Nigerian Medical Journal
NIGERIA MEDICAL ASSOCIATION
Print ISSN 0300-1652, E-ISSN 2229-774X

Original Article

Sport injury prevention strategies and sporting behaviors of male professional footballers - A cross-sectional study

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Abstract

Background: Identifying how playing positions (PP) and playing years (PY) influence injury prevention strategies (IPS) and sporting behaviors (SB) of footballers may guide health professionals in developing targeted interventions to prevent sports injuries and enhance players' fitness. This study assessed the association of PP and PY with IPS and SB of male professional footballers.
Methodology: A cross-sectional survey of 130 male footballers aged 18 to 35 years, from six professional teams in Calabar, Cross River, Nigeria. Data was collected on PP, PY, IPS, and SB using adapted questionnaires on IPS and SB. Data was summarised using frequencies and percentages. The Chi-square test was used to analyse the associations among variables at $p < 0.05$.
Results: Respondents were 31.5% defenders, 32.3% midfielders, 31.5% forwards, and 4.6% goalkeepers. Among these respondents, 54.6% played for 1-5 years, 42.3% for 6-10 years, and 3.1% for 11-15 years. Injury prevention was important to 57.7%, 86.9% had used IPS, 26.9% had used FIFA 11+, and 23.8% had used general warm-up programmes. In SB, 40.0% of respondents looked forward to matches and training, and over 50% felt energetic, found sporting meaningful, behaved aggressively towards opponents, exhibited fair play, acted strong and rigorous, were oblivious of surroundings, felt inspired, and were happy when engrossed in sport. Significant associations ($p<0.05$) were found between SB and each of PP and PY. PP and PY were not significantly associated ($p>0.05$) with IPS.
Conclusion: Although PP and PY influenced the SB of male professional footballers, they do not impact IPS. Usage of IPS was higher in FIFA 11+ than in other IPS. Defenders and forwards have a higher propensity of exhibiting aggressive behaviours towards opponents when liable to injury than midfielders, while the burden of a team having good results was highest among defenders and midfielders than in forwards and goalkeepers.

Keywords: Sports Injuries; Injury Prevention Strategies; Sporting Behaviors; Professional Footballers; Playing Positions; Playing Years.

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How to cite: Oghumu SN, Ekom EA, Nicholas RO, Awhen PA, Okhuahesuyi E, Oke KI, Mbada CM. Sport injury prevention strategies and sporting behaviours of male professional footballers - A cross-sectional study. Niger Med J 2025;66(2):621-636.https://doi.org/10.71480/nmj.v66i2.758.

Quick Response Code:

Introduction

Football, also known as association football or soccer (a term coined from "association"), is a globally recognized sport in most countries of a game played primarily with the foot except in North America and Australia where it is referred to as soccer [1, 2]. It is called soccer in North America and Australia to differentiate it from a similar term in their cultures, such as American football in the United States and Gaelic football in Australia [2]. Football is a widely popular sport enjoyed by people of all ages, races, ethnicities, and classes. It is highly competitive, especially on the world stage, where teams from different countries compete. The game involves two teams each of eleven players, playing for ninety minutes in two halves, with a fifteen-minute break in between [3]. Football players use their entire bodies except the upper extremities, with feet primarily contacting the ball during play. Goalkeepers, however, use their hands to catch the ball within an area surrounding the goalpost, and all players use their hands for throw-ins when the ball goes out of play. Football is characterized by explosive movements, rapid changes of direction, and physical contact, which place significant demands on athletes' bodies [4, 5].

Football poses a persistent challenge due to its high injury rate, a consequence of both its contact nature and the mechanics of play [6, 7]. As a result, footballers are highly susceptible to various injuries that impact their performance and overall well-being [7, 8]. These injuries can be attributed to multiple factors, including the high volume of training and competition, the risk of tackles and collisions, and the potential for fatigue-induced technique errors [6]. Sports injuries can have a detrimental impact on both team and individual athletic success [6]. Additionally, injuries sustained before and during competition may increase the risk of failure and non-participation of players [9]. Generally, the more available a player is for competition, the higher the chances of success for the team [10]. Therefore, injury prevention should be prioritized to maximize players' participation and performance [9, 10].

Injury prevention strategies (IPS) are interventions designed to optimize performance and protect players from injuries by maintaining their fitness and availability for sports participation [11]. Broadly, IPS aims to enhance players' intrinsic abilities such as flexibility, agility, strength, conditioning, proprioception, and balancing while ensuring they can tolerate extrinsic factors of playing surface, environmental conditions, specific sports rules, and adaptations [11]. A sound knowledge of IPS is crucial for athletes, coaches, and the entire team. Some IPS, such as the Fédération Internationale de Football Association (FIFA) 11+, foam rolling for myofascial release, strength/endurance training, pre-activation routines, and core stability, have been proven effective [8].

