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A Co-Relation Study between the Physical Activity, Stress and Intake of Micronutrients on Young Athletes (18-35 years) before and during Lockdown

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Abstract: ***As lockdown has imposed space for athletes from their daily training/practice sessions along with competition schedules, it increases the unpredictability about the future. Reduced training and imbalanced diet has affected their future competitiveness, damaging their physical, social and psychological abilities. This research was done to study how athletic performance was affected due to lack of training/practice sessions along with micronutrient intake and it's impact on mental health. A cross-sectional study was done with purposive sampling. Data was collected via online questionnaire which included sets of questions regarding physical activity, Cohort perceived stress scale and food frequency table for micronutrient, before and during lockdown. The study was conducted during lockdown hence, non availability of certain foods was observed, which resulted in low intake of micronutrients (especially Calcium, Iron, Vitamin C and Vitamin D) among 70% of athletes. These athletes were found more prone to injury and infections, which lowered their physical activity and thereby resulted in increased stress levels. Hence, it was concluded that before lockdown athletes were able to handle situations and manage their diet as well as training/practice sessions. However, during lockdown it became difficult for athletes to manage things holistically which affected their dietary pattern and mental health.***

Keywords: micronutrient, physical activity, stress, lockdown, mental health, athletes, sports performance, injuries, athletic performance

1. Introduction

Corona Virus pandemic began on 17th November, 2019 in China. Later by 11th March, 2020 it was designated as a pandemic by World Health Organization (WHO), (World Health Organization, 2020).According to the decision given by WHO, Government decided to impose worldwide lockdown. Many instructions were provide by WHO for the pandemic. The main instructions were to maintain social distance of 2 feet, wearing a mask was mandatory, wash hands frequently, social gatherings were prohibited. WHO recommended that individual should perform the physical activity at least 75 minutes during week. Due to lockdown the education system, economic status, physical activity, lifestyle of people got affected miserably. But even during lockdown all these things were continued in form of online education, work from home, online physical activity webinars etc. Infact people started to connect more through this online mode, and took this approach positively and became more health conscious. But as lockdown extended people started getting irritated and frustrated, there was a fear among people, feeling of helplessness, unemployment, shortage of essential things, financial issues, stress, mental health was affected, etc. All these factors contributed to much health related problems such as cardiovascular problems, respiratory problems, obesity, etc. The pandemic became threatening part to people's life and health, which became a world stressor. Lockdown increased the sedentary behavior amongst people and decreased the physical activity level. More time was spent doing work while sitting such as work from home, online lectures, etc. The pandemic affected everyone's life but athletes were affected the most, as the training pattern changed. Training sessions got restricted to online mode. Unavailability of coaches, trainers, hand on training, regular practice, etc. reduced the performance level of young athletes. This resulted in de-training of athletes. Principle of reversibility was observed.

Life of intense training individuals such as athletes was affected to a great extent. More specifically young athletes who were focused on their academic education and sports career. Athletes try to maximize their performance by maintaining diet, physical and mental health. As there was closure of training/fitness centers, gyms, restrictions on outdoor activities, led athletes to switch their training patterns. In this unusual circumstances, without getting proper guidance from the coaches or instructors they had to practice at home. Some young athletes were unable to continue their training sessions due to lack of space and equipment. This confinement reduced the performance level of young athletes and made them over think about their competitive career, which affected their mental health status, and athletes got susceptible to eating disorder. Eating disorder leads to deficiency of Vitamins and Minerals which causes many mental health problems such as anorexia nervosa and bulimia nervosa especially in female athletes. COVID-19 resulted in cancellation of major sport events such as Olympics, European Football Championship, National Basketball Association League and many more. This created a stressful environment for athletes and they believed that this was a lifetime loss for their game. On the other hand it was beneficial for some athletes who were under recovery period as they got enough time to recover and reach back to peak performance levels.

