Medicina Sportiva (2016), vol. XII, no 1, 2727-2732
Journal of the Romanian Sports Medicine Society

Prevalence of generalized joint hypermobility and its association with sports injuries at recreational cricket players

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Abstract. *Introduction*. Cricket is a dynamic sport that involves many abstract skills and movements. At present, the optimum level of flexibility required to prevent injury when participating in sporting activity is not clear and may vary. This study was therefore designed to evaluate the prevalence of generalized joint hypermobility and its association with sports injuries in recreational cricket players. *Material and Method.* One hundred and two male recreational cricket players participated in this study. The participants were assessed for joint hypermobility using the validated Beighton score (0-9). Player profile and details of sporting injuries while playing cricket were gathered by means of a self-administered questionnaire. Data was analysed using and inferential statistics of Pearson´s correlation coefficient was used to find the association between the variable and summarised with mean, standard deviation. *Results.* The result showed that the 12-month prevalence of injuries was 69 injuries among cricket players. The prevalence of generalized joint hypermobility was 50%. There was no significant association (p=0.061) between generalized joint hypermobility and upper limb injuries while there was a significant association (0.011) between generalized joint hypermobility and lower limb injuries among cricketers. Hand and finger injuries were the most common injury sustained by the cricket players. *Conclusion.* In this study generalized joint hypermobility had no association with upper limb injuries in recreational cricket player but had a significant association with lower limb injuries in recreational cricket players.
Key words: *cricket players, joint hypermobility, sports injuries*.

Introduction

Generalized joint hypermobility (GJH) is a recognized feature of many heritable disorders of connective tissue, such as Ehlers-Danlos Syndrome, Osteogenesis Imperfecta, and Marfans Syndrome which are associated with symptoms of chronic fatigue and widespread musculoskeletal pain, which may result from the GJH (1). The increased connective tissue flexibility in GJH is considered to be of primarily genetic origin, given its common autosomal dominant presentation (2). The prevalence of joint hypermobility (JH) and the syndrome in the adult population has been reported to be between 10 and 30% (3). Joint laxity is usually greatest at birth, decreases during childhood and continues to reduce during adolescence and adult life (4), which means that there are age related changes in flexibility levels.

Sports is one of the most common and widespread recreational activity and a common cultural element of modern societies (5). Sport and exercise contributes both to the physical and mental health of an individual (6). While the social benefits of sport, such as gain of fitness, reducing risk of disease, recreation, development of self-confidence and high self-esteem, combating crime and anti- social behaviors, educational effects or integration of marginalized groups are well known by policy makers, relatively little attention is paid to the undesirable side effects of injuries like an increased risk of re-injury and the socioeconomic cost associated with it. There are preventive steps that can be taken in order to reduce the incidence and severity of sport injuries. The most important step is identifying contributing factors and addressing changes in order to prevent injury (5).

Regarding sport injury in Nigeria, Akodu et al (7) reported an overall of 89 injuries sustained in 9 football matches resulting in 9.9 injuries per match or 289 injuries per 1000 player hours. Seventeen (19.1%) of these injuries resulted in loss of competition activity (time-loss) equivalent to 1.9 injuries per match or 55.2 injuries per 1000 player hours. Over three quarters (73; 82%) of injuries were incurred through contact with another player. Owoeye et al. (8) on the other hand reported 55.8% 12 month musculoskeletal injury prevalence in professional female basketball players.

Cricket is a bat and ball team sport, which is particularly popular in commonwealth countries with teams competing at the international level (9). Cricket is a dynamic sport that involves many abstract skills and movements (10). To enhance these skills and movements, many players ensure that their bodies are kept fit

and strong (11). There are three unique aspects of the game (bowling, batting and fielding) which are associated with risk of injury (11).