Understanding football players' predispositions toward IPS, as well as their behaviors when selecting and implementing these strategies during sports engagement, is essential. Tabben and colleagues suggested that the successful implementation of IPS is influenced by contextual factors, including lifestyle habits (inadequate sleep, poor nutrition, smoking), the number of matches, pressure to win, team standings in competitions, and a lack of communication and cooperation among teammates [12]. Additionally, sports safety behavior plays a key role in the successful implementation of IPS [13], and the extent to which IPS influences sports behavior can determine the outcomes of sports injuries [14]. Thus, specific IPS and sporting behaviors (SB), such as training habits, technical skills, on-field behavior, and players' motivation, can have an impact on sports experience.

The effective use of IPS requires behavioral changes in sports participation [15]. Proven IPS could be more widely adopted if the determinants and influences of sports safety behaviors were better understood [16]. A previous study reported that an athlete's behavior consists of a series of actions and reactions aimed at continuously achieving goals and fulfilling evolving needs [17]. Athletes' SB reflects their sportsmanship, ethical behavior, fair play, and respect for the sport, participants, and spectators [17]. Also, the demands of playing positions (PP) and playing years (PY) highlight the need for individualized training practices to optimize performance [18].

Positional roles in soccer are known to significantly influence the physical, physiological, and technical demands of football [19]. Owoeye et al found that the number of years of experience and position of play do not determine how much a footballer knows about IPS [20]. However, there are conflicting reports on the association of players' characteristics of PP and PY with the risk of injury [18, 19, 21]. Research on the association of PP and PY with SB is limited. Hence, studies exploring the connection between PP, PY, IPS, and SB may be valuable for players and coaches. Identifying how PP and PY would influence IPS and SB of footballers could guide health professionals in developing targeted interventions to prevent injuries, enhance players' fitness and assist coaches and sports organisations in making decisions to enhance team success. This study investigated the association of PP and PY with IPS and SB among male professional footballers.

Methodology

This cross-sectional study employed purposive sampling to select male professional football teams actively participating in competitive football. The criteria for team selection included consistent involvement in regional competitions, past performance, and official listing in regional football leagues, ensuring a representative sample of the professional football landscape. Six teams were selected: Calabar Rovers, May and Frank, Diamond Stars, Rock Stars, Ricky Max and FAANS FC. Players aged 18 to 35 years, who had been actively engaged in football within the past year, were consecutively recruited. Players with pre-existing medical conditions that could affect their training, playing ability, or sports participation in the previous year were excluded.

The sample size formula of $n = N/[1 + N(e)^2]$ by Yamane was used to determine the sample size of the study [22], where n = expected sample size, N = total population under consideration (in this case 180, a sum of the six teams as each coach reported an average of 30 players in the team), and e = acceptable sample error at 0.05. Hence, the expected sample size, $n = 180/1 + 180\ (0.05)^2 = 124$. A 5% participant dropout was anticipated, thereby yielding a sample size of 130 participants. Ethical approval for the study was obtained from the Health Research and Ethics Committee of the University of Calabar Teaching Hospital (UCTH/HREC/33/Vol.III/360).

The study used two questionnaires. The first was an injury prevention strategy (IPS) questionnaire, adapted from Geertsema et al [23]. The second was a sporting behavior questionnaire, incorporating items from the Sports Engagement Scale by Guillen & Martinez-Alvarado and the Sports Ethics Scale by Ziolkowski et al [24, 25].The IPS questionnaire comprised three sections: Section 1 gathered socio-demographic and playing profiles; Section 2 assessed players' attitudes toward injury prevention; and Section 3 collected data on preferred injury prevention strategies, with participants indicating their preferred practices. Notably, the questions on "ACL history" from the original questionnaire were omitted, as they were specific to one type of injury, which was not central to this study. The SB questionnaire contained 18 items, combining 9 questions from the Sport Engagement Scale and 9 from the Sports Ethics Scale. These 18 items were distributed across three domains: 5 questions on players' motivation for sports behavior, 3 on training behavior, and 10 on on-field behaviors, all assessed using a 5-point Likert scale (ranging from strongly disagree to strongly agree). The internal consistency of the SB questionnaire was confirmed with Cronbach's alpha of 0.75.

