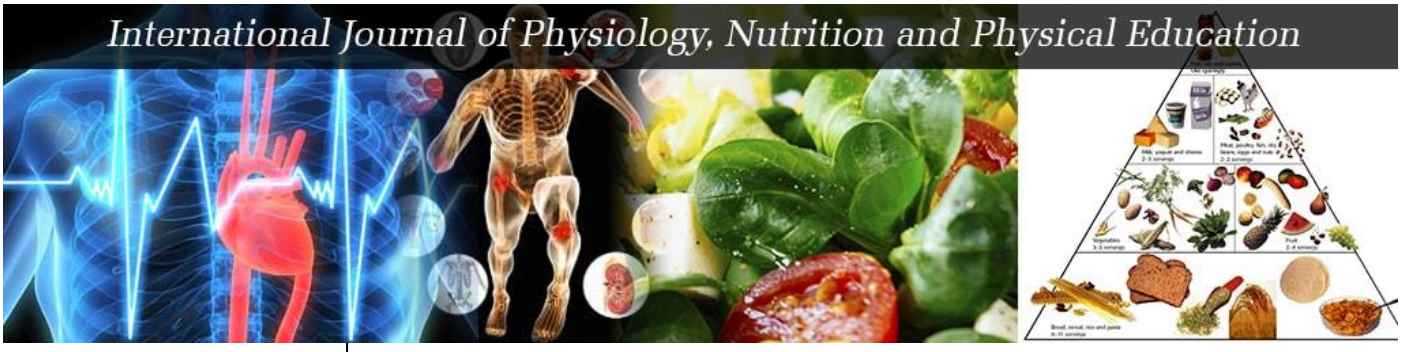

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Rati Kshirsagar
Student of Post Graduate Masters in Specialized Dietetics, Department of Food Nutrition & Dietetics, Sir Vithaldas Thackersey College of Home Science (Empowered Autonomous Status), S.N.D.T. Women's University, Juhu, Mumbai, Maharashtra, India

Dr. Rekha Battalwar
Professor & Director-Administration and Planning, Sir Vithaldas Thackersey College of Home Science (Empowered Autonomous Status), S.N.D.T. Women's University, Juhu, Mumbai, Maharashtra, India

Corresponding Author:
Rati Kshirsagar
Student of Post Graduate Masters in Specialized Dietetics, Department of Food Nutrition & Dietetics, Sir Vithaldas Thackersey College of Home Science (Empowered Autonomous Status), S.N.D.T. Women's University, Juhu, Mumbai, Maharashtra, India

A study on the impact of vegetarian versus non-vegetarian dietary patterns on weight and fitness management of athletes

Rati Kshirsagar and Rekha Battalwar

Abstract
Diet plays a vital role in athletic performance, recovery, and overall health. This study aimed to examine the impact of vegetarian versus non-vegetarian dietary patterns on weight and fitness management among 150 athletes (74 vegetarians, 76 non-vegetarians) aged 18-30 years in the Mumbai Metropolitan Region. Assessments included 24-hour dietary recalls, anthropometric measurements, physical performance tests, and the International Physical Activity Questionnaire-Short Form (IPAQ-SQ). The study found no significant differences in gender distribution, family type, or overall body composition between the groups (p>0.05), though significant differences were observed in marital and employment status, with vegetarians more likely to be unmarried and students, while non-vegetarians had a higher proportion of employed individuals. Non-vegetarians reported higher intakes of protein (p = 0.005), vitamin D (p = 0.000), and iron (p = 0.000), while vegetarians had higher intake of dietary fiber (p = 0.001) and vitamin C (p = 0.000). Both groups showed insufficient calcium and vitamin D intake. Correlation analysis revealed links between higher adiposity and increased energy and fat intake, and lower physical activity with reduced nutrient intake. The results suggest that well-planned vegetarian and non-vegetarian diets can support effective weight and fitness management in athletes.

