport participation is a biopsychosocial activity (Armour & Chambers, 2014), and moreover, psychological and social factors may additionally influence the dietary behaviours of youth soccer players. In a recent qualitative investigation, Carter et al. (2022) explored the perspectives of the barriers and enablers to nutritional adherence in professional male academy soccer players, by interviewing players ($n = 13$), nutritionists ($n = 12$) and coaches ($n = 10$) from 2, 12 and 10 professional clubs in the UK, respectively. The authors used the COM-B model to understand the barriers and enablers of soccer players' dietary behaviours to facilitate the development of evidence-based behaviour change strategies via the Behaviour Change Wheel (Michie et al., 2011), and in doing so reported that participants perceived that nutritional knowledge, cooking skills and training venue food provision were key barriers and enablers to facilitating adherence to nutritional guidelines. This study demonstrates the value of exploring nutritional practices from the perspectives of those with lived experiences (i.e., of players themselves) and those who work alongside them in the training facilities (i.e., support staff). In this regard, O'Donnell et al., (2023) recently conducted a qualitative case study to explore the perspectives on RED-S from the perspective of athletes, coaches and medical professionals working in the sport of netball. This mode of research demonstrates that nutritional experiences are not solely individuated, but reciprocally influenced by interactions with others across social contexts (Overdorf & Silgailis, 2005).

There is a need for further transdisciplinary understanding of how youth soccer players experience nutritional practices, whereby this type of research approach allows for the interaction of in-depth and reflective personal insights between participants' perspectives, hence providing a greater understanding of the social context. To the authors' knowledge, the role of nutrition in influencing the performance and development of academy soccer players across both the YDP and PDP has yet to be explored from the perspective of multiple stakeholders. Although the perspectives of the barriers and enablers to nutritional adherence have previously been qualitatively explored in players of the PDP (Carter et al., 2022), there is a need to explore the perspectives of stakeholders in the YDP given that this is when players experience their most rapid phase of growth and maturation (Hannon et al., 2020), their significant energy demands (Hannon et al., 2021), and the apparent lack of support provided to this phase (Carney et al., 2022).

With this in mind, the aim of the present study was to qualitatively explore player, caregiver (parent/guardian/host-family), and club staff perspectives of the role of nutrition in influencing the performance and development of male academy soccer players from the YDP and PDP. It is hoped that the present data may inform the creation of stakeholder specific education and behaviour change interventions which improve the nutrition practices of the academy player.

Methods

Research philosophy and positionality

A relativist ontology and constructivist epistemology, which assumes that reality is relative according to how each individual experiences it (Sparkes & Smith, 2014), comprised the philosophical underpinnings to this paper. This epistemological approach assumes that reality is subjective (Ormston et al., 2014), whilst recognising that prior experience and current social contexts may influence one's perceptions. It is therefore the researcher's role to support the participant's understanding of their subjective realities, and subsequently interpret and communicate these appropriately. This approach considers the role of the first author as the performance nutritionist working at the club, acknowledging that his identity within the social context may influence what he observes and therefore impact upon conclusions.

Sample

To gain detailed insights into the multiple perspectives of nutrition in academy soccer, players, caregivers (i.e., parents, guardians, host-families), and staff from a variety of roles from one English soccer academy of category one status were purposefully invited to take part in this study. This approach is comparable to previous qualitative explorations of nutrition practices in professional sport (Carter et al., 2022; Logue et al., 2021; Martin et al., 2017; McHaffie et al., 2022) and allow for a broad understanding of the soccer context in question. A single case study soccer academy was studied to develop a detailed and nuanced view within the context of the club, allowing for the development of new insights (Lobo et al., 2017), of which some may be generalisable to other soccer academies. Participants invited to take part in the study were contacted through a gatekeeper at the club via an email containing a participant information sheet. All players ($n = 10$) recruited were aged above 12 years old and played in either the YDP ($n = 6$; 13.8 ± 1.2 years) or the PDP ($n = 4$; 17.5 ± 0.6 years). Parents or guardians ($n = 10$) also took part, all of whom currently live with a player from the YDP ($n = 7$) or PDP ($n = 3$). Staff members invited to the study all currently work full-time at the club in varying roles. These roles included coaches ($n = 3$), sport scientists ($n = 3$), physiotherapists ($n = 3$), and catering staff ($n = 2$). This sample allowed for an in depth understanding of nutrition in academy soccer. Ethical approval was granted by

the Liverpool John Moores University Ethics Committee (22/SPS/028) and, as condition of this, further details of the participants are not provided to avoid direct identification. All participants provided verbal and written informed consent before completing the interview, including child assent and carer consent forms for those under the age of 18 years. Consistent with qualitative research (Sparkes & Smith, 2014), the sample size was not decided a priori, but determined by the analysis, with recruitment stopping for each participant group when any additional data did not contribute to the identification of any new themes.

