Impact of Nutrition, Physical and Mental Health on Performance of Sportspersons in Tamil Nadu- A Mixed Method Study

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ABSTRACT

Background: Sports is a physical activity which involves effort and skill in which an individual or a team competes another or others for entertainment. Pressurised environment and a number of setbacks may lead to mental health problems. This article aims to determine the impact of nutrition status and the impact of physical and mental health on the performance of sportspersons studying at various institutions in Tamil Nadu. **Methodology:** This is a mixed method study in which both qualitative and quantitative data are analysed and combined. In which, sequential explanatory mixed method is done quantitative data were collected and analysed first followed by qualitative data collection. **Result**: 8.75% of the participants followed mixed type of diet. To increase carbohydrate loading only 12% of the participants took special diet during practice and competition. 58.75% of them did not take any supplements to enhance the perforamance.20.61% of the participants relied on internet of nutrition. 4% of respondents underwent psychiatric treatment for depression. **Conclusion**: Acquiring good nutrition is possible through various source but maintaining good dietary practice is necessary. Injuries are expectable in the field of sports and pressurised situations are common for all. But diligent management of injuries and a strong willpower and a desire to win would success.

Keywords: nutrition, injuries, stress, mixed method.

Introduction

The name “sport” is derived from the Italian word “desportate” which means “fun spending time” for the people of higher order[1.] Oxford English language dictionary defines sport [2] as “an activity which involves physical effort and skill in which an individual or a team competes another or others for entertainment” [3]

Extensive physical training and strict exercise accompanied by a strict dietary regimen are the prerequisites of sports. Physical exercise up lift our mood and has been proven method for stress relief. Exercise can combat feelings of anxiety and depression and sharpen our mind

forces improve our self -esteem. The aggregation of all these benefits promises longer, healthier and more joyful life.[3]

Sports influence the ability of the brain to focus, concentrate, capture, store and process the information. So, impact of sports on education is indispensable and hence students are encouraged to participate in sports. Sports also foster teamwork skill, social and risk-taking attitude, management skill and leadership skill. All these skills help to acquire top position in perfection and to maintain good relationship later.

Fit and healthy individuals constitute an overall healthy society and a strong nation. Hence sports persons are considered as an asset to a nation. Their potential is showcased at global platform. All countries aspire to become a sport super power and establish themselves as great sporting nations. Olympic sports practice and establishing various championship tournaments and federations are mainly for achieving this goal

An activity like sport requires efficient physical performance and demands a rich healthy and balanced diet. Inadequate intake of carbohydrates, proteins, vitamins and minerals exert a negative influence in the performance. There are many instances of sports persons who due to poor economic background or inadequate knowledge have insufficient intake of nutrition and gradually lose their physical efficiency to perform.[7]. Injuries and illness caused during the tournament make a negative influence on their performance.

Highly pressurized environment and number of setbacks due to personal loss and the like may lead to mental health problems. Consequently, sports persons suffer from stress, anxiety and depression. These mental ill health symptoms may have sports related manifestations and impair performance.[4]

It is time we inspire young talent. We need to instill immense spirit of participation in sports that helps players prove their potential. Indian government has realized the importance of this mission and hence has dedicated the Khelo – India program, a specialized national scheme for overall sports development along with the first ever national sports university inaugurated in Imphal (Manipur)[5]. Indian government has instituted Rajiv Gandhi Khel Ratna award, Dron Acharya award, Arjuna award and Dhyan Chand award for sports persons for setting milestones in this field[6]. With this backdrop a study on the nutritional status and both physical and mental health of sports persons studying at various institutions in Tamil Nadu that provide physical education in their curriculum has been done.

Materials and methods:

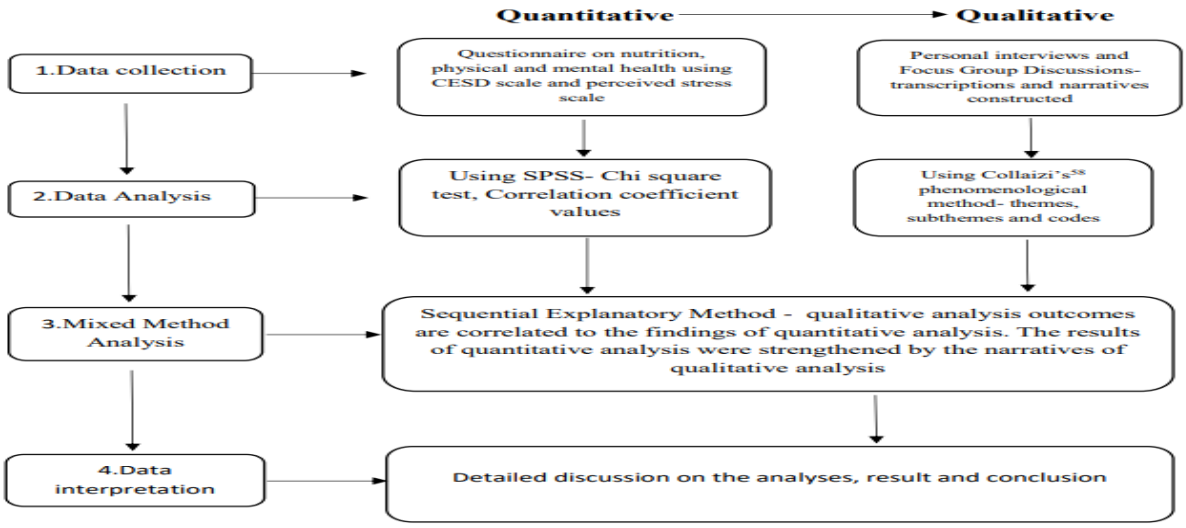

Fig.1 Flow chart

Study design: This is a mixed method study in which both quantitative and qualitative data were analysed and combined for study purpose. It is a sequential explanatory mixed method analysis in which quantitative data are collected and analysed first followed by qualitative data collection and analysis to clarify and conceptualize the quantitative findings. **Study setting:** The list of various educational institutions in Tamil Nadu having curriculum on physical

education was prepared as sampling frame from which institutions namely Arul Anadhar College, Savithabai Higher Secondary School, Sithalakshmi Girls Higher Secondary School from Madurai District , Arignar Anna stadium, Trichy, Ayyanadar Janaki Ammal College, Virudhunagar District were selected by Simple Random Technique. **Study period:** The study was conducted from October 2019 to June 2021. Permission was acquired from the authority of above-mentioned institutions. Students from various other institutions also responded for quantitative data collection, as it was done by online mode during COVID 19 pandemic lockdown. **Sample size:** The prevalence of the sports nutrition knowledge score (moderate) before nutrition education was reported at 55% by Mrs.G. Latha et al. (2014), in the edition of the Journal of Emerging Technologies and Innovative Research. Based on this guide, we assume a 95% confidence interval, a 5% absolute precision value, and an available population size of 3000. The minimum required sample size will be 338 ~ 345.$n = \frac{Z^2_{1-\frac{\alpha}{2}}\, p(1-p)}{d^2}$. **Study tool:** The study instrument was pilot tested on 50 randomly selected participants from Bharathiyar university in order to validate the instrument.

- A semi structured questionnaire containing questions on socio-demographic details, about the sports of interest and achievements at various levels and about nutrition, anthropometry and physical health was used. Then mental health was studied with
- CES-D Centre for Epidemiological Studies Depression scale
- Perceived stress scale.

Data analysis

The data obtained were entered in Microsoft excel sheet and analysed by SPSS.Ver.25. Descriptive statistic frequency percentages, mean and SD were calculated.

Asses the strength of relationship between categorical variable we applied Chi square test at 5% level of significance.

Focus Group Discussions (FGD).

By using purposeful sampling method, 10 participants were selected from four institutions who were institutional and professional players for personal interviews and Focus Group Discussions(FGD). The recording of interviews and FGDs were transcribed and translated into English, organised into statements and formulated into themes and subthemes. The themes and subthemes were formulated based on the categories taken in quantitative analysis. The text image data obtained were coded and analysed for themes, subthemes, code family and code names. Sequential Explanatory Method is adopted in mixing quantitative and qualitative analyses. The narratives evolved in the qualitative analysis were correlated to the percentage values of each level of players from the quantitative findings. **Ethical clearance:** Ethical clearance was obtained from the Institutional Ethics Committee of Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madhuranthagam, Tamil Nadu.