Long term injury surveillance in cricket has been carried out in Australia, South Africa and England with the view to identifying injury patterns (12). At present, the optimum level of flexibility required to prevent injury when participating in sporting activity is not clear and may vary between muscle groups and probably sports (13). Knowledge of where athletes fall in the spectrum of joint mobility may influence intervention and understanding of their complaints Boyle et al. (14) and it has been postulated that athletes at either end of the flexibility spectrum are likely to be more at risk of injury (15). On a more general level, Hardin et al. (16) reported a slower rehabilitation course for individuals presenting with joint hypermobility, highlighting the need for effective screening and preventative programs to manage hypermobile athletes and limit the socioeconomic costs associated with sports injuries.

Identifying athletes who are more prone to injury may allow preventive and treatment efforts to be better focused; hence this study is aimed at investigating the prevalence of generalized joint hypermobility and its association with sports injuries in recreational cricket players.

Material and Method

A total number of 102 cricket players participated in this study. They were recruited from club cricket committee league of Lagos state.

Questionnaire Design. A structured questionnaire based on the FIFA Medical and Research Centre consensus for studies relating to football injuries was adopted from previous related survey on sport injury (17). The questionnaire consist of 14 closed ended questions and was divided in to two: sections A and B. Section A sought information on the personal and physical characteristics of the player, including age, position of play and the appropriate number of matches in the last year. Section B, was used to obtain information on the injury that occurred to the upper limbs and lower limbs in the last 12 months and also supplied information about the number of injuries the location, timing and the severity through time loss. Section C consist of the nine point Beighton hypermobility scale (0=negative test, 1=positive test) which was used to measure the extent of hypermobility of the participants. The Beighton index can be categorized into three groups: 0–2 (not hypermobile); 3–4 (moderately hypermobile); 5–9 (distinctly hypermobile).

Administration of the questionnaire. Prior to the commencement of the study approval was sought and obtained from Health Research and Ethics Committee of Lagos University Teaching Hospital Idi-Araba, Lagos, with reference number: ADM/DCST/HREC/APP/322. Informed written consent and other relevant documents were obtained from the participant. Copies of the questionnaire were then distributed to the participants by the researcher through personal visits to the cricket club centers.

The purpose of the study was clearly explained to the participants before administering the questionnaire. All participants were evaluated by a face-face interview technique using a questionnaire. After completion of the questionnaire, the subjects were assessed for hypermobility using the validated Beighton index for hypermobility. Nine items were scored based on an ordinal score of 0-9, with a higher score representing greater joint mobility. Each individual item was scored using a nominal scale in which "1" represents a positive sign and "0" represents a negative sign. All measurements were obtained bilaterally using a universal goniometer, with the exception of forward trunk flexion and passive apposition of the thumb to the flexor aspect of the forearm.

Data analysis. The data was analyzed using Statistical Package for the Social Sciences (SPSS) version 22.0 for Windows and was summarized using descriptive statistics of mean, standard deviation and percentage. Inferential statistics using Pearson correlation coefficient test was used to compare the association between the outcome variables. The level of significance for all inferential tests was set at $p \leq 0.05$.

Results

A total number of 102 cricket players participated in this study. They were between the ages of 18 and 38 years with a mean age of 23.3 years (Table 1). Out of the 102 participants evaluated 33 (32.4%) were bowlers, 24 (23.5%) were fielders, 6 (5.9%) were wicket-keepers, 31(30.4%) were batmen, and the other 36 (35.3%) declared themselves as all-rounders. Where 28 of the participants choose more than one position. 78 (76.5%) of them were right handed, 4 (3.9%) of them were left handed and 16 (15.7%) were both. The approximate no of the matches ranges from 1 to 100. A total of 69 injuries were recorded, 35 (50.7%) to the upper limb and 34 (49.3%) to the lower limb. Table 2 showed that bowling 21 (30.43%), batting 16 (23.19%), all-rounders 13 (18.84%) and fielding 11 (15.94%) accounted for most of the injuries with wicket-

keeping and umpire accounting for 4 (5.80%) each. It also showed that of the 69 injuries that occurred, 45 (65.2%) of the injuries occurred during a competitive match while 24 (34.8%) of the injuries occurred during training.