Procedures

To address our aims, we undertook a qualitative investigation as a means to understand the experiences and perceptions of individuals within complex social environments (Sparkes & Smith, 2014). The sampling, data collection, and data analysis procedures outlined below sought to provide a credible and transparent account of the understanding of the role of nutrition for the development and performance of academy soccer players. Semi-structured interviews were undertaken with all participants. An "open-ended" (Gall et al., 2003) format was adopted. Questions were presented in a conversational and informal manner, to allow for maximal voluntary contribution and detail (Lincoln & Guba, 1985). For example, initial questions began with phrases such as "What are your thoughts on … ?" and "In your opinion … ?". Subsequent "probing" (Gratton & Jones, 2004) via naturally occurring follow-up questions allowed for further depth in responses to be acquired (Turner, 2010). This format of enquiry allowed participants the liberty to express their experiences and opinions with minimal constraints and to self-navigate towards areas they felt significant (Braun & Clarke, 2013). The interview was centred on exploring the participants' perceptions on the role of nutrition in influencing the development (e.g., growth and maturation) of academy soccer players. The questions outlined in Table 1 were devised with the study aims and findings of previous literature in mind (Carney et al., 2022; Carter et al., 2022; Hannon et al., 2020; McHaffie et al., 2022). Pilot interviews were conducted with two academy players and four staff members from the same club to determine the viability of the interview questions. The wording of some questions was subsequently reviewed and adjusted following feedback from these pilot interviews. Pilot interviews were not included as part of the analysis.

All participants were invited to take part in the interview at the club's training facility. If they were unable to attend the training facilities at the club, participants were offered the option of taking part in the interview via online software (Microsoft Teams) with cameras on. All interviews were recorded and subsequently transcribed verbatim. The interviewer was acquainted with the academy soccer subculture having worked as a performance nutritionist in the industry for the previous five years and within the current club for two years. This could be viewed conversely due to the potential for them to lead the interview based on their own personal views and experiences, however this was deemed advantageous due

Table 1. Player interview guide and aims (wording was adjusted for parents and stakeholders).

Questions	Prompts	Aim
Domain 1. Participant background and demographic.		
Can you tell me about your journey playing football so far?	How long played for, number of academies, time at current club.	Understand their background and experiences.
Domain 2. Perceived academy specific performance nutrition priorities and their impact on player development and performance.		
Thinking about since you started playing football, what and/or who has influenced your understanding of nutrition for football?	Personal interest, experience working with nutritionists, player feedback, other members of staff (e.g., coaches, physios, sport scientists), parents, friends.	Ascertain where their understanding of nutrition has come from.
What are your thoughts on the role of nutrition for your performance and development. Is it important, and if so to what extent and what are the potential benefits?	Energy availability/fuelling significant energy requirements, fuelling training and games, recovering from training and games, growth and maturation, body composition, hydration, injury prevention and rehabilitation.	Understand their perceptions of the importance and role of nutrition.
Of the potential benefits of nutrition you mentioned, do you think any are more of a priority for you as an academy footballer?	Why do you think this/these are the priorities? Does this differ for *the other phase* (YDP/PDP).	Understand what areas of nutrition they perceive to be most important and why.
Are you aware of any potential negative implications related to players not following the appropriate nutritional advice?	Energy availability, growth & maturation, injuries, Lack of energy.	Understand their level of knowledge.
Domain 3: Nutrition associated challenges for academy soccer players.		
Do you think any of the priorities previously mentioned are more of a challenge to academy players?	In what areas do you struggle to optimise your nutrition, time/schedule demands, why?	Understand what nutritional challenges they face and why.
Do you think you need support to overcome these challenges?	From who? Why? How?	Understand what support they believe they need.
From your experience, has there been anything you have seen to be helpful and why?	Work with previous nutritionists, education sessions, food and drink provision.	Understand what they perceive to be helpful.
Do you think the phase you currently play in (YDP/PDP) receives sufficient nutrition support?	Differences in food and drink provision, individualised support, group education.	Understand their perceived nutritional support requirements for their stage of development.

to his fluency in their jargon and informal terminology (Cook et al., 2014).

