Injuries in Nigerian National Female Footballers at the 2008 Beijing Olympic Games, China: A prospective case study

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SUMMARY

This study was conducted to investigate the incidence, profile and treatment of injuries in the Nigerian national female footballers (the Super Falcons) during camping and competitions at the 2008 Beijing Olympic Games in China. A prospective descriptive case study was carried out. The team physiotherapist closely monitored all the training and competition matches and documented all injuries reported by the players. Information about the type and duration of exposure, the location and type of injury, diagnosis and treatment were recorded on injury report forms.

A total of 60 injuries were reported throughout the study period. Thirty-eight (63.3%) and 22 (36.7%) of these injuries were reported during training and matches respectively. The incidence of injury was calculated as 0.68 injury per training session and 7.3 injuries per match. Strain (n=15, 25.0%) was documented as the most frequent diagnosis, while the thigh muscle was the most commonly injured body part (n=11, 18.4%) for both training and matches. A total of 262 separate applications of treatments were made. Cryotherapy (n=61, 23.3%) was the most frequently used treatment modality.

The incidence of match injuries presented by the Super Falcons of Nigeria during the Beijing Olympics in China was notably high. The characteristics of injuries reported in this study are consistent with previous epidemiological studies on female footballers. There is a need for more elaborate prospective studies on injuries in elite female footballers in Nigeria.

KEYWORDS: Incidence/pattern of injuries, treatment, female footballers, Nigeria

INTRODUCTION

Football is the most popular sporting event in the world. Female football is fast growing in popularity, with an increasing number of female football tournaments organized both locally and internationally, and more female players getting licensed (Biedert and Bachmann, 2005). The Fédération Internationale de Football Association (FIFA) organized the very first women's football world cup tournament in China in 1991 and has since then organized a biennial under-20 world championship for women (Dvorak and Junge, 2007). Women's football has also been included as a game in the Olympics.

The Nigeria national women's football team, also referred to as the Super Falcons, is controlled by the Nigeria Football Federation (NFF), formerly called the Nigeria Football Association. The team has been to every world cup tournament since 1991, but has only managed once to finish in the top eight. The Super Falcons are

currently ranked 1st in Africa and 27th in the world in the FIFA world ranking (FIFA/Coca-Cola World Ranking 2011).

Football is the most played sport in Nigeria. FIFA has estimated the total number of players in Nigeria to be 6,653,710, with 58,710 identified as officially registered (FIFA/Coca-Cola World Ranking, 2011). Although men constitute a large percentage of these players, Nigerian women, like their counterparts worldwide, have shown increased participation from the grassroots to the elite level.

In spite of the growing popularity of women's football and the increasing number of female players internationally, epidemiological data on injuries in elite female footballers are rare (Biedert and Bachmann, 2005; Faude et al, 2005; Dvorak and Junge, 2007). Attention seems to be focussed more on male football (Inklaar, 1994; Dvorak and Junge, 2000; Junge and Dvorak, 2004). According to Dvorak and Junge (2007), the incidence of injuries in top-level women's football competitions was reported to range from 1.3 injuries per match in the 1999 Women's World Cup to 2.9 injuries per match in the 2006 FIFA U-20 Women's World Cup. This was said to be within the range of values previously reported for elite male and female club players, but still lower than the rates from equivalent international men's competitions. Furthermore, the diagnosis and mechanisms of injury among female players was found to differ substantially from those previously reported in male football players. In another study (Faude et al, 2005) investigating the incidence of injuries in female players of the German national league, injury rate was reported as 2.8 injuries per 1000 training hours and 23.3 injuries per 1000 match hours. Forty-two percent of these injuries were reported to occur during training and 58% during match play.

In Nigeria, a few epidemiological studies have been done on specific sports (Ataikpo, 1999; Hamzat et al, 2002; Akinbo et al, 2007; Owoeye et al, 2009; Owoeye, 2010). Only three studies were found to specifically relate to football, of which two were on male football (Hamzat et al, 2002; Akinbo et al, 2007) and only one on female football (Ataikpo, 2001). The study on female football investigated, retrospectively, injury pattern and prevalence from 1997-1999. The injury cases documented were not adjusted for exposure risk, hence, the incidence of injuries was not stated.

This prospective case study was conducted to investigate the incidence, profile and treatment of injuries sustained by the Super Falcons of Nigeria during camping and matches at the 2008 Beijing Olympic Games in China.

METHODOLOGY

A prospective case study was conducted on the Nigerian female national team. A total of 36 professional female footballers were invited for a training tour in South Korea between July and August 2008 (28 days). Most of these players were home-based players recruited from the top female football clubs playing in the first division of the national league. All the players gave their informed consent before the commencement of training.

