Varun Singh
Assistant Professor, Dept. of
Physiotherapy, GJUST Hisar,
Haryana, India

Shashwat Prakash
Consultant Physiotherapist,
Physio4U: Advanced
Physiotherapy, Lucknow, Uttar
Pardesh

Sonu Punia
Assistant Professor, Dept. of
Physiotherapy, GJUST Hisar,
Haryana, India

Sivachidambaram Kulandaivelan
Assistant Professor, Dept. of
Physiotherapy, GJUST Hisar,
Haryana, India

Relationship between pre-competition anxiety and performance levels in inter-university women football teams

Varun Singh, Shashwat Prakash, Sonu Punia and Sivachidambaram Kulandaivelan

Abstract
Introduction: One of the psychology factor that is believed to have an effect on athletic performance is the level of anxiety experienced prior to an athletic contest. This is referred to in the literature as pre-competitive anxiety (PCA). PCA has both positive as well as negative role in performance.
Objective: The aim of this study was to see the relation between performance and PCA level in inter-university women football team.
Methodology: Study design: Present study was a cross-sectional study and correlational design. Sample size: 273. Sex: Female. Number of teams: 16 amongst total 20 teams.
Protocol: All participants completed SCAT (Sports Competition Anxiety Test) questionnaire for measuring PCA. The teams were ranked according to their performance in the tournament (1-16 ranks and 1-6 position).
Statistics: Data were analyzed using IBM SPSS v21.0 software. Spearman rank correlation test was used to measure the correlation between PCA and performance.
Results: All teams had moderate level of anxiety (mean SCAT score >17) expect two teams. There was a moderate negative correlation between team's PCA and performance (rho -0.554). This level of correlation decreased when individual SCAT score with performance (~ -0.3). There was a high correlation between SCAT score based on rank and SCAT score based on position (rho 0.904).
Conclusion: The present study supports that within moderate PCA level, the performance increases as the PCA level decreases amongst national level inter-university football teams.

Keywords: Athletic performance; Football; Youth sport; Test anxiety scale; Universities; Survey and questionnaires

1. Introduction
Team sports like football, individual player's physiological and psychological factors play a significant role on performance [1, 2]. Many studies from western countries show the role of psychological factors on sports performance [3]. Players experience anxious thoughts just before the important games and tournaments due to the expectation from team management, fans, financial rewards (motivation) etc. [4, 5] These thoughts can influence the on-field performance either positively or negatively depending on the personality type of players, experience [6], mental skill [7], strength of opponent team [8], strength of own team [9] etc. [10]

Anxiety can be defined as the tensions or worries due to stress (i.e) team sports- important matches. Even though many literatures described anxiety as negative factor, it may improve or decrease the performance depending on the factors mentioned above. There are two forms of anxiety trait and state. Trait anxiety is a personality of an individual who respond to the situations in a same manner over the period of time and is stable. Whereas state anxiety is situation-specific which occurs just before the situation (i.e) situations the player thinks important or significant to their career. Among the two types, state anxiety plays a significant role on performance especially in important tournaments, games. Literature describes this as pre-competition anxiety (PCA). PCA has both positive as well as negative role on performance of individual players which translates into team performance. Another classification of anxiety is somatic anxiety and cognitive anxiety.

Correspondence
Sonu Punia
Assistant Professor, Dept. of
Physiotherapy, GJUST Hisar,
Haryana, India

Somatic anxiety depends on physical/physiological state of player whereas cognitive anxiety depends on mental state of the players. Performance of players improves with increasing anxiety, literature describes this as arousal, level up to the extent [11, 12]. If the anxiety crosses certain limits, the player will lose the control and their performance started to decrease [13, 14]. Players cannot perform at their best like they usually do because of anxiety. This is called inverted 'U' theory which was first described by Yerkes and Dodson [15]. This individual player's performance collectively may influence the team's success or failure in the tournament [16]. Many researchers conducted experiments to see the association between anxiety and performance [17, 18].