Keywords: Vegetarian diet, non-vegetarian diet, athletes, nutritional intake, body composition, physical fitness

Introduction
Nutrition plays a pivotal role in athletic performance, influencing training efficiency, recovery, body composition, and overall physical output. Athletes adopt diverse dietary patterns based on their beliefs, cultural practices, ethical views, and performance goals. Two major dietary practices commonly observed in the athletic community are vegetarian and non-vegetarian diets, each with distinct nutritional profiles and physiological implications (Petermann-Rocha *et al.*, 2023) [22]. A vegetarian diet, particularly in its lacto-ovo form, includes plant-based foods along with dairy and eggs, offering benefits such as high fiber content, antioxidant intake, and lower saturated fat levels. These elements contribute to improved digestion, reduced inflammation, and better cardiovascular health, which are essential for endurance and recovery (Ayaz *et al.*, 2024) [3]. Conversely, non-vegetarian diets provide high-quality, complete proteins with all essential amino acids, heme iron, vitamin B12, and omega-3 fatty acids nutrients vital for muscle repair, strength development, and energy production (Khanna *et al.*, 2006) [14]. Animal-based diets have been linked to greater lean muscle mass, enhanced power output, and quicker post-exercise recovery (West *et al.*, 2023) [28]. However, excessive intake of red and processed meats can pose risks such as inflammation and elevated cholesterol, potentially hindering athletic health and longevity (Wang *et al.*, 2023; Kaufman *et al.*, 2023) [27, 12]. In addition to diet, structured fitness management and lifestyle choices significantly influence athletic outcomes. Training programs focused on endurance, strength, agility, and recovery must align with dietary intake to optimize results (Kerksick, C. M., *et al.*, 2017) [13]. Lifestyle factors such as stress levels, sleep quality, and substance use also impact energy balance and recovery (Matos, J. P., *et al.*, 2015) [18]. Furthermore, dietary supplements—such as protein powders, creatine, and micronutrients are often used to bridge nutritional gaps, while dietary counseling helps athletes personalize their nutritional strategies

for sustained performance (Fiorini *et al.*, 2023) [9]. Understanding the comparative effects of vegetarian and non-vegetarian diets on weight management and fitness parameters is essential, especially in the context of rising interest in plant-based nutrition. This study explores these impacts, helping to inform optimal dietary planning for athletes seeking to enhance performance while maintaining health and physical fitness.

Aim of the study was to study the impact of vegetarian and non-vegetarian dietary patterns on weight and fitness management of athletes.

Materials and Methodology

A descriptive cross-sectional study was conducted among 150 athletes (74 vegetarians and 76 non-vegetarians) aged 18-30 years in the Mumbai Metropolitan Region. Participants were selected using purposive sampling and were actively engaged in Kabaddi and Cricket. Inclusion criteria included individuals following a vegetarian or non-vegetarian diet and participating in regular athletic training. Exclusion criteria covered pregnant or lactating women, individuals with metabolic or hormonal disorders, those on therapeutic or restrictive diets, and those taking medications affecting weight or metabolism. Ethical clearance was obtained from the Institutional Scientific and Biomedical Ethics Committee (ISBEC), and informed consent was secured from all participants, ensuring voluntary participation and confidentiality. Data collection involved a structured questionnaire comprising sociodemographic details, lifestyle habits, medical history, dietary supplement use, and dietary counseling. Anthropometric assessments included height, weight, BMI, waist-hip ratio, and body fat percentage. Physical activity was evaluated using the IPAQ-SQ (2002), and fitness was assessed through performance tests like push-ups, plank, squats, sit-and-reach, and balance tests. Nutrient intake was captured using 3-day (1 weekday and 2 weekend days) 24-hour dietary recallsData were analyzed using SPSS version 25 for Windows. Descriptive statistics (mean, SD, frequencies, percentages) were computed. Chi-square tests assessed associations between categorical variables. Independent t-tests compared group differences in anthropometry, MET, performance, and dietary intake. Pearson's correlation measured relationships between anthropometric and performance variables. Dietary intake was compared with RDA using paired or one-sample t-tests. A p-value < 0.05 was considered statistically significant.

Results

This section presents the key findings of the study comparing vegetarian and non-vegetarian athletes in terms of sociodemographic characteristics, anthropometric measurements, dietary intake, physical activity levels, and physical performance. Statistical analyses were conducted to identify significant differences between the two dietary groups and to explore correlations among relevant variables. The results provide insight into how dietary patterns influence nutritional status, body composition, and fitness parameters in young athletes.