After obtaining ethical approval for the study, a letter of introduction was sent to the respective football clubs, seeking permission to administer the questionnaires and explaining the study's purpose and significance. The research proposal was also included. Follow-up visits to the clubs facilitated the acquisition of administrative permission from the six selected teams. Subsequently, the researchers were introduced to the coaches, who recommended that the questionnaires be administered after morning training sessions. Data collection occurred over a three-month period, with each team visited at least twice.

On each data collection day, the study's objectives were explained to the participants individually, and informed consent was obtained from those who met the inclusion criteria and expressed willingness to participate. Participants signed consent forms, and self-administered printed questionnaires were distributed, which took approximately 20 minutes to complete. The complete questionnaires were returned on the same day. Researchers remained available to provide clarification for any questions that participants had during the completion process.

A response rate of 100% was obtained, as all participants completed their questionnaires. The data were analyzed using IBM SPSS version 26. Descriptive statistics of percentages and frequency were used to summarize the data. Chi-square was used to analyse the association between SB and players' profiles of PP and PY. Also, Chi-square was used to analyse the association between IPS and players' profiles of PP and PY. The level of significance was set at $p<0.05$.

Results

Respondents were primarily aged 21-25 years (39.2%) and 26-30 years (33.8%). They were nearly evenly distributed across defenders (31.5%), midfielders (32.3%), and forwards (31.5%), with goalkeepers being the smallest group (4.6%). Most respondents (54.6%) had been playing for 1-5 years, 42.3% for 6-10 years, and 3.1% for 11-15 years (Table 1).

Table 1: Socio-demographic and playing characteristics of respondents (n=130)

Variables	Frequency (n)	Percentage (%)
Age Group		
18-20 years	18	13.8
21-25 years	51	39.2
26-30 years	44	33.8
31-35 years	17	13.1
Playing Position		
Defenders	41	31.5
Midfielders	42	32.3
Forwards	41	31.5
Goalkeepers	6	4.6
Playing Years		
1-5 years	71	54.6
6-10 years	55	42.3
11 years and above	4	3.1

The majority of respondents (57.7%) considered injury prevention very important, while 36.2% found it moderately important. The thigh was the most crucial area for injury prevention (36.9%), followed by the knee (34.6%) and the ankle (21.5%). Over half of the respondents (>50%) disagreed (39.2%) or totally disagreed (17.7%) with the statement that playing is more important than injury prevention exercises, while 19.2% agreed (Table 2).

Table 2: Respondents attitudes towards preventing sports injuries (n=130)

Variables	Frequency (n)	Percentage (%)
How important do you try to prevent injuries?		
Very important	75	57.7
Moderately important	41	36.2
Not very important	7	5.4
Don't know	1	0.8
It is more important to play than to do IPS		
Fully agree	10	7.8
Agree	25	19.2
Not sure	18	13.8
Disagree	51	39.2
Totally disagree	23	17.7
Don't know	3	2.3
Coach motivation affects my motivation for IPS		
Fully agree	73	56.2
Agree	39	30.0
Not sure	12	9.2
Disagree	3	2.3
Totally disagree	1	0.8
Don't know	2	1.5
Feelings about IPS		
Very positive	95	73.1
Positive	29	22.3
Neutral	6	4.6
Received advice on IPS		
Yes	112	86.2
No	14	10.8
Don't know	4	3.1
Medical support staff available for IPS		
Team doctors	29	22.3
Team physiotherapists	64	49.2
Team massage therapists	6	4.6
Team sport scientists	7	5.4
Doctors not in the team	5	3.8
Physiotherapists not in the team	2	1.5
Massage therapist not in the team	3	2.3
No medical support staff	14	10.8
Previously used IPS		
Yes	113	86.9
No	15	11.5
Don't know	2	1.5
Part of the body you have tried to prevent		
Head	1	0.8
Groin	3	2.3
Thigh	49	37.7
Knee	44	33.8
Ankle	33	25.4

Keys: IPS = Injury Prevention Strategies

A majority (56.2%) fully agreed that coach motivation affects their motivation to do injury prevention exercises, with 30% agreeing (Table 2). Most respondents (73.1%) had very positive feelings about injury prevention measures, while 22.3% felt positive (Table 2). A large number (86.2%) had previously received advice on injury prevention, while about 10% had not (Table 2). About half (49.2%) reported physiotherapists as the most common medical support staff, followed by doctors (22.3%), with about 10% saying their teams had no medical support (Table 2). A vast majority (86.9%) had previously done injury prevention training, with about two-thirds focusing on preventing thigh and knee injuries (Table 2).