Data analysis

All interviews were recorded and transcribed verbatim into a word document. A reflexive thematic analysis approach was adopted (Braun & Clarke, 2019), with a six-stage process of thematic analysis (Braun & Clarke, 2006) employed: (1) familiarisation and immersion of the data was achieved by repeated reading and listening of the data during the transcription process; (2) a systematic process of initial coding allowed for any relevant content to be identified; (3) initial codes were re-examined to identify patterns in the data and generate initial themes; (4) identified themes were reviewed for their appropriateness by the research team by comparing them to the raw data; (5) following agreement of the themes, they were refined, defined and named; and finally, (6) data extracts from each theme were used to provide a concise, coherent, logical, non-repetitive, and interesting account of the story the data tell, both within and across themes (Braun & Clarke, 2006).

Methodological trustworthiness and rigor

Several procedures were undertaken to ensure scientific rigour. This included the recruitment of a varied sample and by piloting the interview questions. Members of the research group independent of the primary author also acted as a critical friend to provide critique of the data analysis. In doing so, the team sought to provide credible and transparent perceptions of the role of nutrition in the development and performance of academy soccer players. The data analysis process demonstrates high rigour as all authors engaged in open and challenging discussions and were collaborative and reflexive throughout (Smith & McGannon, 2017). The worthiness of this research topic was justified given the gap in evidence and practice in this population (Hannon et al., 2021; Naughton et al., 2016; Stables et al., 2022). The research team also acknowledged the need to take steps towards detachment during key stages of the study (Elias, 1956), particularly given the lead authors role as the nutritionist at the club. To support this, the final author was not familiar with the club or involved in the interview process, acted as a "critical friend" and independently reviewed the interview schedules and transcripts (Smith & McGannon, 2017). However, we do acknowledge a degree of involvement given the lead authors role within the club and their personal interest in this topic. This was deemed advantageous due to their "insider knowledge" of this topic and social context. The findings and discussion section that follows presents four themes and relevant quotations from the data, allowing readers to interpret the data in their own way and consider the transferability of findings to their own context (Smith, 2018).

Findings and discussion

Via a reflexive thematic analysis of the interviews (mean: 28 min; range 11–37 min), four themes were established, that present a narrative of the understanding of the role of nutrition on player development and performance in academy soccer. These themes are presented below, and player and stakeholder quotes are presented verbatim to support the narrative.

Theme 1: Food for thought! Lack of understanding on the role of nutrition in supporting player development

When participants were initially asked about their understanding as to how nutrition may impact player development, a range of perceived benefits were identified that included fuelling, body composition, hydration, and "health". Despite such sentiments, however, our data suggested that participants typically presented with a lack of understanding of how nutrition can benefit player development, let alone the relevance of nutrition for the academy player. In this regard, there was a view that players "just eat" with no purpose or development goal in mind.

PDP Player 4: I don't know because I used to just eat . . . . because I used to get fed at school, eat whatever that was there . . . .and then eat whatever was here . . . and then just have a little bit at home often. Never really with a priority in mind, I wouldn't even know what it should have been.

Consistent with this insight, support staff also suggested that players do not eat with a purpose in mind and are unaware of the impact of nutrition on their performance and development as an academy soccer player. This was especially evident in relation to "fuelling" the energy demands of training.

Sport Scientist 3: I think there's a lack of awareness from the players of why we give them food, so like the amount of food I see thrown in bins, or they have one bite, it's almost like a luxury to them. But what they don't view food as is fuel, it's just food to them.

This sentiment was echoed by a coach working in the YDP:

Coach 3: I think the priority at say U13s or U14's is just getting the boys to actually eat, we have boys who just do not understand the importance of fuelling their bodies.

Meanwhile, a physiotherapist working in the PDP suggests that physical opportunity is not a challenge for the players in this phase, whilst continuing the notion that the players lack awareness and require educational support:

Physiotherapist 1: I think there's a bigger problem throughout academy football where they're not eating enough and fuelling for the demands of the sport. Are they aware of how much they need to take on? Fuelling shouldn't be a problem because they're given enough opportunity. The players are almost the biggest problems themselves rather than what food is potentially offered. I think it's then educational and them wanting to buy in to it and do it properly, that's the biggest hinderance.