Most of the literature supports that high level of PCA will decrease the players performance in important tournaments [14, 19]. During the 1980s and thereafter, sport-specific trait anxiety has frequently been assessed using the Sport Competition Anxiety Test (SCAT) [20], a uni-dimensional measure that does not distinguish between or measure differences in somatic and cognitive anxiety. The aim of this study is to see the relation between performance and PCA level in inter-university women football team players.

2. Methodology
2.1 Study design: Present study was a cross-sectional study and correlation design.
2.2 Sample size: All players who participated (n=365) all-India inter-university tournament held at GJUST, Hisar in the months of December 2013-January 2014, were invited to join this study by explaining the purpose. 273 (response rate 74.8%) women football players were agreed to participate. Prior to contacting players, permission was requested from coaches. Written informed consent was taken from every player who volunteered to the study.
2.3 Instrument used: Competition related anxiety of the athletes was measured using Sport Competition Anxiety Test (SCAT) developed by Rainer Martens in 1977 [20]. All 273 players were provided with SCAT questionnaire and they were asked to give their opinion strictly independent manner. SCAT contains 15 items, which include 5 spurious items, 8 positive items and 2 negative items. Each item had three possible responses i.e. (a) Rarely (b) Sometimes (c) Often. 10 measure (item 2, 3, 5, 6, 8, 9, 11, 12, 14, 15) symptoms

associated with anxiety. The five items (1, 4, 7, 10, 13) that are not scored, are included to reduce bias. We modified the SCAT form to meet our requirements (i.e) standard instructions of the SCAT ask respondents to indicate how they "usually feel when competing in sports and games"; however, to make the instruments more relevant to the players in this study, the phrase "sports and games" was replaced with the word "football" etc. The lowest possible score is 10 on this test and the highest possible score is 30. A low score indicates low anxiety and a high score indicates high anxiety.
2.4 Protocol: Before administering the SCAT test, the procedure and the purpose was briefly explained to all the subjects for better understanding and to increase the motivation level. All participants completed SCAT form approximately 2 hours before the scheduled match time to allow the proper preparation of individual team. The SCAT form used for this study was in English and examiner translated to Hindi if player not able to understand. Help of other player with English knowledge was used to translate it to the players who mother tongue was not Hindi and unable to understand English. It took approximately 5 minutes to complete the form. Since the tournament contained both league (round-robin) and knock-out stage, SCAT was administered only once during league stage by three of the authors (VS and both SP). The teams were ranked according to their final position in the tournament.
2.5 Data analysis: Data was analyzed using IBM SPSS (version 21.0) software. Spearman rank correlation test was used to measure the correlation between PCA and performance.

3. Results
All 273 players were from 5 different zones (3-4 universities from each zone) of the country (55 players from central zone, 46 from north zone, 51 from east zone, 50 from west zone and 68 from south zone). All teams had moderate level of PCA (SCAT score between 17.3 and 21.17) expect two teams which had low level (team 6 and 16). Mean SCAT score 18.7 fell within the lower end of moderate anxiety level. Spearman rank correlation test showed that there was a moderate negative correlation between mean team PCA and performance based on final ranking after tournament (rho - 0.554) (Table 1).

Table 1: Descriptive statistics and spearman's correlation of team SCAT score and rank based on final performance (individual n=273; team n=16)

S. No	Team Code (n)	Zone	Rank	SCAT Mean±SD	Low Score	High Score
1	Team 1 (19)	Central	7	19.53±2.82	15	26
2	Team 2 (18)	Central	8	17.67±3.16	13	25
3	Team 3 (18)	Central	16	19.78±1.17	17	22
4	Team 4 (18)	North	1	17.39±4.03	13	24
5	Team 5 (12)	North	11	21.17±2.08	18	25
6	Team 6 (16)	North	6	14.81±2.14	10	18
7	Team 7 (16)	East	10	20.06±1.98	17	25
8	Team 8 (16)	East	13	18.69±1.66	16	21
9	Team 9 (20)	East	5	17.30±1.34	15	20
10	Team 10 (17)	West	15	19.53±4.26	13	25
11	Team 11 (16)	West	14	19.44±2.42	16	25
12	Team 12 (18)	West	12	20.83±4.31	14	27
13	Team 13 (13)	South	3	18.38±1.71	16	22
14	Team 14 (18)	South	9	19.67±2.17	17	24
15	Team 15 (18)	South	4	19.78±2.86	14	25
16	Team 16 (20)	South	2	16.10±2.88	13	25
	Grand Total (273)			18.70±3.16	10	27