FIFA 11+ was the most preferred IPS (26.9%), followed by general warm-up programs (23.8%), strength training (13.1%), movement preparation (9.2%), and flexibility training before football (5.4%) (Table 3).

Table 3: Respondents preferred injury prevention strategies (n=130)

Variables	Frequency (n)	Percentage (%)
FIFA 11+	35	26.9
General warm-up	31	23.8
Movement preparation	17	13.1
Strength training	12	9.2
Flexibility training on the pitch	5	3.8
Flexibility training before football	7	5.4
Flexibility training in separate session	3	2.3
Sprint training	2	1.5
Cool down sessions	12	9.2
Specific prevention protocol	1	0.8
Balance and core stability	5	3.8

Cool down was preferred by 9.2%, flexibility on the pitch by 3.8%, separate sessions by 2.3%, and balance and core stability training by 3.8% (Table 3). Regarding SB, 40.0% looked forward to matches and training in the mornings, while 56.2% felt full of energy during training and matches (Table 4).

Table 4: Respondents sporting behaviors (n=130)

Sporting behaviour	Disagree f (%)	Neutral f (%)	Agree f (%)
Motivated behaviour			
1. In the morning I look forward to matches & training	12 (9.2)	66 (50.8)	52 (40.0)
2. Feels full of energy during my training & matches	21 (16.2)	36 (27.7)	73 (56.2)
3. Sport activity is full of meaning & resolve	20 (15.4)	31 (23.8)	79 (60.8)
4. Take part in actions of healthy lifestyle	11 (8.5)	15 (11.5)	104 (80.0)
5. Take a drug to win a contest	86 (66.2)	33 (25.4)	11 (8.5)
Training behaviour			
6. Do prolong training to eliminate mistake	51 (39.2)	31 (23.8)	48 (36.9)
7. Divide time effectively between training, family & rest	10 (7.7)	25 (19.2)	95 (73.1)
8. Work hard to be at highest performance	19 (14.6)	18 (13.8)	93 (71.5)
On the field behaviour			
9. Behave aggressively towards opponents when I feel he will cause me injury	22 (16.9)	40 (30.8)	68 (52.3)
10. Put effort so the team gets a good result	9 (6.9)	16 (12.3)	105 (80.8)
11. Sense of fair play when liable to injury	26 (20.0)	26 (20.0)	78 (60.0)
12. Strong and rigorous in sport activity	13 (10.0)	40 (30.8)	77 (59.2)
13. Happy when engrossed in sport activity	17 (13.1)	22 (16.9)	91 (70.0)
14 Oblivious of the activity around when playing	38 (29.2)	17 (13.1)	75 (57.7)
15. Absorbed in my sport activity	47 (36.2)	19 (14.6)	63 (48.5)
16. My sport activity is a challenge	28 (21.5)	49 (37.7)	53 (40.8)
17. Inspired whilst carrying out sport activity	14 (10.8)	21 (16.2)	95 (73.1)
18. Act according to conscience while playing	49 (37.7)	31 (23.8)	50 (38.5)

Most (60.8%) found sport activity meaningful, and many engaged in healthy lifestyle actions. About a third (39.2%) disagreed with prolonging training to eliminate mistakes, while 36.9% agreed. Most (73.1%) effectively divided time between training, family, and rest, and 71.5% worked hard to perform at their best (Table 4). On-field behaviour showed that 52.3% behaved aggressively towards opponents when feeling threatened, and over 50% exhibited fair play, acted strong and rigorous, were oblivious to surroundings, felt inspired, and were happy when engrossed in sport. Most (80.8%) put effort into achieving good team results, 40.8% found sport activity challenging, and 48.5% were absorbed in it. More than a third either disagreed (37.7%) or agreed (38.5%) with acting according to their conscience while playing (Table 4).

Table 5 shows significant associations ($p<0.05$) between PP and SB. Most defenders (56.1%), midfielders (61.9%), and forwards (70.7%) found sport meaningful, while only 16.7% of goalkeepers did. Prolonged training to eliminate mistakes was significant for defenders (48.8%) and midfielders (38.1%), but less so for forwards (29.3%). Aggressive behavior towards opponents was significant for defenders (61.0%) and forwards (65.9%), but less for midfielders (38.1%). Effort for team success was significant for defenders (90.2%), midfielders (85.7%), forwards (68.3%), and goalkeepers (66.7%).