The discussion of "fuelling" and "under-fuelling" continued to the potential impact upon growth and maturation, a crucial component in the physical development of an academy player as they transition between development phases of the academy pathway. Despite the documentation of increasing energy demands during this time, however, when probed on the impact of nutrition on growth and maturation, participants did not readily consider the concept that a player's daily energy intake should increase as they get older. For instance, YDP Player 3 stated *"I'm not sure about that. No idea. I guess maybe"* and when asked about the differences between the YDP and PDP, Catering 1 said *"I think it's the same yeah, from any age. I think the only difference I presume, was the difference between male and female. I'd say the same nutritional priorities for the 13s or 14s as I would the U23s"*. This lack of awareness was also present in a coach working in the YDP:

Coach 1: I wouldn't know to be honest. But taking a guess, I'd say if you've got a player going through growth and he's not eating correctly then that is going to have some sort of impact.

Similarly, a member of the medical department also made suggestions but remained unclear as to exactly how growth and maturation impacts the nutritional requirements of this population:

Physiotherapist 3: Yes, but I wouldn't know to what extent . . . . my gut would say that you probably need more fuel in that group. Just because obviously you're gonna have like higher metabolic rate with growth and maturation and the turnover of cells. But that's a guess and putting two and two together there and it might be five.

In those cases where participants did acknowledge that players may "need to eat more" as they get older, there was an apparent lack of understanding as to the "how" and "what" may need to change in terms of practical nutrition strategies.

YDP Parent 2: I'm pretty sure it would impact his nutritional requirements, but I wouldn't have a Scooby Doo* how or what I should be doing about it. (* colloquial term for "clue").

YDP Parent 7: I mean, I guess they're growing more when they're younger right, so maybe they'd need more then to fuel that growth. But I wouldn't know what.

The negative consequences of presenting with chronically low energy availability has recently been discussed in the literature using the RED-S model (Mountjoy et al., 2018) and may include: reductions in skeletal bone accrual, increased risk of stress fractures, delayed sexual maturation, impaired growth and maturation of tissues and organs, and suppression of the immune system (Loucks et al., 2011). However, despite the fact that academy soccer players are vulnerable to injury during the growth spurt (Hall et al., 2022; Hill et al., 2022; Johnson et al., 2020; Monasterio et al., 2021), the potential causative link between sub-optimal energy intake and injury (especially bone related injuries) had not been considered by the participants in this study. This is especially important when considering that a recent randomised control trial from our group demonstrated that sub-optimal carbohydrate intake before, during and after training (comparable to the habitual practices of academy players) increases markers of bone resorption when compared with consuming carbohydrate intake according to the recommended guidelines (Stables et al., 2023). When asked if there are any potential negative implications to not following the appropriate nutritional advice on bone health, YDP player 2 simply stated *"I have no clue"*, with this lack of awareness extending to a parent as well:

YDP Parent 2: I hadn't contemplated whether any of his growth-related injuries could possibly be related to his diet . . . kind of got alarm bells going in my head now.

A coach who works in the YDP, a time in which players are vulnerable to growth related injuries, was also unaware of the impact of nutrition in this context:

Coach 3: I don't really know if there's any correlation to like injuries or anything like that from a lack of nutrition or under fuelling as such.

This view was also held by a member of the sport science department:

Sport Scientist 3: I don't know if I think under fuelling is directly linked to growth and maturation related injuries, because they're mainly bony injuries. I genuinely don't know.

Overall, Theme one demonstrates that players, caregivers and members of staff within this study lack the awareness and understanding of how nutrition can impact player health, development and performance. With this in mind, practitioners working in academy soccer should consider delivering education to promote awareness and understanding. Future research is warranted to establish the appropriate content and format of delivery for the dissemination of educational content within academy soccer environments.

Theme 2: Who told you that? The influence of caregivers, the internet and unaccredited members of staff

When talking about who and/or what has influenced their understanding of nutrition for soccer players, players highlighted the influence their caregivers have in this regard. For instance, a PDP player mentioned the influence his parents had on his views of nutrition from a young age:

PDP Player 3: I guess the very first thing you find out about nutrition is from your parents telling you to eat the right stuff. So, I guess my parents influenced me when I was younger but now as I'm older I would say nutritionists.

A player from the YDP also reported that their mum has an impact on his understanding of nutrition from a monitoring standpoint:

YDP Player 3: Probably my mum, yeah, she's very big on that side of things. And she's always like, looking out for like, for what I eat and stuff. Yeah. Whenever I eat something bad she's like, "you shouldn't be eating that".