Table 1: Sociodemographic Characteristics of the Study Participants

Variables	Vegetarian (n=74)		Non vegetarian (n=76)		Total (n=150)		P value
	N	%	N	%	N	%	
Gender :							
Males	41	55.4	35	46.1	76	50.7	0.252
Females	33	44.6	41	53.9	74	49.3	
Marital status :							
Married	5	6.8	19	25	24	16	0.007*
Unmarried	68	91.9	55	72.4	123	82	
Divorced	1	1.4	2	2.6	3	2	
Employment status :							
Employed	21	28.4	37	48.7	58	38.7	0.031*
Self employed	16	21.6	12	15.8	28	18.7	
Unemployed	8	10.8	2	2.6	10	6.7	
Student	29	39.2	25	32.9	54	36	
Types of family :							
Nuclear family	40	54.1	49	64.5	89	59.3	0.454
Living alone	1	1.4	0	0	1	0.7	
Joint family	23	31.1	20	26.3	43	28.7	
Living with your spouse	10	13.5	7	9.2	17	11.3	
Socioeconomic Status (SES) Distribution :							
Upper Lower	2	2.7	7	9.2	9	6	0.174
Lower Middle	19	25.7	25	32.9	44	29.3	
Upper Middle	42	56.8	32	42.1	74	49.3	
Upper Class	11	14.9	12	15.8	23	15.3	

* P value being less than the typical significance level of 0.05 indicates statistically significant results.

Table no. 1 presents the socio-demographic characteristics of the 150 study participants, categorized by dietary groups (vegetarian and non-vegetarian). The gender distribution was comparable between groups, with males comprising 50.7% and females 49.3% of the total population (p = 0.252). A significant difference was observed in marital status (p = 0.007), where a higher percentage of vegetarians were unmarried (91.9%) compared to non-vegetarians (72.4%). Employment status also showed a significant variation (p = 0.031), with more non-vegetarians being employed (48.7%) than vegetarians (28.4%). While the distribution of family types did not significantly differ between the groups (p = 0.454), socioeconomic status showed that most vegetarians (56.8%) belonged to the upper middle class, whereas non-vegetarians were more distributed across upper middle (42.1%) and lower middle (32.9%) classes, although this difference was not statistically significant (p>0.005).