Results:

Table 1: Sociodemographic details of study participants (n =355)

Study Variables	n	%
Age in Years		
16-20	69	19.4
21-25	249	70.1
26-30	30	8.5
31-35	7	2
Gender		
Male	209	59
Female	146	41

Table.1 show that age of the participants ranged from 16-34 years with the mean of 22.68±2.718 years. Among the 355 participants, 69 (19.4%) of them were from 16-20

years,249 (70.1%) of them were from 21-25 years, 30(8.5%) of them were from 26-30 years and 7 (2%) of them were from 31-35 years. Majority of them (70.1%) were under the age group of 21-25 years. It shows that among 355 study participants (209)59% were male and (146) 41% were female

Distribution of the study participants based on the source of nutrition information and types of special diet

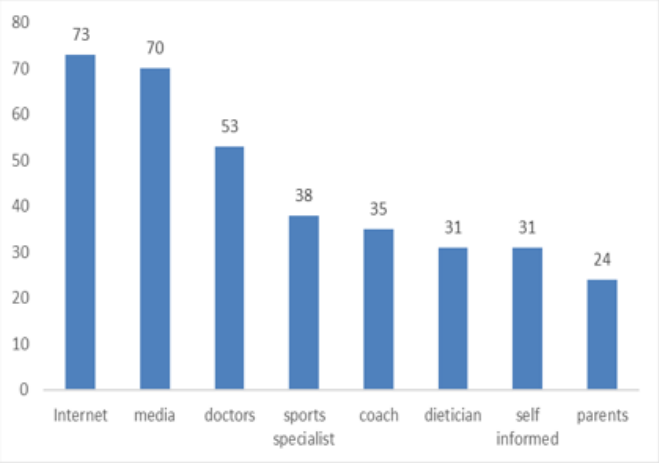

Fig.2. Source of nutrition information

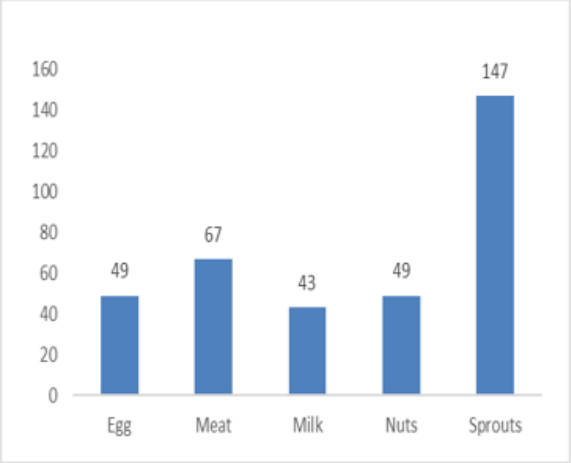

Fig.3 Source of special diet

Among the study participants 147 take sprouts as special diet, 67 consume meat ,49 of the study participants consumes nuts and 49 take egg ,43 take milk as the source of special diet. Most of the players 73 get the nutrition information from the internet, and 70 from media and 53 from doctors, 38 from sports specialist, 35 from coach, 31 from dietician, 31 self-informed and 24 from parents.

Table 2: The Association between the Level of the player and History of injury for the study participants

Level of player	History of Injury		P-Value
	No, n (%)	Yes, n (%)	
School	67(98.5)	1(1.5)	0.028*
College	93(93.1)	7(6.9)	
University	5(83.3)	1(16.7)	
District	23(95.8)	1(4.2)	

State	55(100)	0(0.0)	
National	100(99)	2(1)	

Table 3: Association between level of the player and level of stress based on Perceived stress scale

Level of player	PSS Scale			P-Value	Depression Category		P Value
	Low n (%)	Moderate n (%)	High Perceived n (%)		Depressed n (%)	Not Depressed n (%)	
School	8(11.8)	37(54.4)	23(33.8)	0.001*	52(76.5)	16(23.5)	0.936
College	8(7.9)	40(40.6)	52(51.5)		82(82.2)	18(17.8)	
University	1(16.7)	3(50)	2(33.3)		5(83.3)	1(16.7)	
District	4(16.7)	19(79.2)	1(4.2)		19(79.2)	5(20.8)	
State	0(0.0)	31(56.4)	24(43.6)		46(83.6)	9(16.4)	
National	9(8.8)	63(61.8)	30(29.4)		82(80.4)	20(19.6)	

The association between the level of player h/o injury was found to be statistically significant (p=0.028*). The association between the level of the player and stress- based on Perceived Stress Scale (PSS) was significant but depression category based on (CES-D) – Centre for epidemiological studies Depression Scales was not significant.