Table 2: Descriptive statistics and spearman's correlation of team SCAT score and rank based on best level of play (individual n=273; position n=6)

S. No	Position/Level of play (n)	Rank	SCAT mean±SD	Low Score	High Score
1	League stage (149)	6	19.60±2.92	13	27
2	Quarter finalist (55)	5	17.35±2.85	10	26
3	Fourth position (18)	4	19.78±2.86	14	25
4	Third position (13)	3	18.38±1.71	16	22
5	Runner-up (20)	2	16.10±2.88	13	25
6	Winner (18)	1	17.39±4.03	13	24

When the analysis was done based on best level of play during the tournament, both the mean SCAT score as well as correlation were similar to that of previous table (Table 2). The negative correlation between PCA and performance was decreased to mild when we analyzed individual SCAT score instead on team SCAT score (rho -0.326 versus -0.554). Results also showed excellent positive correlation between SCAT score based on team's final performance rank and SCAT score based on team's best level of play (rho 0.904).

4. Discussion

Purpose of this study was to see the relation between performance and PCA level in elite inter-university women football teams. Result of this study indicates that there was a moderate negative correlation between PCA and performance. PCA is one of the several psychological factors that are believed to have a significant effect on athletic performance [17, 21].

Mean SCAT score found in this study is similar to Indian college level volleyball players [22]; Indian university level field hockey players [23, 24]; Indian college level and academy level cricketers [25, 26].

Parnabas et al. found a moderate-to-high negative correlation in team sports like football [27], handball [28], basketball [29] and field-hockey [30] at university level. Our results also presents that there is a moderate negative correlation between performance and PCA. The importance of this study is the association is within moderate level of anxiety in all teams. Literature shows that both low as well as high anxiety will decrease the performance [11-13].

Craft et al. [17] conducted a meta-analysis on 29 studies to find out the relationship between cognitive anxiety, somatic anxiety, self-confidence subscales of and sports performance. They concluded that only self-confidence subscale showed consistent positive relationship with performance. Their subgroup analysis also showed self-confidence subscale with performance for team sports players (n=18); cognitive anxiety and self-confidence subscales with performance for college level athletes (n=16); self-confidence and somatic anxiety subscales with performance when the questionnaire administered 1-4 hours before competition (n=10). Their findings showed cognitive anxiety (very small) and self-confidence (moderate) had positive relationship with performance. Somatic anxiety had negative relationship (very small) with performance.

Football is a team game which involves not only complex and accurate motor skills but also psychological factors that differentiate the winning and losing team in major competitions. Ethiopian university level male football players scored less SCAT score (mean 16.47) than present study (mean 18.7) [31]; Similarly Indian district level male soccer players had mean SCAT score of 17.85 [32]. Generally females show more anxiety than males in different sports partly because of biological factors and societal expectations [33, 34].

A slight change in somatic anxiety between different zone players was observed during pre-competition. This may be due to difference between zones that progressed from league stage to knock-out stage (4 teams from south and 3 teams from north progressed to quarter finals. 3 teams from south progressed to 1-4 rank classification). This finding could be also due to the non-specificity of the questions in the SCAT form (i.e) the cues somatic anxiety is characterized by rapid heart rate and muscle tension which are also associated with the onset of exercise. Therefore, when subjects are asked to rate 'my heart is racing', the subjects could not interpret this question as exercise induced rather than anxiety induced. However, this problem was prevented by administering the SCAT two hours before the starting of the game.