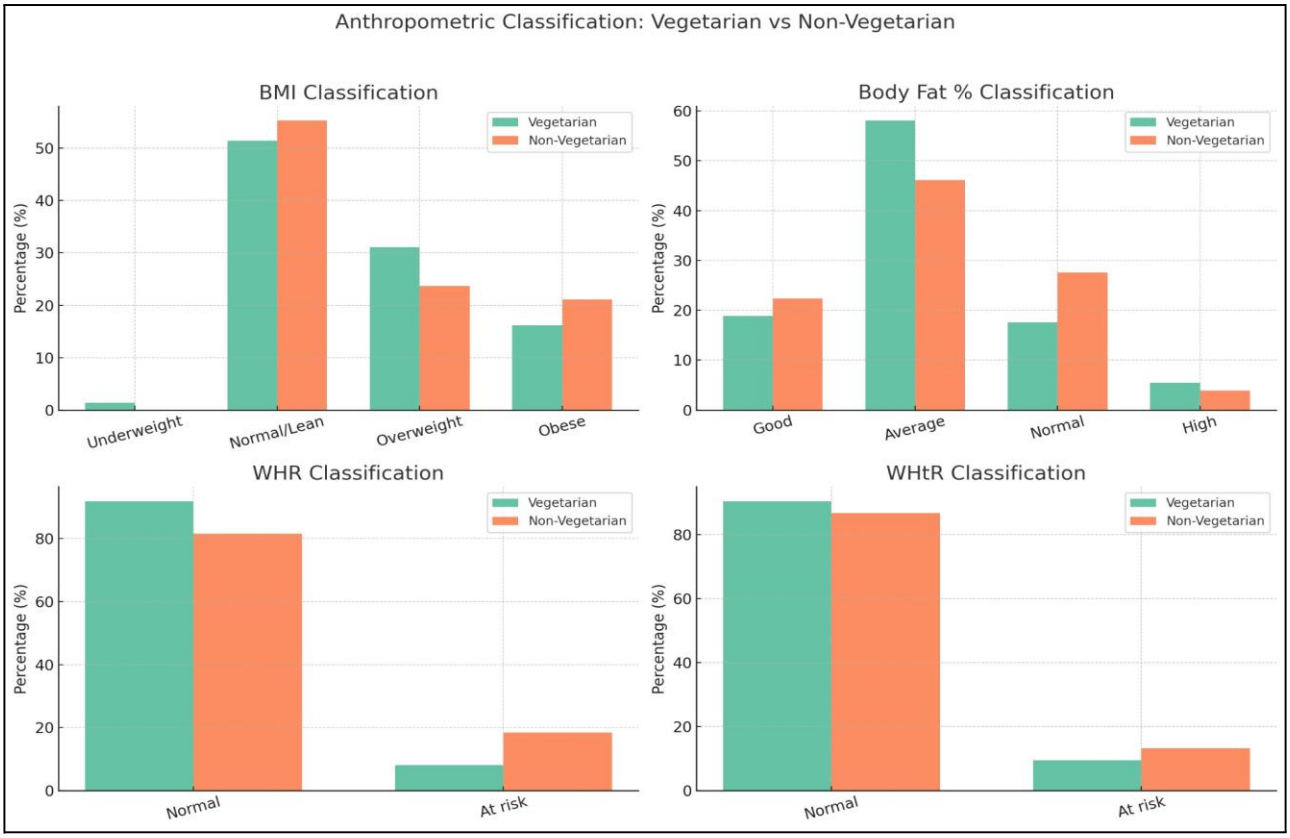

Fig 1: Comparative Classification of Anthropometric Indicators of the Study Participants

Figure no.1 illustrates the distribution of participants by anthropometric classifications across vegetarian and non-vegetarian groups. In terms of BMI, the majority of both vegetarians (51.4%) and non-vegetarians (55.3%) fell in the normal/lean category. A higher percentage of non-vegetarians (21.1%) were classified as obese compared to vegetarians (16.2%). For body fat percentage, 58.1% of vegetarians and 46.1% of non-vegetarians were in the "average" range, while 5.4% of vegetarians and 3.9% of non-vegetarians were categorized as High body fat Percentage. Regarding WHR, 91.9% of vegetarians and 81.6% of non-vegetarians were within the normal range, with a higher proportion of non-vegetarians (18.4%) at risk. Similarly, WhtR risk was observed in 13.2% of non-vegetarians and 9.5% of vegetarians. Overall, the figure highlights comparable anthropometric distributions with slightly elevated obesity and risk-related measures among non-vegetarians.