Nutrition Practice

In focus group discussion on of the district level player said " Many consider animal based food including meat, egg, milk etc., as rich protein source. Nuts, pulses and proteins are vegetarian protein sources recommended. Protein powder denied by some and recommended by some." No artificial supplement recommended. According to another player, "60% Carbohydrate rich food and 10% fiber rich food suggested. Chappathis and Rice recommended. No fatty or oily food before and during the match." 3-4 liters of water daily and 7 Liters during work out times and as per climatic condition was suggested by college level player.

Physical Health

"Physiotherapy and adequate rest is recommended. Human anatomy and dealing with injury taught for us in syllabus and first aid kit is maintained." Was said by another player.

Mental Health

"No stress occurs due to sports. Sports reduces stress. Focused mind and confidence win despite stress. "was according to another player

Themes and Codes as Per Applied Thematic Analysis

Themes	Code family	Code Name	
		Predetermined codes	**Emergent codes**
Nutrition Practice	Type of diet	Essential protein intake	1. Many consider animal proteins including meat, egg, milk etc., as rich protein source. 2. Nuts, pulses and proteins are vegetarian protein sources recommended. 3. Protein powder denied by some and recommended by some.
	Supplement intake	Veg/ Non-Veg supplements	1. Eggs, Meat, Chicken and lots of nuts and sprouts recommended. 2. No artificial supplement recommended.
	Nutrients intake and hydration	Nutrients	1. 60% Carbohydrate rich food and 10% fiber rich food suggested. Chappathi and Rice recommended. 2. No fatty or oily food before and during the match.
	Nutrients intake and hydration	Hydration	1. 3-4 liters of water daily and 7 Liters during work out times and as per climatic condition. 2. Juice and Glucose water allowed.
	Knowledge and Awareness	Diet practice	No sufficient knowledge on diet practice.
		Sufficiency / Satisfactory diet	Sufficient diet available only in sports hostels. Individual spending needed for satisfactory diet.
Physical Health	Fitness / Optimal health	Fitness for sports	Only physically fit person can enter into the sports field.
	Sports related injury / fracture, sprain etc	Availing allopathy treatment	1. Injury is common in sports 2. Physiotherapy and adequate rest recommended. Human anatomy and dealing with injury taught in syllabus. First aid kit maintained.

			3. 5 days practice and 1-day adequate intermittent rest is generally recommended 4. IP for severe injury / fracture and adequate rest.
	Common health issues	Availing allopathic medicine for treatment	1. Eye sight problem, typhoid, Chickungunia, PCOD- Allopathy treatment 2. Asthma – breathing exercise; no allopathy treatment.
Mental Health	Prevalence of stress, its causes and participant's response	Practice related stress	1. No stress due to sports. Sports reduces stress. 2. Focused mind and confidence win despite stress. 3. Participation in sports recommended in various departments as stress – buster.
	Factors causing stress / depression	General factors	Controversies / conflicts, postponement of tournament are the general factors
		Individual factors	Denial of chance, rejection, economic status, injury, break up in friendship and staying away from home. Are individual factors
	Positive attitude	Efforts taken	Focusing gaining mental strength, visualizing the victory and warm-up activities.

Mixed Method Analysis- Colaizzi's phenomenological method

Joint display of quantitative and qualitative findings regarding the impact of various factors on performance of sportspersons

IP* =Institutional players Include school level, college level and university level players

PP* = Professional players include district level, state level and national level players

Themes/Factors	Extent of impact of nutrition, physical and mental health on performance				
	Quantitative findings				Qualitative findings
	Cross tabulation value	Status (significant/ Insignificant)	Inference (comparison between institutional players (IP)* and professional level players(PP))*		
			Attribute 1	Attribute 2	
Type of diet	0.001	significant	Ordinary diet: IP --- 52.5%	Special diet: IP --- 45.5%	- -Students and coaches prefer special type of diet with rich protein source.

			PP--- 47.5%	PP--- 54.5%	
Supplement intake	0.344	Not significant	With supplement: IP --- 66.6% PP---33.4%	Without supplement: IP --- 49% PP---51%	--No artificial and processed supplements like protein powder are preferred.
Hydration	0.001	significant	Below 3 litres per day: IP --- 58% PP--- 42%	3 litres and above per day: IP --- 48.6% PP--- 51.4%	--Adequate consumption of water with 3-4 liters daily and 7 Liters during work out times and as per climatic condition recommended --Juice, energy drinks and Glucose water allowed.
Knowledge and awareness on nutrition and diet	0.000	significant	Internet and media (self-informed): IP --- 45% PP--- 55%	Expert advice: IP --- 52% PP--- 48%	--students mostly are self-informed about diet and nutrition through internet and media sources --expert's advice taken by few from coaches
Sufficiency of nutrition	0.090	Not significant	Percentage of students who take home food ---- 55.3%	Percentage of students who take hostel food with self-spending ---- 44.7%	--food with sufficient nutrients available only in sports hostels --food provided in normal institutional hostels not sufficient and students skip meals if not good