Mental health is a major resource for athletes in relation to their performance and development. (Robert J. Schinke). Young athletes faced more challenges as compared to that of general population and non-athletes. The pandemic not only affected their physical performance but also their mental health status. A study observed that a single negative

thought in mind made athletes disoriented and we're not able to concentrate on their game/performance. Many athletes were facing anxiety problems due to cancellation of training sessions, competitions, matches, etc. which hampered the physical activity status. Increase screen time during night disturbed the sleeping pattern. A hormone named melatonin is responsible for sleep. This sleep hormone melatonin is produced in darkness which makes the person feel sleepy. The secretion of hormone got minimized due to rays coming from the screen. This resulted in lack of sleep and insomnia in athletes. Incomplete sleep and rest made the athletes feel more restless, frustrated and increase the stress levels. Circadian Rhythm is physical, mental and behavioral changes that follows a 24 hours cycle. Initially athletes often stayed up binge-watching films, then feeling exhausted in the morning (Miguel Toribio). This cycle got disturbed this impacted stress on body. Many athletes were not able to continue their game/training due to closure of gyms/training centers/academies, etc. Whereas some athletes were unable to continue them due to lack of space and equipment. The athletes were unable to get a field based training and competitive experience. It was found that these factors affected the sports performance of athletes. On the contrary, there were few athletes who faced overtraining due to availability of time. This resulted in fatigue and muscle soreness in the athletes. All these factors contributed to lowered physical activity and causes de-training in athletes. Social isolation and loneliness have been associated with negative health outcomes, including a higher risk of cardiovascular disease (Miguel Toribio, et.al), diabetes, obesity, respiratory problems, anxiety, depression, eating disorder, menstruation problem, as well as a higher risk of a mental health status.

This confinement also affected the eating pattern of young athletes due to unavailability of certain foods in the market. The timings of market were also restricted till 11:00am. Most of the people were unable to go for shopping frequently. They preferred to purchase things weekly, to avoid themselves from getting exposed to virus. Many a times this purchasing pattern resulted in spoilage of fruits and vegetables. Fruits and vegetables are best sources of micronutrients. As they got perished, people started opting for pulses, cereals, ready to eat food or ordering food. A severe loss of micronutrients was found in the body of the athletes. Through the Food Frequency Questionnaire for Micronutrients, we found that majorly athletes were deficit in Iron, Vitamin C, Calcium and Vitamin D.

Iron is the most important nutrient for athletes as it increases the availability of oxygen in the blood and helps in enhancing the athletic performance. The female athletes were found more deficit due to the menstrual cycles. Less amount of iron in the body can lead to anemia and causes weakness.

Vitamin C plays a major role in absorption of iron, boosting the immunity system, maintenance of cells and blood vessels. Vitamin C are rich in antioxidants which helps in increasing the immunity. Leafy vegetables and citrus fruits are major source of antioxidants. If there is consumption of iron but lack of vitamin C, the absorption of iron will be hampered. It captures non-heme iron and stores it in a form that's more easily absorbed by your body.

Calcium is necessary nutrient for maintaining healthy bones. For athletes it is important to have sufficient calcium from the diet to maintain their bone health and prevent from any bone issues. Milk and milk products, few left vegetables, nuts, etc. are best sources of calcium.

Vitamin D is needed for calcium absorption. It was seen that intake of calcium was at moderate level but due to lack of vitamin D, calcium was not absorbed into the body. If there is not enough vitamin D, our body cannot form enough of the hormone calcitriol - active vitamin D. This active form absorbs calcium in the body. There are hardly few sources of vitamin D through food, but sunlight is the major source of vitamin D. As lockdown was imposed and the mobility was restricted, it became difficult for athletes to have sunlight during this period. This affected the calcium absorption and on longer run it might cause bone health issues such as fractures, bone injuries, osteoporosis, etc.

This unhealthy pattern of eating behavior caused eating disorder. Eating disorders are a range of psychological conditions that cause unhealthy eating habits to develop. They might start with an obsession with food, body weight or body shape. For the weight class athletes and aesthetic class athletes the biggest challenge is to maintain their weight. But due to pandemic and closure of training sessions/gyms and unavailability of certain foods made difficult for these athletes to focus on their game. This affected their mental health and increased stress levels of the athletes.