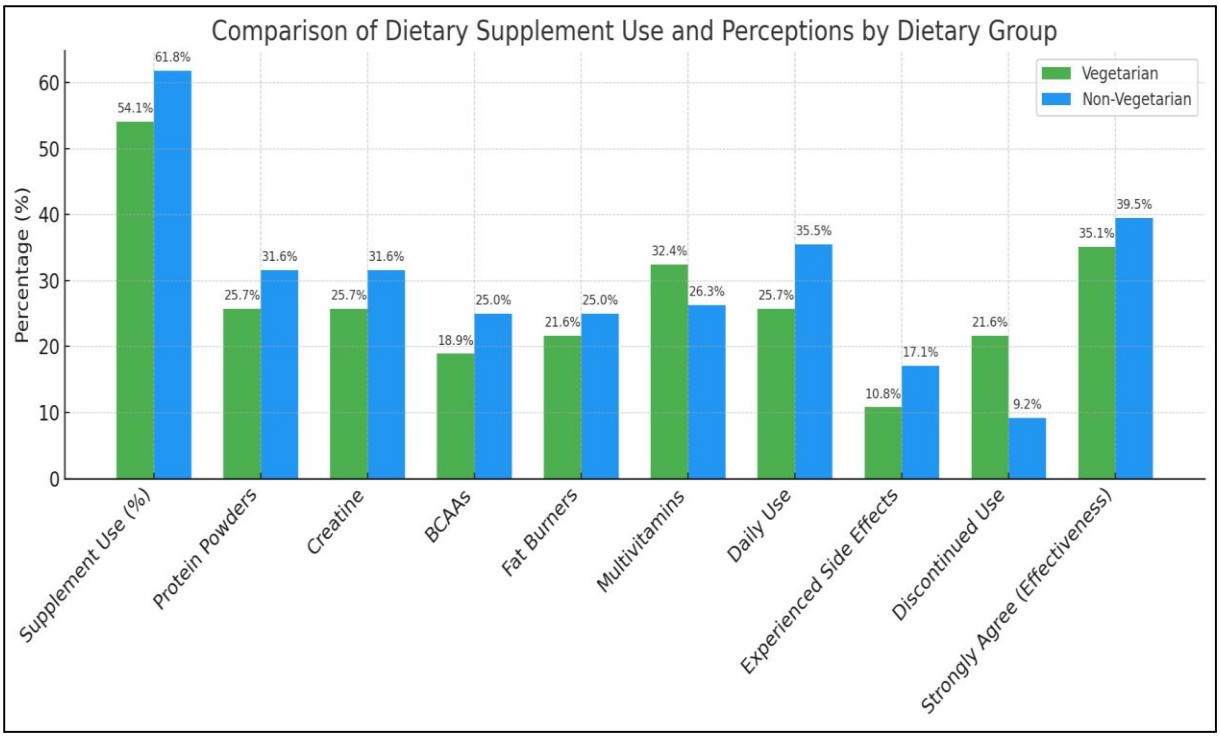

Fig 2: Dietary Supplement Usage Practices and Perceptions of the Study Participants

Figure no. 2 presents a comparative overview of dietary supplement usage practices and perceptions among vegetarian and non-vegetarian athletes. A higher percentage of non-vegetarians (61.8%) reported using supplements compared to vegetarians (54.1%), though the difference was not statistically significant (p>0.005). Commonly used supplements in both groups included protein powders (28.7%), creatine (28.7%), and multivitamins (29.3%). Daily use of supplements was slightly higher among non-vegetarians (35.5%) than vegetarians (25.7%). Adherence to recommended dosage was reported by 50% of participants, while 14% experienced side effects. Notably, 46% of participants consistently followed a specific supplement brand, and 42% included supplements in a structured diet plan. Tracking supplement effectiveness was more common among non-vegetarians (44.7%) than vegetarians (36.5%). A significant difference (p = 0.042) was observed in supplement discontinuation, with more vegetarians (21.6%) reporting it compared to non-vegetarians (9.2%).

Table 2: Comparison of Nutrient Intake of the Study Participants

Nutrients	Vegetarian (n=74)	Non vegetarian (n=76)	Total (n=150)	P value
Macronutrient Intake				
Energy (Kcal)	2359±205.5	2313±240.6	2336±224.4	0.209
Protein (gm)	69.8±5.7	72.9±7.5	71.4±6.8	0.005*
Carbohydrates (gm)	313.6±27.8	304.2±34.8	308.8±31.8	0.069
fats (gm)	77.8±7.4	77.9±8.5	77.9±7.9	0.948
Micronutrient Intake				
Sodium (mg)	2218.0±214.8	2248.4±179.3	2233.4±197.5	0.348
Potassium(mg)	3475.2±333.1	3430.7±465.4	3452.6±404.6	0.503
Fiber(gm)	25.8±2.4	24.5±2.2	25.1±2.3	0.001*
Calcium (mg)	694.9±59.7	678.9±89.7	686.8±76.6	0.201
Vitamin D (µg)	113.4±37.2	205±62.7	159.8±69.1	0.000*
Vitamin C (mg)	73.4±8.5	63±14.5	68.1±13.0	0.000*
Iron (mg)	11.5±3.5	13.7±2.9	12.6±3.4	0.000*

Data presented as Mean ± SD, * P value being less than the typical significance level of 0.05 indicates statistically significant results.

Table no. 2 shows comparison of macronutrient intake revealed that both groups had similar energy and fat consumption, with vegetarians averaging 2359±205.5 kcal and non-vegetarians 2313±240.6 kcal (p = 0.209). Protein intake, however, was significantly higher among non-vegetarians (72.9±7.5 g) compared to vegetarians (69.8±5.7 g), with a statistically significant difference (p = 0.005). Carbohydrate intake was slightly higher in vegetarians but did not reach statistical significance. Among micronutrients, fiber intake was significantly higher in vegetarians (25.8±2.4 g) compared to non-vegetarians (24.5±2.2 g) (p = 0.001). Non-vegetarians had significantly higher intakes of vitamin D (205±62.7 µg vs. 113.4±37.2 µg, p = 0.000) and iron (13.7±2.9 mg vs. 11.5±3.5 mg, p = 0.000). Conversely, vitamin C intake was higher among vegetarians (73.4±8.5 mg) than non-vegetarians (63±14.5 mg), also showing a significant difference (p = 0.000). Calcium, sodium, and potassium intakes did not differ significantly between the groups (p>0.005). These findings underscore distinct nutritional profiles linked to dietary preferences, with specific strengths and potential deficiencies in each group.