Table I. Age distribution of the participants

Age (years)	Frequency (n)	Percentage (%)
<20	28	27.50
21-25	48	47.10
26-30	16	15.70
31-35	5	4.90
36-40	2	2.00
No response	3	2.90
Total	102	100.00

Table II. Position of players according to the injuries and timing of the injuries

	Frequency (n)	Percentage (%)
Position		
Bowler	21	30.43
Fielder	11	15.94
Batting	16	23.19
Wicket- keeper	4	5.80
Umpire	4	5.80
All-rounder	13	18.84
Total	69	100
Timing of injuries		
During a competitive match	45	65.20
During training	24	34.80
Total	69	100

The most common sites of injuries sustained while playing cricket were ankle 14 (20.2%), hands/fingers 12 (17.4%), shoulder 10 (14.5%), and wrist 8 (11.6%) and thigh 8 (11.6%) (Figure 1). 33 (47.82%) injuries were mild (<1 week), 27 (39.13%) were moderate (>1 week <1 month) and 9 (13.04) were severe (> 1month). The mean hypermobility score was 5.09. The prevalence of generalised joint hypermobility using a cut of point of 5 was 50%. The distribution of hypermobility score among the cricket players was grouped into three, non-hypermobile 16 (15.69%) moderately hypermobile 35 (34.31%) hypermobile 51 (50%).

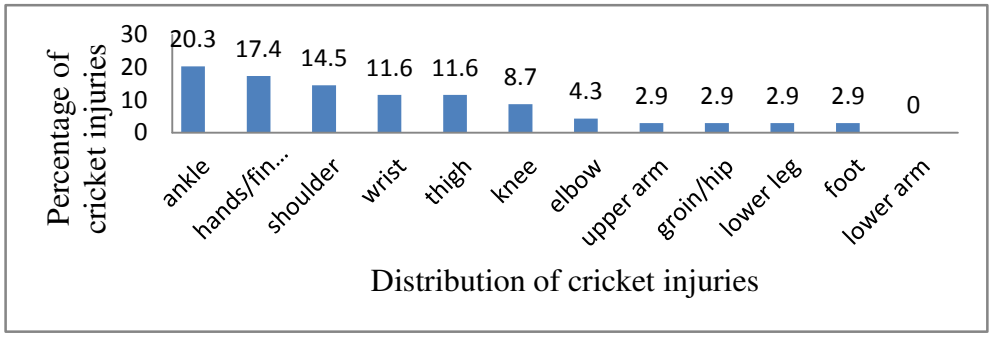

Figure 1. Anatomical site of the injuries of the participants

Distribution of the upper limb injuries according to hypermobile groups. Figure 2 shows the percentage of players who had sustained upper limb injuries while playing cricket in each hypermobile classification (Beighton group). Of the 16 non-hypermobile group 3 (18.8%) players' sustained injuries. In the moderately hypermobile group, 4 out of 35 (11.4%) players sustained injuries, but the highest proportion of injured players came from the distinctly hypermobile group with 20 out of 51 (39.2%) players sustaining injuries.
Distribution of the lower limb injuries according to hypermobile groups. Figure 3 shows the percentage of players who had sustained lower limb injuries while playing cricket in each hypermobile classification (Beighton group). Of the 16 non- hypermobile group 2 (12.5%) players sustained injuries. In the moderately
Association between generalised joint hypermobility and upper/lower limb injuries. Table 3 shows that there was no significant association between generalised joint hypermobility and upper limb injuries. It however

showed that there was significant association between generalised joint hypermobility and lower limb injuries.