Procedures

The team physiotherapist (AL), who was with the team for all the training sessions and matches, documented all the injuries. All information about the location, type, and exact diagnosis of injury were recorded on specially-designed injury report forms following the consensus on definitions and data collection procedures in studies of football injuries outlined by FIFA's Medical Assessment and Research Committee (Fuller et al, 2006). All treatments (usually more than one) given for each complaint were recorded on separate forms. Some treatments were rendered as pre-match prophylaxis and not linked to any particular complaints by the players and were recorded as such.

For the purpose of this study, 'injury' was defined as any physical complaint during a match which necessitated medical attention from the team doctor or physiotherapist, regardless of the consequences with respect to absence from the rest of the match or training (Fuller et al, 2006). Physical complaints such as illnesses, diseases, and mental complaints that were unrelated to football matches or training were not recorded. Previous injuries sustained by players prior to camping were not considered in the study. Data collection was in 2 phases:

Phase I

This was done during the training sessions and it involved all the 36 players. The training sessions were carried out twice daily, excluding Saturdays and Sundays; with each session lasting 2 hours (7-9am and 4-6pm). Each training session comprised mainly warm-up exercises, aerobic drills, skill and strategy mastering sessions, match play and cool-down exercises. There were no extra training sessions or friendly matches. In all, a total of 56 training sessions (112 hours) were observed.

Phase II

This was done during the tournament. Eighteen players were involved in this phase of data collection (players that made the final list for the tournament in China). Exposure time for matches was 1.5 hours (90 minutes), including injury time. It was assumed that the injury time compensated for the loss of play time (stoppages) due to injuries sustained by players during a match. Three competition matches were observed by the Nigerian team; amounting to a total 4.5 hours of match exposure.

Data Management and Analysis

The incidence of injury was expressed as the number of injuries per training session and the number of injuries per match. Injury per training session was calculated as:

$$\frac{\text{Total number of injuries sustained during training}}{\text{Total number of training sessions}}$$

Injury per match was calculated as:

$$\frac{\text{Total number of injuries sustained during matches}}{\text{Total number of matches played}}$$

Data analysis was carried out using SPSS, version 15 for Windows (Lead Technologies Inc SPSS Inc, Chicago, Illinois, USA).

RESULTS

A total of 60 injuries were reported throughout the study period. Of these, 38 (63.3%) were reported during training and 22 (36.7%) during matches. The incidence of injury was calculated as 0.68 injury per training session and 7.3 injuries per match.

The type of injuries and location of injuries are shown in tables 1 and 2. In all, strain (n = 15, 25.0%) was documented as the most frequent diagnosis. This was followed by contusion (n = 13, 21.6%) and sprain (n = 10, 16.6%) injuries. The thigh muscle was the most commonly injured body part (n = 11, 18.4%) for both training and matches. This was closely followed by the ankle (n = 10, 16.6%) and the lower leg (n = 8, 13.3%).

Table 3 shows the physiotherapy treatment modalities. A total of 262 separate applications of treatments were made. The most frequently used modality was cryotherapy (n = 61, 23.3%). Cryotherapy (n = 48) was also the most prevalent modality during training sessions. However, massage (n = 22) was the most frequently used modality during matches, followed by cryotherapy (n = 13). The least used modality was medication (n = 1, 0.4%); this was an anti-inflammatory drug prescribed on one occasion for a player while in the training camp.

Table 1. Types of injury

Type of injury	Training (n)	Match (n)	Total n (%)
Strain	10	5	15 (25.0)
Contusion	8	5	13 (21.6)
Sprain	8	2	10 (16.6)
Others	7	2	9 (15.0)
Bruise	4	2	6 (10.0)
Meniscal lesion	1	1	2 (3.4)
Tendonitis	–	2	2 (3.3)
Chondromalacia	–	2	2 (3.3)
Cramp	–	1	1 (1.7)
Total	38	22	60 (100.0)

Table 2. Anatomical distribution of injuries

Location of injury	Training (n)	Match (n)	Total n (%)
Thigh	7	4	11 (18.4)
Ankle	8	2	10 (16.6)
Lower leg	5	3	8 (13.3)
Back/waist	3	2	5 (8.3)
Knee	2	2	4 (6.6)
Thumb/finger	2	2	4 (6.6)
Foot	2	1	3 (5.0)
Wrist	1	2	3 (5.0)
Shoulder	3	–	3 (5.0)
Neck	1	1	2 (3.4)
Pelvis	1	1	2 (3.4)
Abdomen	–	2	2 (3.4)
Toe	1	–	1 (1.7)
Elbow	1	–	1 (1.7)
Face	1	–	1 (1.7)
Total	38	22	60 (100.0)