These insights support previous findings in which parental eating habits have been shown to influence nutrient intake in young children (Oliveria et al., 1992). For example, the availability and accessibility of fruit and vegetables have been reported to be significant predictors of fruit and vegetable consumption in children with low preference to these foods (Cullen et al., 2003; Kratt et al., 2000). When the players are not at the club's training facilities, parents typically provide their children with the physical opportunity to emulate their dietary preferences, given that they are responsible for selecting the food choices of the family diet (Savage et al., 2007). This notion was present from the perspective of YDP Parent 7, who when asked about where they had acquired their understanding of nutrition for soccer players replied, *"I guess I'm relying on what I would eat or what I want to eat myself"*. This was also reported by YDP player 1 who stated *"My mum cooks everything for me. I'll occasionally cook but very occasionally, but my mum cooks everything for me"*.

Given the significant influence parents have on the players' diets, it would seem appropriate that parents were able to acquire the sufficient nutritional knowledge from accredited sources (i.e., club nutritionist) to be able to positively influence their child's diet. However, we have previously reported that academies in England will typically only have one nutritionist responsible for providing a service to the entire academy, with only 64% of Category one clubs employing a nutritionist on a full-time basis (Carney et al., 2022), as was the case in the present club. This inevitably has implications for the level of service provided and can lead to caregivers acquiring information from elsewhere. For instance, YDP Parent 7 commented on the use of the internet for seeking nutritional support when talking about what influenced their nutritional understanding, stating that *"Influences are mostly just like Googling"*. In addition to caregivers, the use of the internet (or "googling") has previously been reported amongst adult athletes across a range of sports to obtain sources of information regarding nutrition (Devlin & Belski, 2015; Trakman et al., 2019; Vazquez-Espino et al., 2022). Given the wide range of informational sources of nutrition available on the internet and the likelihood for misleading, inaccurate and potentially harmful information, this source of information should inevitably be used with caution. However, the academy players studied here also reported the use of the internet and social media to acquire nutrition knowledge, with PDP Player 2 stating *"So sometimes if I want to find something out I'll just Google it or I'll watch a video on YouTube"*, whilst PDP player 1 suggested that this would be a good way to *"educate yourself and understand what is good for you and what's not good for you"*.

The practice of utilising sources of information that are not informed by an accredited nutritionist was also reported by club staff when reflecting on their time at previous clubs. For instance, a physiotherapist suggested that unaccredited members of staff are often required to deliver nutrition support in the absence of a nutritionist:

Physiotherapist 1: Sometimes in the clubs that there wouldn't be a designated nutritionist then you kind of, you pick up, you pick up on the knowledge from like the S&C (strength & conditioning) coach, for example, or they take it upon themselves because there wasn't a nutritionist.

This experience was also reported by a coach:

Coach 3: Well, I think sports science staff play a big role in it. Like not every club has an assigned nutritionist, so often the sports scientist takes over that role. And they're the one that's providing sort of the workshops, the communication around nutrition, both to the players and to parents.

Such insights agree with a previous audit from our group (Carney et al., 2022) where we reported that sport scientists (as a more "generalist" practitioner) are often utilised to deliver nutrition support in the absence of an accredited nutritionist. Indeed, only 64% of clubs in England (with Category one status) employed nutritionists on a full-time basis, whilst 34 clubs from categories 1–4 relied on members of the sport science and medicine department to deliver nutrition support (Carney et al., 2022). Although the club within this study does employ a nutritionist on a full-time basis, these insights should be taken into consideration given that some of the practitioners working at the club may have prior experiences of having to deliver unaccredited nutrition support to academy players and may at times be tempted to continue to do so in an informal manner.

Theme two therefore highlights the influence of caregivers, the internet and members of staff who lack the necessary accreditation to provide nutritional advice, whilst perhaps providing reasoning for the lack of understanding and awareness previously reported in Theme 1. These sources have the potential to provide limited and inaccurate nutritional information, whilst previous research has demonstrated the potential harm of disseminating erroneous nutritional advice (Cockburn et al., 2014). Nutrition education programmes should therefore consider delivering to all key stakeholders as well as players, with the aim of facilitating positive influences on the diets of academy soccer players.