The main limitation of this study is PCA was measured only once during the league stage of the tournament. It is possible that PCA might have increased as the tournament advanced especially amongst high ranked teams.

This study demonstrates that PCA has negative influence on performance in university level football players. Several rehabilitation techniques such as bio-feedback, diaphragmatic breathing, relaxation technique, visualization, progressive muscle relaxation, goal-setting, positive talk, focusing on performance (meditation), mental imagery could be used to reduce PCA [21, 35]. Sports physiotherapists, psychologists and coaches who are having experience in these techniques could be employed to reduce anxiety level just before the important team sports tournaments.

5. Conclusion

Present study demonstrates moderate negative correlation between PCA and performance in elite Indian university level women football players. We recommend identifying the individual players with high anxiety level and train them through positive thinking and other mental techniques so that chances of their team's success will be increased. Sports psychologists, coaches and sports physiotherapists may be used for this purpose.

6. References

1. Grange P, Kerr JH. Physical aggression in Australian football: A qualitative study of elite athletes. *Psychol Sport Exerc* 2010; 11(1):36-43. DOI: https://doi.org/10.1016/j.psychsport. 2009; 04.006
2. Schilling TA, Hayashi CT. Achievement motivation among high school basketball and cross-country athletes: a personal investment perspective. *J Appl Sport Psychol* 2001; 13:103-28. DOI: http://dx.doi.org/10.1080/10413200109339006
3. Crespo M. Tennis psychology: An overview and update. Newsletter of Society for Tennis Medicine and Science

2002; 5:12.

4. Khan Z, Haider Z, Ahmad N, Khan S. Sports Achievement. Motivation and Sports Competition Anxiety: A Relationship Study. Journal of Education and Practice 2011, 2(4).

5. Douglas A, Louis A, Alison C, Edward J. Psychology. 7th edition. Boston (NY): Houghton Mifflin Company, 2006.

6. Nayek B, Chatterjee K. Comparative study on pre-competition anxiety between national and state level women athletes. *IOSR* Journal of Sports and Physical Education 2013; 1(2):33-6.

7. Sangari M, Fotrousi F, Masrour FF. Relationship between mental skill and competitive anxiety in female national football players. World Appl Sci J. 2012; 20(8):1175-8. DOI: 10.5829/idosi.wasj.2012.20.08.2813

8. Abenza L, Alarcon F, Pinar MI, Urena N. Relationship between the anxiety and performance of a basketball team during competition. Revista de Psicologia Deporte. 2009; 18(l):409-13.

9. Szabo A, Szucs A, Gaspar Z, Sule K. Anxiety and affect in successful and less successful elite female basketball players: In-situ sampling before six consecutive games. Lase Journal of Sports Science. 2014; 5(2):75-92.

10. Kar S. Measurement of competition level anxiety of college level athletes by using SCAT. International Journal of Engineering Science and Innovative Technology. 2013; 2(3):367-75.

11. Singer RN. Motor learning and human performance. 3rd edition. New York: Macmillan; 1980.

12. Cratty BJ. Psychology in contemporary sport: Guidelines for coach and athletes. New Jersey: Prentice-Hall Inc; 1973.

13. Cremades JG, Wiggins MS. Direction and intensity of trait anxiety as predictors of burn out among collegiate athletes. Athletic Insight. The Online Journal of Sport Psychology 2008; 10(2).

14. Martens R, Vealey RS, Burton D. Competitive anxiety in sport. Champaign, IL: Human Kinetics; 1990.

15. Yerkes RM, Dodson JD. The relation of strength of stimulus to rapidity of habit formation. J Comp Neurol Psychol. 1908; 18:459-82. DOI: 10.1002/cne.920180503.

16. Patsiaouras A, Georgiadi O, Anagnostou G, Georgiadis T, Kokaridas D. The effect of a person-centered approach in the management of anxiety in sports: An examination study. Serb J Sports Sci. 2013; 7(4):187-93.