Mentioned below (table 1) are the foods that were used to obtain the information about the micronutrients intakes.

Table 1

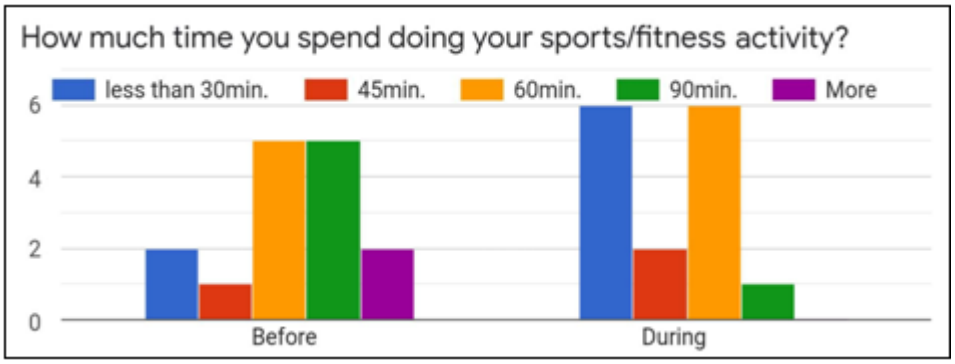
Micronutrients	Food sources
Iron	Bengal gram, roasted (*Chana*)
	Grass Pea (*khesari dal*)
	Peas, roasted (vatana)
	Kidney beans
	Pistachio nuts (Pista)
	Groundnuts (*peanuts*)
	Walnuts
	Beetroot
	Pomegranate
	Spinach (*Palak*)
Vitamin C	Orange
	Strawberry
	Broccoli
	Leafy vegetables
	Sweet lime
	Lemon
	Pineapple
Calcium	Rice
	Maize (*corn*)
	Rice Flakes (*poha*)
	Cabbage (*patta* gobi)
	Spinach (*Palak*)
	Cashew nuts (*kaju*)
	Red gram
Vitamin D	Egg yolk
	Sunlight

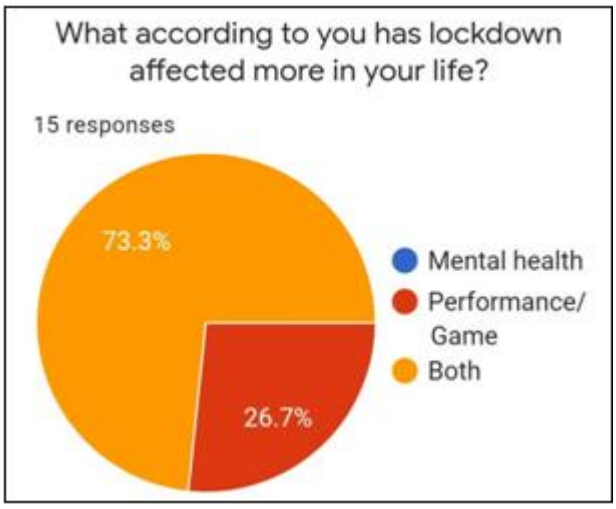
2. Methodology

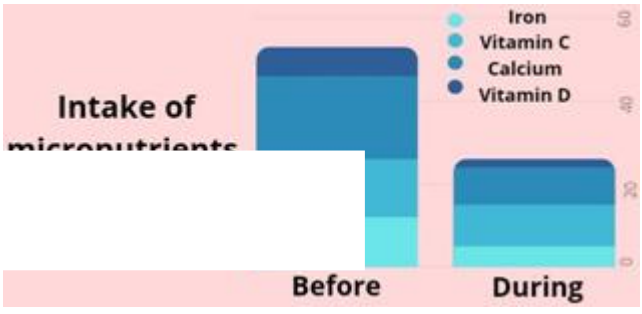
A cross-sectional study was done with purposive sampling. Data was collected via online questionnaire which included sets of questions regarding physical activity, Cohort perceived stress scale and food frequency table for micronutrient, before and during lockdown. Physical activity questions helped us gain the information about how frequently athletes were getting training, duration of training, intensity of training, and physical performance before and during lockdown. Cohort Perceived Stress Scale was used to measure stress intensity of young athletes. The food frequency questionnaire was used to obtain the status of micronutrients in young athletes before and during lockdown.