Theme 3: Too busy to eat! The busy lives of academy players and the impact on their dietary behaviours

There was a general consensus amongst all participants that the biggest nutritional challenge for academy players, notably players in the YDP, is the intensity of their daily schedules such that they are "too busy to eat". When Physiotherapist 1 was asked about their perspective on the challenges academy soccer players may face, they stated *"The YDP, who've got school*

and stuff, but then coming here, it's long days for them, do they even have time to think about food?". This was also expressed by a player currently in the YDP:

YDP Player 2: One of the hardest things about being an academy footballer when it comes to diet is like the long days you have, or like you sometimes forget to eat. I forget sometimes to eat at school. So sometimes I don't eat from half seven in the morning until eight o'clock at night. I just . . . I just don't think of it unless I'm starving. When you're doing stuff you're not that hungry.

Another player in this phase reported the challenge of time in the context of pre-training:

YDP Player 3: We arrive here from school and have to get changed and start training in half an hour and sometimes I'm starving because we haven't eaten since lunch at school.

When reflecting on their time in the YDP at this club, a current PDP player also highlighted this sentiment:

PDP Player 4: Most days I was waking up at seven and getting back home at like eight. You don't really have time to think about food to be honest and there wasn't always time to eat.

A coach currently working with players in the YDP further suggests that not only is it a problem for players having the time to think about food, but also difficulties within their daily schedule in finding appropriate and sufficient time for the players to consume food:

Coach 3: It is quite a big period of the day when we are expected to provide the food rather than the parents. So, I think some of the difficulties with that is there's so much going on in the day that you have to find time and enough time for them to eat.

The concept of "too busy to eat" is especially relevant in relation to fuelling *before* and *after* training, a time when we have previously reported that players throughout the academy pathway report sub-optimal nutritional practices and specifically, that of carbohydrate intake (Stables et al., 2022). The reasons underpinning sub-optimal dietary practices at these specific times are likely due, in part, to the timing between school ending and the start of training. In this way, players may resort to consuming "food on the go" where the travel schedule now presents as a "habitual mealtime". When reflecting on their time in the YDP, this concept was also suggested by a PDP player to be the case in the context of post-training:

PDP Player 4: I used to be starving on the way home, so where I used to change trams I'd go to Sainsburys (a local supermarket) there, I was still hungry when I left training as sometimes there wasn't enough time for me to grab food or eat as much as I'd have liked.

As an extension of the discussion regarding the perceived challenges of the demanding schedule of an academy soccer player in the YDP, all participants also commented that breakfast was a particularly hard meal to consume due to a perceived lack of time before the start of the school day:

YDP Player 3: So I don't eat breakfast because I don't have a lot of time. Maybe I wake up at half seven and I've got to leave by quarter past eight so that's forty-five minutes. I've got to have a shower, get ready. It's busy, it's just non stop. Sometimes people forget about food.

This notion was supported by a current PDP player when discussing the challenges they faced whilst being in the YDP:

PDP Player 1: When I was in the YDP, some days I'll be in such a rush in the morning to get to school, I won't have breakfast.

When parents were asked to provide insights from their perspective on this apparent lack of time in the morning, YDP Parent 5 stated *"He (their son) doesn't seem to eat before he leaves in the morning . . . he always says he needs more time in the morning"*, whilst another parent agreed with the players that time is a challenge when it comes to preparing and providing breakfast before school and in doing so suggests it is there responsibility:

YDP Parent 1: He leaves the house very early in the morning. So, it's like I have just such a short window for him to eat something so early that he doesn't really . . . . is not really hungry yet or something. So that's a little bit of a problem for us always because we want him to have a healthy breakfast like that. But it's more like a rush in the morning, you know.

These findings suggest that parents and players do not understand the importance of consuming breakfast and are unaware of time efficient breakfast options. This is consistent with previous data reported within elite male youth soccer players (Naughton et al., 2016), in which the researchers reported a skewed daily distribution of macronutrient intakes, with both absolute and relative energy intake at breakfast being significantly lower than at lunch and dinner. More specifically, a lower protein intake at breakfast was reported in the YDP when compared to the PDP, with protein intake at breakfast being derived from the addition of milk to a predominantly carbohydrate-based option (e.g., cereal, bread), a behaviour which is common in children of these ages in the general population (Alexy et al., 2010).

Overall, theme three highlights the demands of an academy soccer player's typical day and the potential time constraints and the associated impact on players' dietary behaviours. The proclaims from players and parents that a lack of sufficient time in the morning to consume breakfast suggests that perhaps they 1) do not understand the importance of taking in nutrients at this time of day and 2) are unaware of practical, time-efficient solutions that are sufficient for the energy requirements of an academy

soccer player. This would indicate the need for the provision of education to both parents and players to support them with this challenge.