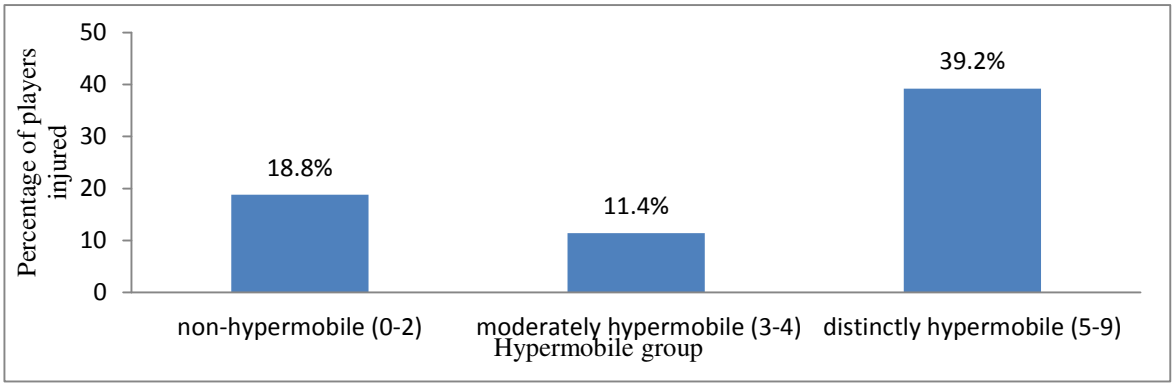

Figure 2. Distributions of upper limb injuries according to hypermobile group

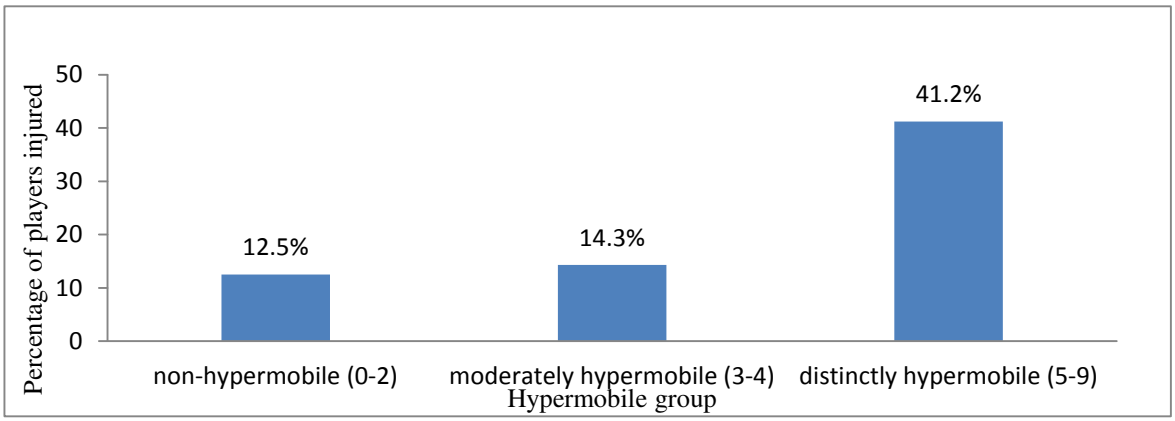

Figure 3. Distribution of lower limb injuries according to hypermobile group

Table 3. Associations between generalised joint hypermobility and upper limb/lower limb injuries

Hypermobility of the extremities	R	p-value
Upper limb	-0.187	0.061
Lower limb	-0.250	0.011*

**significant at p< 0.05;* Key: R-Pearson correlation coefficient.

Discussion and Conclusion

This objective of this study was to investigate the prevalence of generalised joint hypermobility and its association with sports injuries among recreational cricket players. Findings from this study showed that among recreational cricket players, upper limb injuries were more common than lower limb injuries. This finding is contrary to the result of a study carried out by Orchard *et al.* (18) on cricket players where lower limb injuries were more common than upper limb injuries.