Table 6 shows significant associations ($p<0.05$) between PY and SB. Feeling energetic during matches was significant for 1-5 years (66.2%), 6-10 years (45.5%), and 11+ years (25.0%). Prolonged training to eliminate mistakes followed a similar pattern. Finding sport meaningful was significant for 1-5 years (71.8%), 6-10 years (47.3%), and 11+ years (50.0%). Aggressive behaviour was significant for 1-5 years (52.1%), 6-10 years (52.7%), and 11+ years (50.0%). Being strong and rigorous was significant for 1-5 years (69.0%), 6-10 years (47.3%), and 11+ years (50.0%). Feeling happy and inspired during sport was significant for 1-5 years (80.3% vs 81.7%), 6-10 years (58.2% vs 63.6%), and 11+ years (50.0% vs 50.0%). PP and playing years were not significantly associated ($p>0.05$) with IPS (Table 7).

Table 5: Association of respondents playing positions with sporting behavior (n=130)

Sporting behaviour	Defenders (n_1)			Midfielders (n_2)			Forwards (n_3)			Goalkeepers (n_4)			χ^2	p-value
	Dis (%)	Neu (%)	Agree (%)	Dis (%)	Neu (%)	Agree (%)	Dis (%)	Neu (%)	Agree (%)	Dis (%)	Neu (%)	Agree (%)		
Motivated behaviour														
1. In the morning, I look forward to matches & training	14.6	51.2	34.1	0.0	50.0	50.0	14.6	46.3	39.0	0.0	83.3	16.7	10.67	0.099
2. Feels full of energy during my training & matches	17.1	43.9	39.0	14.3	23.8	61.9	14.6	17.1	68.3	33.3	16.7	50.0	10.82	0.094
3. Sport activity is full of meaning & resolve	9.8	34.1	56.1	26.2	11.9	61.9	4.9	24.4	70.7	50.0	33.3	16.7	18.96	0.004
4. Take part in actions of healthy lifestyle	2.4	12.2	85.4	16.7	4.8	78.6	4.9	14.6	80.5	16.7	33.3	50.0	11.53	0.073
5. Take a drug to win a contest	58.5	29.3	12.2	83.3	11.9	4.8	53.7	36.6	9.8	83.3	16.7	0.0	10.87	0.093
Training behaviour														
6. Do prolong training to eliminate mistakes	26.8	24.4	48.8	54.8	7.1	38.1	36.6	34.1	29.3	33.3	66.7	0.0	20.12	0.003
7. Divide time effectively between training, family & rest	9.8	26.8	63.4	4.8	9.5	85.7	4.9	24.4	70.7	33.3	0.0	66.7	12.77	0.047
8. Work hard to be at highest performance	12.2	17.1	70.7	4.8	9.5	85.7	22.0	17.1	61.0	50.0	0.0	50.0	13.83	0.032
On the field behaviour														
9. Behave aggressively towards opponents when I feel he will cause me injury	14.6	24.4	61.0	14.3	47.6	38.1	14.6	19.5	65.9	66.7	33.3	0.0	22.11	0.001
10. Put effort so the team gets a good result	0.0	9.8	90.2	11.9	2.4	85.7	7.3	24.4	68.3	16.7	16.7	66.7	15.23	0.019
11. Sense of fair play when liable to injury	14.6	24.4	61.0	16.7	16.7	66.7	26.8	22.0	51.2	33.3	0.0	66.7	5.11	0.530
12. Strong and rigorous in sport activity	19.5	34.1	46.3	9.5	23.8	66.7	2.4	34.1	63.4	0.0	33.3	66.7	9.36	0.154
13. Happy when engrossed in sport activity	12.2	19.5	68.3	21.4	14.3	64.3	2.4	19.6	78.0	33.3	0.0	66.7	9.81	0.133
14 Oblivious of the activity around when playing	39.0	9.8	51.2	23.8	19.0	57.1	19.5	9.8	70.7	66.7	16.7	16.7	11.12	0.085
15. Absorbed in my sport activity	43.9	9.8	46.4	42.9	19.0	38.1	22.0	17.9	61.0	37.0	14.6	48.5	10.17	0.337
16. My sport activity is a challenge	24.4	34.1	41.5	11.9	33.3	54.8	26.8	46.3	26.8	33.3	33.3	33.3	8.14	0.228
17. Inspired whilst carrying out sport activity	9.8	19.5	70.7	11.9	16.7	71.4	9.8	12.2	78.0	16.7	16.7	66.7	1.23	0.975
18. Acts according to conscience while playing	31.7	22.0	46.3	45.2	19.0	35.7	36.6	26.8	36.6	33.3	50.0	16.7	4.93	0.553

Keys: n1=Number of defenders (41); n2=Number of midfielders (42); n3=Number of forwards (41); n4=Number of goal keepers (6); Dis=Disagree; Neut=Neutral.