Table 3: Correlation between Anthropometric and Physical Activity Parameters of the Study Participants

Parameters	Vigorous MET		Moderate MET		Walking MET		Total MET	
	R value	P value	R value	P value	R value	P value	R value	P value
Weight	-0.158	0.279	0.025	0.789	-0.087	0.290	-0.029	0.727
BMI	-0.109	0.457	-0.121	0.185	-0.054	0.512	-0.039	0.635
Body fat%	-0.156	0.283	-0.182*	0.045*	0.152	0.063	-0.122	0.138
Waist circumference	-0.231	0.110	0.865	-0.131	0.110	-0.110	-0.071	0.386
Hip circumference	-0.152	0.297	0.076	0.406	-0.225**	0.006**	0.001	0.991
WHR	-0.136	0.351	-0.167	0.067	0.106	0.197	-0.134	0.102
WHtR	-0.160	0.272	-0.06	0.513	-0.11	0.182	-0.039	0.635

* Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed), BMI-Body Mass Index ; Body Fat%-Body Fat percentage; WHR-Waist-to-Hip Ratio ; WhtR-Waist-to-Height Ratio, MET-Metabolic Equivalent of Task

Table no. 3 explores the correlations between various anthropometric indicators and physical activity parameters. Most relationships between anthropometric measures and physical activity levels were weak and statistically non-significant (p>0.005). A slight negative correlation was observed between body fat percentage and moderate METs (r =-0.182, p = 0.045), suggesting that individuals with higher body fat tend to engage in less moderate-intensity activity. Interestingly, hip circumference showed a positive correlation with walking METs (r = 0.225, p = 0.006), indicating that those with larger hip measurements may report more walking-related activity. However, no significant correlations were found for weight, BMI, waist circumference, waist-to-hip ratio (WHR), or waist-to-height ratio (WHtR) across most activity domains.

Table 4: Correlation Between Anthropometric Indicators and Nutrient Intake of the Study Participants

Variables	BMI		Body Fat%		WHR		WhtR	
	R value	P value	R value	P value	R value	P value	R value	P value
Energy (kcal)	0.269**	0.001**	0.122	0.136	0.059	0.475	0.269**	0.001**
CHO (gm)	0.247**	0.002**	0.137	0.095	0.034	0.683	0.245**	0.002**
Protein (gm)	0.144	0.079	0.122	0.137	0.133	0.105	0.137	0.094
Fat (gm)	0.432**	0.001**	0.025	0.765	-0.025	0.758	0.484**	0.001**
Sodium (mg)	0.377**	0.001**	0.055	0.500	-0.096	0.242	0.309**	0.001**
Potassium (mg)	0.318**	0.001**	-0.181*	0.027*	-0.142	0.083	0.418**	0.001**
Fiber (gm)	0.317**	0.001**	0.198*	0.015*	0.131	0.109	0.141	0.086
Calcium (mg)	0.320**	0.001**	-0.056	0.497	-0.079	0.337	0.366**	0.001**
Vitamin D (IU)	0.075	0.361	-0.011	0.898	-0.007	0.935	0.160	0.050
Vitamin C (mg)	0.231**	0.004**	-0.109	0.185	-0.080	0.330	0.316**	0.001**
Iron (mg)	0.037	0.652	-0.172*	0.035*	0.007	0.932	-0.072	0.381

* Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed), (BMI-Body Mass Index ; Body Fat%-Body Fat percentage; WHR-Waist-to-Hip Ratio ; WhtR-Waist-to-Height Ratio ; CHO-Carbohydrates)

Table no. 4 presents the correlation between selected anthropometric measures [BMI, body fat percentage, waist-to-hip ratio (WHR), and waist-to-height ratio (WHtR)] and both macro-and micronutrient intake. The results show that BMI and WHtR were significantly and positively correlated with total energy (r = 0.269, $p<0.01$), fat (BMI: r = 0.432, WHtR: r = 0.484, $p<0.01$), and carbohydrate intake (r ≈ 0.245, $p<0.01$), indicating that individuals with higher BMI or central adiposity tend to consume more calories and fats. Similarly, significant positive correlations were found between these measures and micronutrients such as sodium, potassium, calcium, fiber, and vitamin C ($p<0.01$), reflecting higher consumption among participants with greater adiposity. In contrast, body fat percentage demonstrated negative correlations with potassium (r =-0.181, $p<0.05$) and iron intake (r =-0.172, $p<0.05$), possibly indicating less favorable dietary profiles in individuals with higher fat mass. WHR did not show any significant associations with nutrient intake. These findings highlight a pattern where higher energy and micronutrient intake is associated with increased BMI and central obesity.