Table 3. Treatment modalities used during training and competition

Treatment	Training (n)	Match (n)	Total n (%)
Cryography	48	13	61 (23.3)
Massage	24	22*	46 (17.6)
Taping/bandaging	33	9*	42 (16.0)
Exercises	22	12	34 (13.0)
Mobilization	16	5	21 (8.0)
TENS	12	8	20 (7.7)
Ultrasound	10	4	14 (5.3)
Stretching	–	9	9 (3.4)
Rest	8	–	8 (3.1)
Support	2	1	3 (1.2)
Manipulation	1	2	3 (1.2)
Medication	1	–	1 (0.4)
Total	177	85	262 (100.0)

TENS: Transcutaneous electrical nerve stimulation

*16 (~73%) and 3 (~33%) of the massage and taping/bandaging procedures were pre-match prophylaxis for players

DISCUSSION

This study explored the incidence and pattern of injuries sustained by the Super Falcons of Nigeria during preparatory training and matches for a major international competition. It also investigated the types of treatment interventions rendered to injured players.

In this study, more injuries were reported during training sessions than during matches. A higher prevalence of injuries during training as recorded in the present study negates the results from most previous epidemiological studies on both male and female footballers (Soderman, 2001; Junge et al, 2002; Faude et al, 2005; Dvorak and Junge, 2007; Dvorak et al, 2009). The obvious reason for this incongruence is the wide difference in the exposure time of players in pre-competition training (112 hours) and matches (4.5 hours). Hence, it is important to point out that the said prevalence does not represent a higher risk of injuries during training because players' exposure (in hours) was not put into consideration.

A few factors may be responsible for the high occurrence of injuries for both training and matches. The high intensity of pre-competition training of 2 sessions daily for 28 days was perhaps too much for the players. The long duration of training was identified in a previous study as a major risk factor for a high prevalence of injuries (Ataikpo, 2001). Furthermore, the Super Falcons commenced their training tour quite late and were made to train until a few days to the competition, implying that they did not have adequate recovery time.

Research evidence has shown that the neuromuscular system is depressed by the combination of training, game play, and skills practice precluding adequate recovery in athletes (Marx et al, 2001; Kraemer and Ratamess, 2004). This essentially predisposes such athletes to injuries. Complete rehabilitation from a prior injury along with improved skill and fitness has also been identified as a critical factor in preventing injuries (Junge et al, 2000; Peterson et al, 2000). It is important to note that a good number of the reported injuries were recurrent minor injuries from the same players who played through the three matches before the team was finally eliminated.

A major limitation of this study is that it examined a team of players over a short period of time. The study presents too little data to be extrapolated to injuries per 1000 matches or training hours and, hence, is reported as injuries per training session and per match. The difference in study settings makes comparison with most related studies difficult. Most of the other epidemiological studies examined several players/teams over a long period of time (at least a season) and were reported as injuries per 1000 hours of training, and match exposure and injuries per match. Dvorak and Junge (2000) reported the overall incidence of injuries during the 2000 and 2004 women's Olympic football tournaments (for all the participating teams) as 2.1 and 2.3 injuries per match respectively. An incidence of 7.3 injuries per match recorded in this study compared with the aforementioned and other epidemiological studies (Soderman et al, 2001; Dvorak et al, 2009) on international tournaments, indicate a high incidence of match injuries among the Super Falcons of Nigeria.

The characteristics of injuries reported in this study are consistent with previous epidemiological studies on female footballers. Most of the injuries reported in this study affected the lower extremities, especially the ankle, knee and thigh, as previously reported for elite male and female football players (Soderman et al, 2001; Faude et al, 2005; Dvorak and Junge, 2007; Dvorak et al, 2009). In accordance with other studies (Soderman et al, 2001; Fuller et al, 2006; Dvorak and Junge, 2007; Dvorak et al, 2009) on female footballers, contusion, sprain and strain were most often diagnosed. It can be speculated that the high risk of thigh strain in this study reflects the impact of the high intensity of modern professional female football on the Nigerian team featured at the 2008 Olympics; a team that was mostly constituted with home-based players.

The team physiotherapist attended to virtually all the football-related injuries reported during training and matches; almost all the treatment modalities used were within the physiotherapy domain. These modalities were applied both on-field and off-field. Cryotherapy, massage and taping/bandaging were the most frequently used treatment modalities. This was in accordance with previous studies (Jelsma et al, 1997; Akinbo et al, 2008; Owoeye et al, 2009) documented for single and multi-sport competitions. The NFF must ensure that the high-demand treatment modalities are adequately provided in subsequent competitions.

CONCLUSION

This study shows that the incidence of match injuries sustained by the Super Falcons of Nigeria during the Beijing Olympics in China was notably high. The characteristics of the injuries reported are consistent with

previous epidemiological studies on female football. The treatment modalities used were within the physiotherapy domain.

There is a need for more elaborate prospective studies on injuries in elite footballers in Nigeria; a pool of such epidemiological studies would enhance the development of injury prevention programmes.

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