Table 6: Association of respondents playing years with sporting behavior (n=130)

Sporting behaviour	*1-5 years (n_1=71)*			*6-10 years (n_2=55)*			*11 years & above (n_3=4)*			χ^2	p-value
	Dis (%)	**Neu** (%)	**Agree** (%)	**Dis** (%)	**Neu** (%)	**Agree** (%)	**Dis** (%)	**Neu** (%)	**Agree** (%)		
Motivated behaviour											
1. In the morning, I look forward to matches & training	5.6	54.9	39.4	12.7	47.3	40.0	25.0	25.0	50.0	3.80	0.433
2. Feels full of energy during my training & matches	8.5	25.4	66.2	27.3	27.3	45.5	0.0	75.0	25.0	13.92	0.008
3. Sport activity is full of meaning & resolve	4.2	23.9	71.8	30.9	21.8	47.3	0.0	50.0	50.0	19.38	0.001
4. Take part in actions of healthy lifestyle	8.5	7.0	84.5	9.1	18.2	72.7	0.0	0.0	100.0	4.92	0.296
5. Take a drug to win a contest	71.8	22.5	5.6	58.2	29.1	12.7	75.0	25.0	0.0	3.64	0.457
Training behaviour											
6. Do prolong training to eliminate mistakes	8.5	25.4	66.2	27.3	27.3	45.5	0.0	75.0	25.0	13.93	0.008
7. Divide time effectively between training, family & rest	8.5	12.7	78.9	7.3	27.3	65.5	0.0	25.0	75.0	4.64	0.326
8. Work hard to be at highest performance	14.1	16.9	69.0	16.4	10.9	72.7	0.0	0.0	100.0	2.62	0.624
On the field's behaviour											
9. Behave aggressively towards opponents when I feel he will cause me injury	26.8	21.1	52.1	3.6	43.6	52.7	25.0	25.0	50.0	15.11	0.004
10. Put effort so the team gets a good result	8.5	9.9	81.7	5.5	16.4	78.2	0.0	0.0	100.0	2.50	0.645
11. Sense of fair play when liable to injury	15.5	15.5	69.0	23.6	25.5	50.9	50.0	25.0	25.0	7.01	0.135
12. Strong and rigorous in sport activity	2.8	28.2	69.0	20.0	32.7	47.3	0.0	50.0	50.0	12.80	0.012
13. Happy when engrossed in sport activity	4.2	15.5	80.3	25.5	16.4	58.2	0.0	50.0	50.0	16.30	0.003
14 Oblivious of the activity around when playing	22.5	14.1	63.4	40.0	10.9	49.1	0.0	25.0	75.0	6.44	0.169
15. Absorbed in my sport activity	26.8	16.9	56.3	49.1	12.7	38.2	50.0	0.0	50.0	8.96	0.176
16. My sport activity is a challenge	22.5	36.6	40.8	20.0	40.0	40.0	25.0	25.0	50.0	0.48	0.976
17. Inspired whilst carrying out sport activity	2.8	15.5	81.7	21.8	14.5	63.6	0.0	50.0	50.0	15.46	0.004
18. Acts according to conscience while playing	46.5	22.5	31.0	27.3	25.5	47.3	25.0	25.0	50.0	5.60	0.231

Keys: n_1=Number of players within 1-5 years; n_2=Number of players within 6-10 years; n_3=Number of players 11 years & above; Dis=Disagree; Neut=Neutral.

Table 7: Association of respondent's injury prevention strategies with playing positions and playing years (n=130)

Variables	A	B	C	D	E	F	G	H	I	J	K	L	χ^2	p-value
Playing positions														
Defenders	34.3	25.8	41.7	20.0	14.3	20.0	28.6	66.7	0.0	50.0	100.0	20.0	29.59	0.638
Midfielders	34.3	38.7	33.3	30.0	42.9	20.0	42.9	0.0	0.0	25.0	0.0	20.0		
Forwards	31.4	29.0	16.7	40.0	60.0	28.6	28.6	33.3	50.0	25.0	0.0	60.0		
Goal keepers	0.0	6.5	8.3	10.0	14.3	0.0	0.0	0.0	50.0	0.0	0.0	0.0		
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**		
Playing years														
1-5 years	57.1	58.1	58.3	60.0	42.9	80.0	42.9	33.3	100.0	41.7	0.0	40.0	10.96	0.975
6-10 years	37.1	38.7	41.7	40.0	57.1	20.0	57.1	66.7	0.0	50.0	100.0	60.0		
11 years & above	5.7	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0	0.0		
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**		

Keys: A= FIFA 11+; B= Warm up programme; C= Sport specific movement; D= Strength training (pitch); E= Strength training (separate session);F= Flexibility training (pitch); G= Flexibility training (before/after football); H= Flexibility training (separate session); I= Sprint training; J = Cool down; K= Specific prevention protocol; L= Balance and core stability.