Table 5: Correlation Between Dietary Intake and Physical Activity of the Study Participants

Variables	Vigorous MET		Moderate MET		Walking MET		Total MET	
	R value	P value	R value	P value	R value	P value	R value	P value
Energy (kcal)	0.049	0737	0.032	0.724	-0.360**	0.001**	-0.093	0.257
CHO (gm)	0.086	0.556	0.089	0.332	-0.371**	0.001**	-0.064	0.434
Protein (gm)	-0.052	0.722	-0.106	0.245	-0.079	-0.337	-0.159	0.052
Fat (gm)	0.059	0.687	0.192*	0.034*	-0.366**	0.001**	0.036	0.664
Sodium (mg)	0.081	0.579	0.213*	0.019*	-0.476	0.001	0.032	0.694
Potassium (mg)	0.082	0.578	0.211*	0.020*	-0.467**	0.001**	0.054	0.512
Fiber (gm)	-0.02	0.890	-0.008	0.929	0.929	0.173	-0.081	0.323
Calcium (mg)	0.052	0.722	0.178	0.05	-0.405**	0.001**	0.025	0.765
Vitamin D (IU)	0.139	0.342	0.256**	0.004**	-0.448**	0.001**	0.106	0.198
Vitamin C (mg)	0.052	0.724	0.201*	0.026*	-0.321**	0.001**	0.074	0.369
Iron (mg)	0.366**	0.010**	0.157	0.085	-0.240**	0.003**	0.137	0.094

* Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed), (MET-Metabolic Equivalent of Task ; CHO-Carbohydrates)

Table no. 5 illustrates the correlation between various dietary intake parameters (macronutrients and micronutrients) and physical activity levels measured through MET scores (vigorous, moderate, walking, and total METs). A strong negative correlation was observed between walking METs and several dietary variables including energy intake (r =-0.360, $p<0.01$), carbohydrate intake (r =-0.371, $p<0.01$), fat intake (r =-0.366, $p<0.01$), calcium (r =-0.405, $p<0.01$), and vitamin D (r =-0.448, $p<0.01$), suggesting that individuals with higher walking activity tend to have lower intake of these nutrients. Moderate METs showed weak but statistically significant positive correlations with fat (r = 0.192, $p<0.05$), sodium (r = 0.213, $p<0.05$), potassium (r = 0.211, $p<0.05$), vitamin D (r = 0.256, $p<0.01$), and vitamin C (r = 0.201, $p<0.05$), implying that moderate-intensity physical activity may be associated with better dietary quality. Vigorous METs did not exhibit many strong associations, though a notable positive correlation was seen with iron intake (r = 0.366, $p<0.05$), possibly indicating increased iron requirements or intake in more active individuals.

Discussion

A significantly higher proportion of vegetarians were unmarried (91.9%) compared to non-vegetarians (72.4%) ($p<0.05$). This may suggest that single individuals experience more autonomy and fewer social constraints, allowing for independent dietary choices, including vegetarianism. Appleton *et al.* (2015) [2] support this observation, reporting that single individuals are more likely to adopt alternative eating patterns due to fewer household influences. Employment status also showed a significant difference ($p<0.05$), with more vegetarians being students (39.2%) and more non-vegetarians being employed (48.7%). This aligns with contemporary trends, where younger, educated populations—especially students—are more receptive to vegetarian diets for ethical and environmental reasons. Corrin

& Papadopoulos (2017) [5] noted similar findings, observing that youth are at the forefront of plant-based diet adoption. Although not statistically significant (p>0.05), vegetarians in the study tended to belong to a higher socioeconomic class compared to non-vegetarians. This may be due to the affordability and accessibility of specialized vegetarian foods and supplements, which are often more accessible to individuals from upper socioeconomic backgrounds. Lea & Worsley (2003) [16] and Darmon & Drewnowski (2008) [7] reported a positive relationship between SES and health-conscious dietary practices.