Ip at hospital and related congenital health issues	0.137	Not significant	With history of ip: IP --- 24% PP--- 76%	Without history of ip: IP --- 50.8% PP--- 49.2%	--congenital health issues don't hinder students from pursuing games --students suffereing from asthma, eyesight problems, typhoid, pcod, menstrual cramps continue playing after treatment --treatment from doctors, breathing practices followed for recovery
Confidence level and positive attitude in response to stress	0.001	significant	Without confidence: IP --- 57.6% PP--- 42.4%	With confidence: IP --- 48% PP--- 52%	--no significant sports related stress, students and coaches opine that sports reduces stress --students follow positive affirmations and visualization during challenges --sportsmanship and team spirit cultivate confidence and mental strength among students
Fear factors and negative emotions	0.001	significant	Low nervousness range: IP --- 46% PP--- 54%	High nervousness range: IP --- 48% PP--- 52%	--students depressive about denial of opportunity, partiality and postponement of tournament --repeated injuries and

					rejection in selection cause stress

Discussion:

In this study, 23(5.75%) participants followed exclusively vegetarian diet, 41(1.25%) followed only non-vegetarian diet and 334(83.75%) participants followed mixed type of diet. Sangeetha M et al. in their study on the nutritional status of participants in Coimbatore district [7] have reported that 15% of their respondents followed vegetarian diet, 80% followed non-vegetarian diet and 5% followed mixed diet. 47(11.24%) respondents used multivitamin capsules and 27(6.75%) took glucose as other supplements. 235(58.75%) did not take any special supplement to enhance the performance. Balthazar G et al. (2019), in their study on elite Spanish athletes reported that 152(45%) respondents used protein supplement. Abbey EL et al in their study on the nutrition practices of American football players have reported that protein powder was the most commonly used supplement (34%). Opinion of the state level players in the present study vary as one recommends protein powder and the other went against protein powder or any other artificial supplements.[8] In the current study, 20.61% respondents relied on internet for nutrition guidance. 6.69% accepted the recommendations of their parents, 9.75% sought the guidance of the coach and they also sought the recommendations of media 19.78%, doctors 15.04% and general dieticians 8.64% and 8.64% participants were self-informed. In a study by Folasire et al. 78% of respondents had stated that they did not seek any nutritional advice and 21.8% of participants sought nutritional advice. Of those who sought nutritional advice, 41.7% were advised by coaches, 37.5% by dieticians, 8.3% by their friends and 12.5% by doctors.[9] In a study by Abbey et al on dietary practice of the sportspersons, 5% followed the guidance of the professors, 25% that of coaches, 5% that of nutritionists and 19% that of athletic trainer, 9% took physicians' advice, 6% went for journals and 3% were self-informed.[8]

In this study, 16 (4.5%)respondents had allergy, 3 (0.84%) had asthma and 16(4.5%) had poor vision and were using specs. Professor Mike Gleeson, in his study on how common are illness amongst athletes had stated that 10% to 20% of the athletes has digestive system illness, 10% to 15% had skin infection and 5% to 10% had genitourinary infection. He had also stated that 33% of respiratory tract infection made many British athletes miss training session in different Olympic games.[10]

He had also stated that 33% of respiratory tract infection made many British athletes miss training session in different Olympic games.[10] In this study, 28(7%) participants had workout stress and 189(47.5%) had stress for various other reasons. 16(4%) respondents underwent psychiatry treatment for depression. The coaches and participants of FGD had affirmed that there will not be any stress due to sports and that sports reduce stress.

In a systematic review of 8882 articles by Rice S M et al.(2018) had stated that depression was the most frequently assessed mental health domain in the 70.4% of the included studies[11]. Gomez G.C et al. have stressed in their study that there was a prevalence of anxiety and stress for 40% and depression for 26.9%.[12].Kerr ZY et al.(2014) in their study on former collegiate athletes have stated that there was a prevalence of anxiety(16.2%) and depression(10.4%) among their respondents [13] and in a study by Emily Kroshus (2016) the depression and anxiety rates were 32.5% and 30.7% respectively [14]. One of the participants in FGD of the present study stated that there was less stress in team sports than in individual sports. The same view was reflected by Pluher E et al.(2019), in their study on anxiety and depression in individual and team sports athletes. They have reported that the rate of anxiety/depression between individual and team sports was 13% : 7%.[15]

Conclusion

Many of the participants feel that their performance will be better if better nutrition is available. Only 51% of the College Level Players and 36% of State Level Players get special diet before practice or competition.