Theme 4: Considerations for stakeholder specific support

In reviewing the findings from themes one, two and three, there appears to be an obvious requirement to educate not only players, but also caregivers and club staff, who in turn, can collectively impact the nutritional behaviours of academy players. Indeed, all stakeholder groups called for targeted education programmes that were bespoke to each stakeholder, and also customised to the requirements and challenges of the academy player. In this regard, key stakeholders advocated for more player education at a younger age, with Coach 3 stating *"I think the earlier that we can sort of educate the players around the importance of nutrition the better"*, whilst Physiotherapist 3 suggested *"They need education in those formative years"*. A parent of a player in the YDP also proclaimed the need for players to receive educational support to promote understanding, whilst suggesting that this may provide a source of motivation to implement better dietary behaviours:

YDP Parent 5: I'd also say a bit of education for him really, so he understands the importance of it and why he needs to do it. I guess that might encourage him a bit more.

The call for the delivery of educational support during the players' "formative" years has been previously reported (Carter et al., 2022), though it is noteworthy that academies in England often prioritise the delivery of performance nutrition services to players in the PDP (Carney et al., 2022). The reduced level of support provided to players of the YDP is a particular cause for concern, considering that this is the phase when players typically undergo their most rapid phase of biological growth and maturation (Hannon et al., 2020). The players themselves also appeared to recognise the increasing "service provision" as they got older.

PDP Player 2: I'd say the difference from the PDP to the YDP is, I think it's just more talked about, like pushed on to you, if that makes sense? Like you've got more people telling you how important it is. When you're in the youth phase you don't think it's as important as it actually is.

Other players from the PDP also provided insights on their previous perceptions of nutrition when they were younger, suggesting that they were not aware of the importance of nutrition and the impact it may have on their performance:

PDP Player 3: Me, being in that phase (YDP) I would never have thought, right, I'll eat healthy and it'll be good. When you first start out you're kind of ignorant to it.

PDP Player 4: When I was younger I used to eat dead bad because like, you never used to think it affected you that much. It's bad to say but when I first started U18's that was when I started to take it more seriously.

Given the lack of support during a player's time in the YDP previously reported (Carney et al., 2022), the need to provide educational to caregivers becomes especially evident, particularly as YDP Parent 1 states ' *I think it's a very important part of the parent of a footballer to make sure that this is right, because giving the right or wrong food could have an impact on his performance at the end of the day here'*. Another parent of the YDP reiterates this view whilst advocating the need educational support:

YDP Parent 6: Education for the parents, not just the child, because adults do the cooking at home. I know they want them to be independent and stuff, but I've got two children. It's me that does the cooking so it's me that needs to be educated as well. So I think parents need to be educated, the child, yes, for the future, but the parent as well for the now.

The influence of caregivers on the players' diets was previously reported in theme 2, and as an extension of this concept, providing educational support to the caregivers may in turn translate to improving the dietary behaviours of the players. For instance, Physiotherapist 3 states *"They like the foods their parents do and they give them and they form their habits like that"*. A member of staff who coaches players in the YDP concurs with the need for parental support, whilst providing insights from a different perspective in suggesting that positioning the nutrition support as a means to enhance growth may serve as a means of motivation:

Coach 1: I think you need to educate parents on this, how can you maximise growth through nutrition. If you can get that into them from a young age the buy-in would go through the roof. Everyone's obsessed with it.

In addition to caregivers, the requirement to educate the support staff who may ultimately present as a "club gatekeeper" towards nutrition is also readily apparent. In this regard, Physiotherapist 2 suggested that *"You've almost got to try and influence the system to help the lads"*. Given the presence of multiple stakeholders in "the system", it would seem appropriate that they too were aware of the nutritional requirements of the players:

Physiotherapist 2: I think a lot of it has been learning on the job, but we don't . . . . our teaching isn't as good for physios, we don't get taught about paediatric stuff very well at all. It's probably covered in like one or two weeks too, in terms of like anatomical and physiological development and stuff. I think we're limited there and then we're even more limited on our educational nutrition. So a lot of it has been like learning on the job.

In additon to club staff admittedly possessing limited knowledge of nutrition, the players themselves also suggested that club staff may benefit from educational support too:

PDP Player 2: I'm sure the catering team already have a basic understanding of what we need, but I guess a bit more nutrition education for them wouldn't hurt too.

In relation to the content of educational support, participants suggested that the support needs to promote a general understanding of the role of nutrition for player development (i.e., theoretical knowledge) but also provide practical insights as to "what to eat, when" and also adopt an "individualised" approach.