Of the injuries that occurred in the upper limb among the cricket players in this study, hand/finger injuries were the most common, followed by the shoulders and then wrist. This agrees with the result of the study carried out by Dhillon et al. (19) on professional cricket players who reported that of the 16 injuries that occurred in the upper limb in their own study, 11 were seen in the hand. It also agrees with the result of the study carried out by Stretch, (20) on elite cricketers who reported that the upper limb injuries were predominantly to the phalanges and gleno-humeral joint.

Of the injuries that occurred in the lower limb among the cricket players in this study, ankle injuries were the most common followed by thigh injuries, and knee injuries, this is contrary to the findings of the study by Stretch (20) who reported that injuries to the patella and knee followed by injuries to the hamstrings,

quadriceps and ankle constituted the most common areas affected. Most of the injuries in this study occurred during a competitive match (65.20%), while 34.8% occurred during training, this is similar to the result of

the study carried out by Stretch and Venter (12) among South African cricket players who reported that most injuries occurred during first-class matches (32%), limited-overs (26%), practices and training (27%). It also agrees with the result of the study by Orchard *et al.* (18) who reported that most injuries were sustained in test and first-class matches (40%) and 1-day matches (28%), with 28% sustained in activities outside matches. This could be as a result of players putting in more effort during a competitive match than during training.

Out of the total number of injuries, 13.04% were severe enough to prevent the cricketers from returning to play for more than 4 weeks. This finding is contrary to the result of the study carried out by Dhillon et al. (19) on professional cricket players who reported that 65% of the injuries were severe enough to prevent the cricketers from returning to play for more than 4 weeks and also contrary to the findings of the study of Stretch (20) on elite cricketers who reported that 26.1% of the injured players were not able to practise or play matches for more than 21 days. This maybe as a result of a better understanding of the scientific and medical aspects of the sport, allowing better management of the injured players or the different levels of play of the studies where professionals play more intense matches than recreational players, causing the higher percentage of severe injuries among them.

Prevalence of generalised joint hypermobility in this study was 50%. This is similar to the prevalence quoted in the study carried out by Ji Won Kwon. (21) at Korean adults female. This prevalence was contrary to the one reported in study carried out by Didia et al. (22) on students who reported it to be 12.19% and Stewart and Burden (15) on first division rugby players who reported the prevalence to be 24%. This could be as a result of gender, ethnicity and age of the participants.

The result of this study revealed that there is no significant association between generalised joint hypermobility and upper limb injuries in recreational cricket players but there is a significant association between generalised joint hypermobility and lower limb injuries in cricket players. This could be as a result of the upper limb hypermobility being an advantage in cricket skills.

Findings of this study were similar to the result of a previous study by Stewart and Burden (15) in which hypermobile athletes have been shown to have increased risk of injury in amateur rugby. It also supports the result of the study by Smith et al. (23) who revealed that there is significant association between generalised joint hypermobility and sports injuries among netball players. Similar results were also found in a study carried out by Decoster et al. (24) on lacrosse participants and Collinge and Simmonds (25) on professional football players. This could be as a result of the diversity of contact and non- contact sports.

Previous study have focused on injury rates in groups thought to have a high incidence of hypermobility, such as dancers and ballerinas Bird (26) or gymnasts. This study differs from previous work, in that the sport, cricket was chosen independent of any expectation about their joint mobility.

It remains unclear why subjects with hypermobile joints are predisposed to injury. It could be as a result of the increased maximal stretch angle in the hypermobile muscle tendon unit with an enhanced tolerance to passive tension Magnusson et al (27) but this has not been shown to have a direct connection to muscular complications. Patients with hypermobility syndrome have been shown to have impaired joint proprioception in both the knee and finger joints (28). This impaired proprioception may account for the increase in acute injuries.

Based on the results of this study. It was concluded that there is no association between generalised joint hypermobility and upper limb injuries among recreational cricket players while there is significant association between generalised joint hypermobility and lower limb sports injuries in recreational cricket players.

Conflict of interest. None declared. *Acknowledgement.* The authors acknowledge the contribution of all the subjects that participated.

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Received: March 20, 2016
Accepted: May 25, 2016