3. Results

The study was conducted during lockdown hence, non availability of certain foods was observed, which resulted in low intake of micronutrients (especially Calcium, Iron, Vitamin C and Vitamin D) among 70% of athletes. These athletes were found more prone to injury and infections, which lowered their physical activity and thereby resulted in increased stress levels. The physical activity was reduced to 56% during Pandemic. Around 78% of young athletes were found to be in stress. 73% of athletes agreed that their mental health status and sports performance was affected due to lockdown.







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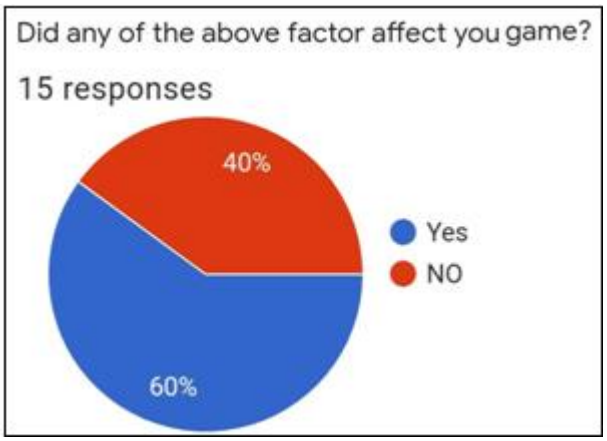

4. Conclusion

It was concluded that before lockdown athletes were able to handle situations and manage their diet as well as training/ practice sessions. However, during lockdown it became difficult for about 60% of the athletes to manage things

References

[1] Javier Pina, Marti Casale, 2020, Sports in time of COVID-19: Impact of the lockdown on team activity, Apunts Sports Medicine.
[2] Alamgir khan, Salahuddin khan, October 2017, Effect of anxiety on athletic performance, RES inves Sports Medicine.
[3] Elise R Facer, Daniel Hoffman, Jannie N Tran, Sean PA, Shanta, 04 February 2021, Sleep and mental health in athelete during lockdown, Sleep volume 44.
[4] Claussen Malte Christian, Zimmerman Stiffer Michael, Sefritz enrich, Scherr Johan, 2020, Mental health in competitive sports during COVID-19, Sports and exercise medicine Switzerland.