The number of participants who follow the guidance of the coaches and doctors for nutrition practice is less than that of those who rely on internet for guidance for nutrition intake. The participants highly recommended Non – Vegetarian diet. But the opinion varies as to weekly how many days they should consume non- vegetarian diet.

It is common to get sports related injuries in the field of sports. But only 96 % College Level and 95% National Level players among the participants had injury and 97% participants were injured. Those who were severely injured and got fracture, switched over to some other field of sports and they had to struggle to excel. The lower abdominal pain and heavy flow during menstruation did not hinder the performance of the female participants.

Personal issues like break up in friendship, death of a family member, poor economic condition or the other issues like rejection from selection, postponement of competition, repeated injuries and denial of chance bring mental disturbances and they feel stressed and depressed. But sports activities and practices relieve stress. Such personal issues also make positive effect in the performance in the case of some players.

Recommendations

- The players should follow a diet chart according to their field of sports. More affluent people should come forward to be the patrons of the sports persons who are economically back ward. The institutions which provide physical education should maintain a separate mess specially meant for sports persons.
- The sports person should be aware of sports medicine.

❖ The sports persons should learn stress management and should improve positive attitude and a strong will power.

References:

1. Merriam-Webster. Merriam-Webster's Advanced Learner's English Dictionary .2nd edition. Springfield (MA): Merriam-Webster, Inc.; 2016 [2025 Mar 03].
2. Oxford University Press. Oxford Dictionary of English. 3rd edition. Oxford (UK): Oxford University Press; 2010 [cited 2025 Mar 03].
3. Wikipedia- en.m.wikipedia.org last accessed on 4/8/2024.
4. Souter G, Lewis R, Serrant L. Men, Mental Health and Elite Sport: A Narrative Review. Sports Med Open. 2018 Dec 19;4(1):57
5. Ministry of Youth Affairs and Sports, Government of India. Khelo India – About [Internet]. [cited 2025 Mar 03]. Available from: https://kheloindia.gov.in/about-
6. Sports Development Authority of Tamil Nadu. Official website of the Sports Development Authority of Tamil Nadu [Internet]. [cited 2025 Mar 03]. Available from: https://sdat.tn.gov.in
7. Sangeetha KM, Ramaswamy L, Jisna PK. Assessment of Nutritional Knowledge and Impact of Nutrition of Nutrition Education Among Selected Sports Persons of Coimbatore Districts. International Journal of Science Research .2014;3(11): PP: 970-978.
8. Abbey EL, Wright CJ and Kirkpatrik CM. Nutrition Practices and Knowledge among NCAA Division III Football Players. Journal of Internal Society of sports Nutrition.2017;14:13, PP:1-9.

9. Folasire OF, Akomolafe A. Sanusi RA. Does Nutrition Knowledge and Practice of Athletes Translate to Enhance Athletic Performance. Global journal of Health Science .2024;7(5), PP: 215-225.
10. Gleeson M. How common are illnesses amongst athletes*?* [Internet]. My Sports Science. [cited 2025 Mar 03]. Available from: https://mysportsscience.com/
11. Rice SM. et al. Sport-Related Concussion and Mental Health Outcomes in Elite Athletes: A Systematic Review**.**Sports Medicine.2018;48: PP: 447-465.
12. Gomez GC et al. Sleep Quality and Its Association with Psychological Symptoms in Adolescent Athelets, Journal of Revista Paulista de Pediatria. 2017;35(3):316-321
13. Kerr ZY , Defresse JD and Marshall SM. Current Physical and Mental Health of Former Collegiate Athletes, The Orthopaedic Journal of Sports Medicine ;2014;2(8).
14. Kroshal E et al. Variability in institutional screening practices related to collegiate athletes mental health. Journal of athletic training.2016;5(15); PP: 389-397.
15. Pluhar E et al. Team Sports Athletes May Be Less Likely to Suffer Anxiety or Depression Than Individual Sports Athletes. Journal of Sports Science and Medicine.2019;18: PP: 490-496.