Discussion

This study evaluated the association between playing position (PP) and playing years (PY) with injury prevention strategies (IPS) and sporting behaviors (SB) among male professional footballers. The age distribution of respondents reflects typical professional football categories, often seen in elite competitions [26]. The majority of the respondents had 1-5 years of playing experience, with fewer in the 6-10 years and 11+ years categories, suggesting that most players are still early in their football careers. Early career professional football age is believed to begin at about 21.7 years and peaks around 35 years [26, 27]. Younger footballers bring agility and stamina, while older players bring experience [27, 28]. These dynamics may help explain the higher representation of players with fewer PY and the relatively small number of those with more PY in this study. Also, it is believed that physical performance tends to decline after 30 years, which may explain this tendency of football teams to have fewer older players, particularly those nearing their peak years, in favor of younger talents [27].

The finding that most respondents considered injury prevention to be very important underscores the significance of IPS in sport participation. This finding aligns with the previous report that footballers find IPS to be very important [9]. Also, the findings of this study suggest that a vast majority of respondents had done injury prevention training, had positive feelings about IPS, and received professional advice on IPS.

These behaviors suggest that the respondents actively engage with IPS to maintain their participation in the sport, a finding consistent with Zech and Wellmann's report on professional football teams in Germany [29]. Additionally, the majority of respondents disagreed with the statement that playing is more important than IPS, highlighting the priority given to injury prevention in the context of their sport. Notably, the motivation for players to engage in IPS often stemmed from their coaches, as the majority of participants indicated that their coach's encouragement played a significant role in their decision to participate in injury prevention programs. This finding corroborates Harøy et al who reported that coaches significantly influence players' utilization of IPS [30]. In terms of medical support, physiotherapists and doctors were the most frequently encountered on-field staff, a finding that aligns with previous studies on the roles of medical professionals in on-field rehabilitation [20, 31]. However, one study noted variations in the number of physiotherapists and doctors across elite football competitions, while another emphasized the importance of a strong athlete-physiotherapist relationship for effective rehabilitation [32, 33].

Respondents in this study placed a particular focus on preventing thigh and knee injuries, indicating the importance of these areas in the context of football. The sport's reliance on foot-to-ball contact, with thigh muscles (quadriceps and hamstrings) providing critical force, makes injuries to the thigh region especially concerning [34]. Moreover, several extrinsic muscles of the foot, involved in movements such as dorsiflexion, plantarflexion, inversion, eversion, adduction, abduction, and supination, originate from the knee region [35]. Given this anatomical connection, knee injuries can have a significant impact on a player's ability to participate in the sport, highlighting the importance of protecting the knee. Additionally, this study found that FIFA 11+ was the most preferred IPS followed by general warm-up programs, which portends that the respondents derived benefits from utilizing FIFA 11+ as an IPS. Also, IPS especially FIFA 11+, has been found to be effective in reducing lower extremity injuries in male footballers [36, 37]. FIFA 11+ includes 15 exercises like running, strength, plyometric, and balance exercises [38]. There are numerous reports on the benefits of FIFA 11+, including reducing the incidence of sports injuries, improving neuromuscular control, and meeting players' needs for the physical demands of football [36, 38, 39].

The finding of this study that strength training, cool-down, movement preparation, flexibility training, balance, and core stability training were used by fewer respondents demonstrates the limited utility of these IPS in isolation for their beneficial effects. This is consistent with the report that injury prevention programs incorporating all elements of fitness tend to be more effective than programs that consist of only one element of fitness [40]. Moreover, the finding that only one-third of respondents look forward to training and matches in the morning suggests a lack of intrinsic motivation among some players. This aligns with the observation that intrinsic motivation is often driven by factors such as personal interest, satisfaction, and enjoyment of the activity [41]. In contrast, more than half of the respondents reported feeling energized during training and matches, finding the sport meaningful. These responses indicate potential extrinsic motivation, as players may be driven by the desire to impress coaches or secure a spot in matches. Extrinsic motivations often arise from external rewards, such as praise, recognition, or career advancement [42], which may explain why some players exhibit heightened motivation for outward recognition. This was further supported by similar findings of this study that respondents act strong and rigorous during sports, are oblivious to surroundings during sports, feel inspired while playing, are happy when engrossed in sports, work hard for peak performance, and put up effort for team success. These

behaviors align with Bandura's Expectancy Theory and Expectancy-Value Theory [42], which emphasizes the role of anticipated outcomes and value in shaping motivation and behavior.