[5] Juan Pons, Yago Ramis and Miquel Terregosa, 2020 December, Where Did All the Sport Go? Negative Impact of COVID-19 Lockdown on Life-Spheres and Mental Health of Spanish Young Athletes, Frontier in psychology.
[6] Miguel Toribio-Mateas, 2020, Supporting your mental health beyond lockdown.
[7] Anna May Martin, Zoe Franklin, 2021, COVID-19: Assessing the impact of lockdown on recreational athletes, Apunts Sports Medicine volume 54.
[8] Dinesh Srisena, Mandy Zhang, October 2020, Impact of COVID-19, perspective from sports and exercise medicine, Annals of Academy of medicine sports.
[9] Henrik Gustafson, Therese skoog, Paul Davis, Goran kentta, 2021, Mindfulness and Its Relationship With Perceived Stress, Affect, and Burnout in Elite Junior Athletes, Clinical sports psychology.
[10] Giampaolo Santi, Alessandro Quartiroli, and Maurizio Bertollo, 2021, Jan 12 The Impact of the COVID-19 Lockdown on Coaches' Perception of Stress and Emotion Regulation Strategies, Frontier in psychology.
[11] Juan Gonzalez, Clara Lopez Mora and Mora Isabel Tover, 2021 March 24, COVID-19 and Regulation of the Psychological Response in Spanish High-Performance Athletes, Frontier psychology.
[12] Aleksandra M Rogowska, Cezary Kuśnierz, and Anna Bokszczanin, 2020 September 28, Examining Anxiety, Life Satisfaction, General Health, Stress and Coping Styles, During COVID-19 Pandemic in Polish Sample of UniversityStudents, Psychology Research and behaviour management.
[13] Cindy Chang et al ., 2020 Feb, Mental health issues and psychological factors in athletes: detection, management, effect on performance andprevention:American, Medical Society for Sports Medicine Position Statement-Executive Summary Sports Medicine.
[14] Sang hyuk park et.al., 2020, The effects of self talk on shooting athelte
[15] Seckin senisik et al., 2021 May, The effect of isolation on atheletes mental health during COVID-19 lockdown, Sports pyschology.
[16] Scott Graupenspagger et al., 2020, Social distancing, team mate interaction, Athletic identity, and mental health of students - athletes during COVID-19 lockdown, J adolsec health.
[17] Vincent Gouttebarge et al., 2017 November, A prospective cohort study on symptoms of common mental health disorder among athletes, Phys Sportsmed.
[18] Lawrence L Spriet, 2018 March, Nutritional and environmental influence on athlete health and performance, Sports Medicine, National Library of medicine.
[19] Graeme L close et al ., 2019 Nutrition, for the prevention and treatment of injuries in track and field athletes Sport Nutritional exercise and metabolism, Int J Sport Nutr Exerc Metab.
[20] Andrea J Brukhaaris, August 2012, Effect of Vitamin C supplement on athletes performance, Sports Medicine.
[21] Amity Ruberol et al., October 2018, Does Iron supplementation helps to improve athlete performance, Sports Medicine.
[22] Madylyn Relay Higgins et al., 2020, Antioxidant and Exercise performance with focus on Vitamin E and C supplementation, Int J Environ Res Public Health.
[23] R Aparicio-Ugarriza et al, 2019 June, relationship between physical fitness level and macro- and micronutrient intake in Spanish older adults, National Library of Sports Medicine.
[24] Charles R Pedlar et al., 2018 March, Iron balance and iron supplementation for female athletes, Sports medicine.
[25] Beat knecthle et al., 2020, Vitamin D and sports performance, National library of medicine.
[26] Marc sim et al ., 2019 July, Iron consideration for athlete, Applied physiology.
[27] Pamela Hinton, 2014 September, Iron and endurance athletes, Applied Nutrition and metabolism.
[28] Mirian de la Puente et al ., 2020, Role of Vitamin D in athelete in performance, Nutrients.
[29] Geoffray D Abraham et all., 2018, Effects of Vitamin D on Skeletal muscle and athletic performance, J Am Acad Orthop Surg.
[30] Michael Wiciniski et al, 2019, Effect of Vitamin D on exercise, Nutrients.
[31] German Clenin et al., 2015, Iron deficiency in sportsdefinition, influence on performance and therapy, Swis med wkly.
[32] Micheal Anthonius Lim, 20 August 2020, Exercise addiction and COVID-19 restrictions, Journal of Mental Health.
[33] A.G Papaioannou, RJ schinke, 27 May 2020, Physcial activities, health and well being in an imposed distance world, International journal of Sport and Exercise psychology.
[34] Chantal Simon, Lisa Martin, April 04 2021, Mental health impact on at-risk high-level athletes during COVID-19 lockdown: A pre-, during and post-lockdown longitudinal cohort study of adjustment disorder, JSAMS Journal of Science and Medicine sports.
[35] Leonie Louisa Bauer et al ., 2020, Associations of exercise and social support with mental health during quarantine and social-distancing measures during the COVID-19 pandemic: A cross-sectional survey in Germany, The preprint server of health science.
[36] Milena Tomovic, Lana Krzman, 04 December 2020, Sport and exercise participation in time of Covid-19—A narrative review of medical and health perspective, Translational Sports medicine.
[37] Anders Hakkason, Caroline Jonsson, 14 September 2020, Pyschological distress and problem gambing in elite athletes during COVID-19 restrictions, International Journal of Environmental research and public health.
[38] Malinauskas Romualdas, 2010, The association among social support, Stress and Life Satisfaction as Percieved by Injuired college athletes, Social behaviour and personality and international journal.