YDP Parent 5: Maybe some different ideas for certain foods you know where I'd probably say oh eat cereal or toast or something. Maybe you might say actually he might enjoy this or something that other boys eat? Just maybe some ideas.

PDP Player 3: I just think from what I experienced if it was maybe a more individualised programme for me I think I would have wanted to do it more because I would have thought right well that's specific to what I need to do rather than just like general advice that everybody gets.

Theme 4 highlights the need for stakeholder nutrition education, that is specific to their roles and responsibilities in influencing the dietary behaviours of academy soccer players. Although participants made suggestions for the content of such educational support, further research is warranted to design and develop an academy soccer nutrition education program that provides stakeholder specific support, with the aim of increasing awareness and providing practical solutions to positively influence the dietary behaviours of academy soccer players.

Summary of findings and future research directions

In conducting a qualitative exploration of player caregiver and club staff understanding of the role of nutrition for player development, several connected themes emerged that have clear implications for practice. In this regard, there is a readily apparent need for targeted player and stakeholder education (i.e., parents/guardians, coaches, support staff etc.) to initially equip such individuals with a sufficient knowledge base. It is noteworthy, however, that education alone is unlikely to change nutrition behaviours (Alaunyte et al., 2015; Spronk et al., 2014), and hence stakeholder specific behaviour change interventions should also be developed to positively affect players' nutritional behaviours given that food choices are multifaceted, situational, and complex (Sobal & Bisogni, 2009). For instance, factors influencing food choice have previously been categorised in to 1) Food-related features: intrinsic features (i.e., colour and aroma), extrinsic features (i.e., information and packaging) (Eertmans et al., 2001; Wang et al., 2019); 2) Individual differences: biological (e.g., hunger, appetite, taste), physical (e.g., access, cooking skills, time), psychological (e.g., mood and stress), cognitive (e.g., attitudes, preferences, knowledge), and social (e.g., family and friends) (Bellisle, 2003; Rozin, 2006), or 3) society-related features: culture and economic variables (e.g., price and income) (Rayner & Lang, 2015). Future research is warranted to identify the specific nutritional related behaviours that are likely to have the most beneficial impact, before establishing the appropriate content and format of delivery for the dissemination of subsequent educational content within academy soccer environments. Given the benefits of co-creation approaches to develop education curricula (Bovill et al., 2009; Jensen & Bennett, 2016; Murphy et al., 2017), it is suggested that a similar approach be considered here. Indeed, this approach has previously been used to create nutritional change within the horse racing industry (Martin, 2019) at athlete, stakeholder, and organisational level. Given the present limitation of sampling one club only, it is also suggested that a co-creation approach to education design should involve multiple soccer academies with varying category status. Such a co-ordinated approach that involves multiple clubs, stakeholders and governing bodies is likely to lead to the greatest change and impact. The use of a case study design may be a potential limitation as our findings may only reflect the culture and procedures at one club as well as those who were willing to participate. Future research is warranted to develop a better understanding of the prevalence of such findings within other academy settings. Nevertheless, the present study allows readers to reflect on the case under study and assess if the findings bear familiar resemblances to the readers' experiences, setting they move in, events they have observed or heard about, and people they have talked to (Smith & McGannon, 2017), prior to forming "naturalistic generalisations" (Stake, 2005).

Conclusions

The present study used a qualitative case study methodology to explore player and stakeholder perspectives on the role of nutrition in supporting the development of academy soccer players. Data demonstrate that participants across all stakeholder groups display a limited knowledge as to how nutrition can impact player development, especially in relation to promoting growth and maturation. Additionally, participants did not readily appreciate that the negative aspects of underfuelling extend to increased injury risk. Players also report that parents have a strong influence on their dietary choices and behaviours, some of which have been formed from an early age. Parents, in turn, report that they are not equipped with the necessary theoretical or practical skills (i.e., awareness of which foods to cook) to provide the relevant meals for their sons. Notwithstanding an apparent lack of knowledge and stakeholder influences (that also extend to club support staff), it is noteworthy that the "busy lives" of an academy player (as due to schooling and training schedules) is perceived as a challenge to enable the execution of behaviours that are conducive to optimal nutritional intake. When considered together, it is clear that educating all stakeholders should now be a strategic goal for practitioners, clubs and governing bodies as an initial step towards improving the dietary behaviours of academy boys. This would of course need to take into consideration key

contextual information such as category status, facilities, staffing and finances, all of which will have implications for the content of educational support required for each club.

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