17. Craft LL, Magyar TM, Becker BJ, Feltz DL. The relation between the competitive state anxiety inventory-2 and sport performance: A meta-analysis. Journal of Sport and Exercise Psychology 2003; 25(1):44-65. DOI: https://doi.org/10.1123/jsep.25.1.44.

18. Parfitt G, Pates J. The effects of cognitive and somatic anxiety and self-confidence on components of performance during competition. J Sports Sci. 1999; 17(5):351-6. DOI: 10.1080/026404199365867

19. Cox RH, Qiu Y, Liu Z. Overview of sport psychology. In: Singer RN, Murphey M, Tennant LK, editors. *Handbook* of research on sport psychology. New York: Macmillan; 1993; 3-31.

20. Martens R. Sports competitive Anxiety Test. Champaign III: Human kinetics; 1977.

21. Bali A. Psychological factors affecting sports performance. International Journal of Physical Education, Sports and Health. 2015; 1(6):92-5.

22. Qureshi DU. Comparative study of anxiety test between college level table tennis and volleyball players. Scholars Impact 2015; 1(2):41-4.

23. Khan MT, Zafar M. State anxiety between university and national level field hockey players: A comparative study. IOSR Journal of Sports and Physical Education 2014; 1(7):37-8.

24. Kumar A. A comparative study of sports competitive anxiety among players. International Journal of Physical Education, Sports and Health 2016; 3(5):120-1.

25. Ramakrishnan KS, Sathya P, Ghelani B. Assessment of anxiety in sports person pre & post performance: A study on levels of anxiety in individual vs group sport. Int J Innov Res Sci Eng Technol. 2015; 4(9):8901-5. DOI: 10.15680/IJIRSET.2015.0409085.

26. Rastogi NK, Katiyar V. A comparative study of sports competition anxiety test between college level chess and cricket players. International Journal of Physical Education, Fitness and Sports. 2014; 3(3):22-5.

27. Parnabas V, Parnabas J, Parnabas AM. The effect of cognitive anxiety on sport performances among football players. The International Journal of Indian Psychology 2015; 2(Special Issue): Paper ID IJIPS20150201 (8 pages).

28. Parnabas V, Parnabas J, Parnabas AM. The level of cognitive anxiety and sport performances among handball players. The International Journal of Indian Psychology 2015; 2(Special Issue): Paper ID IJIPS20150202 (7 pages).

29. Parnabas V, Parnabas J, Parnabas AM. The relationship between cognitive anxiety and sport performances on Basketball. The International Journal of Indian Psychology 2015; 2. (Special Issue): Paper ID IJIPS20150203 (8 pages).

30. Parnabas V, Parnabas J, Parnabas AM. The influence of cognitive anxiety on sports performances among Hockey players. The International Journal of Indian Psychology 2015; 2. (Special Issue): Paper ID IJIPS20150204 (8 pages).

31. Khan A, Sorate BA. A comparative study of sports competition anxiety within Jimma university male players of different sports. Journal of Tourism, Hospitality and Sports 2016; 17(1):38-41.

32. Kerketta I. A comparative study of sports competition Anxiety between district levels male Volleyball and soccer players. International Journal of Physical Education, Sports and Health. 2015; 1(3):53-5.

33. Wilson GS, Raglin JS, Pritchard ME. Optimism, pessimism and pre-competition anxiety in college athletes. *Pers Individ Dif* 2002; 32(5):893-902. DOI: https://doi.org/10.1016/S0191-8869(01)00094-0

34. Lewinsohn PM, Gotlib IH, Lewinsohn M, Seeley JR, Allen NB. Gender differences in anxiety disorders and anxiety symptoms in adolescents. J Abnorm Psychol 1998; 107(1):109-17.

35. Parnabas VA, Mahmood Y, Ampofo-Boateng K. Cognitive, somatic and negative coping strategies among Malaysian athletes. European Journal of Social Sciences 2009; 9(3):387-98.