Other SB exhibited by respondents can be linked to drivers of human behavior detailed by Bandhu et al [42]. Actions of maintaining a healthy lifestyle for sports activity align with the arousal theory of motivation, which posits that optimal arousal levels are associated with best performance, while over- or under-arousal can impair performance [42]. Similarly, respondents' balanced approach to diet underscores the importance of proper nutrition for peak performance, as both over- and under-nutrition can lead to poor performance. The finding that respondents effectively divided time between training, family, and rest can be explained by the intrinsic theory of motivation. According to this theory, individuals are more likely to engage in activities that they find personally satisfying and intrinsically motivating [42]. Conversely, behaviors such as exhibiting aggression toward opponents when threatened or demonstrating fair play in the face of injury are indicative of the Social Cognitive Theory of Motivation, which emphasizes learning through direct reinforcement and observation of others [42].

The finding of this study that respondents' motivated behavior of sport activity being full of meaning and resolve was significantly associated with PP and was observable in most defenders, midfielders, forwards, and goalkeepers. This suggests that these PP view their roles as crucial to the team's success and are therefore motivated to exert significant effort. This is consistent with the assertion of Atiq et al that motivation serves as a driving force, propelling individuals to achieve goals and improve performance [43]. Moreover, this study found that defenders were more likely to engage in prolonged training to eliminate mistakes. This is especially important, as defensive errors can often result in costly game outcomes. Rechenchosky and colleagues opined that concentration is key to a defensive strategy that minimizes the opposing team's offensive progression and protects the goal area [44]. This study also revealed that aggressive behavior toward opponents, particularly when feeling threatened, was significantly more pronounced among defenders and forwards. This finding is not surprising, as these positions play pivotal roles in determining the game's outcome and are frequently exposed to injury risks. Notably, research by Argibay-González et al reported that defenders had the highest injury risk in Spain, while forwards faced the greatest risk in England [45]. Additionally, the burden of achieving good results is highest among defenders as revealed by the finding of this present study that respondents' on-field behavior of putting effort into achieving good team results was significantly associated with PP in most defenders and midfielders. Thus, midfielders, too, face injury risks due to their critical role in preventing opponents from advancing into their half.

Significant associations were also observed between respondents' energy levels during matches or training and their playing years (PY), with these associations in the majority of early career players than in older players. Similar associations were found between prolonging training to eliminate mistakes and PY. These results corroborate existing studies suggesting that early-career footballers typically exhibit higher agility and physical performance than their more seasoned counterparts [27]. Early career footballers play to increase their value, attract rewards, and impress coaches for more playing time [46], making them more likely to find sport meaningful and play vigorously. They are also more likely to avoid injuries as they tend to behave aggressively towards opponents. As such, medical support staff continuously seek safe and effective methods to help young players reach their potential and avoid injuries, as they are more susceptible to injuries as they transition towards the peak of their professional careers [46]. Additionally, injury prevalence tends to rise with player maturity [47].

Interestingly, the study found no significant association between either PP or PY and the use of IPS, suggesting that any player, regardless of position or experience, can benefit from engaging in injury prevention strategies. A Delphi study concluded that injury prevention programs should be tailored based on factors such as injury history, pre-season screening, and sport-specific injury rates while considering age, competition level, and the availability of cost-effective materials [48].

The findings of this study recommend the need for comprehensive, individualized injury prevention programs that address both physical and behavioral aspects of male footballers. Also, the study reinforces the importance of a holistic approach to injury prevention in professional football. Coaches, trainers, and health professionals should work together to implement targeted interventions that target both physical preparedness and behavioral factors contributing to injury risk. One limitation of this study is the small number of goalkeepers, suggesting a need for further studies with larger samples of goalkeepers. Also, future studies should explore the long-term effects of various PP and PP on IPS and SB of male professional footballers.

Conclusion

While PP and PY influence SB among professional footballers, these factors do not significantly impact their use of IPS. FIFA 11+ was the preferred IPS, followed by general warm-up programs. Defenders and forwards were more likely to exhibit aggressive behavior towards opponents when liable to injury than midfielders, while the burden of achieving good results was highest among defenders and midfielders.

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