The anthropometric classification analysis revealed broadly comparable profiles between vegetarian and non-vegetarian athletes, with a majority in both groups falling within the normal or lean BMI category. However, a slightly higher prevalence of obesity and risk-related indicators such as WHR and WhtR was observed among non-vegetarians. These subtle differences may reflect marginally better body composition outcomes among vegetarians, which could be attributed to their higher dietary fiber intake, lower saturated fat consumption, and greater intake of plant-based foods—all of which have been linked to healthier weight and fat distribution (Craig, 2009; Clarys *et al.*, 2014) [6, 4]. A greater proportion of vegetarians also fell within the "fitness" range for body fat percentage, supporting findings from Rizzo *et al.* (2013) [23] and Medawar *et al.* (2020) [19], who reported leaner body compositions among plant-based diet followers. Additionally, studies have shown that vegetarians often demonstrate lower visceral adiposity and central obesity risk, contributing to favorable WHR and WhtR profiles (Le & Sabaté, 2014; Appleby & Key, 2016) [15, 1]. The elevated risk indicators in non-vegetarians, though not statistically significant, may warrant closer attention in athletic populations where optimal body composition is crucial for performance. Nonetheless, these findings suggest that both vegetarian and non-vegetarian dietary patterns, if appropriately balanced, can support healthy anthropometric outcomes when combined with regular physical activity and lifestyle management (Rogerson, 2017; Haider *et al.*, 2018) [24, 10].

Supplement discontinuation was significantly more common among vegetarians (21.6%) than non-vegetarians (9.2%) (p<0.05). This may reflect hesitancy related to supplement origin (e.g., gelatin capsules) or a perception of dietary sufficiency. Melina *et al.* (2016) [20] and Rogerson (2017) [24] noted that vegetarians often prioritize whole foods and may be more selective in their use of dietary supplements.

Non-vegetarians consumed a significantly higher percentage of protein than vegetarians (p<0.05). This is consistent with known differences in protein quality and bioavailability, as animal-based foods typically offer more complete protein profiles. Craig (2009) [6] and Rogerson (2017) [24] emphasized the need for vegetarians to consume complementary plant proteins and plan meals carefully to meet athletic protein requirements. Calcium intake was low in both groups, with over 90% of participants consuming only 50.01-75% of the RDA. This is concerning, especially for vegetarians who may avoid dairy. Appleby & Key (2016) [1] also found low calcium intakes among vegetarians not consuming fortified foods or calcium-rich plant sources like leafy greens and tofu. Vegetarians had significantly higher fiber intake (p<.05), consistent with their greater intake of plant foods. High-fiber diets support gastrointestinal health and have been associated with reduced risk of metabolic disease. Craig (2009) [6] and Elorinne *et al.* (2016) [8] found similar advantages among vegetarians in fiber consumption.

Vitamin C intake was also significantly higher in vegetarians (p = 0.000), with nearly all vegetarians (97.3%) consuming at least 75% of the RDA. This reflects the high fruit and vegetable content typical of vegetarian diets. Rizzo *et al.* (2013) [23] confirmed that plant-based diets usually exceed vitamin C requirements, contributing to immune support and antioxidant protection. Iron intake was significantly lower in vegetarians, with 32.4% consuming ≤50% of the RDA compared to only 7.9% among non-vegetarians (p = 0.001). This is likely due to the lower bioavailability of non-heme iron in plant-based foods and the presence of inhibitors like phytates. Haider *et al.* (2018) [10] recommend strategies such as consuming iron-rich foods with vitamin C to improve absorption in vegetarian diets. Vitamin D intake was significantly higher among non-vegetarians (p<0.05), likely due to intake of animal sources like fatty fish, eggs, and fortified dairy. Vegetarian diets lack many natural sources of vitamin D, putting individuals at risk of insufficiency unless supplements or fortified foods are used. Elorinne *et al.* (2016) [8] and Haider *et al.* (2018) [10] highlighted the importance of vitamin D planning in plant-based diets.

The correlation analysis revealed mostly weak associations between anthropometric variables and physical activity levels, with a significant negative relationship between body fat percentage and moderate METs (r =-0.182, p<0.05), suggesting that higher fat mass may reduce engagement in moderate physical activity—a trend supported by studies linking excess adiposity to lower physical performance (Jaremków, A., *et al.*, 2023) [11]. Hip circumference was positively associated with walking METs (r = 0.225, p<0.01), indicating greater walking activity among individuals with larger lower-body mass, possibly due to compensatory lifestyle habits (Lee *et al.*, 2012) [17].

BMI and WHtR were significantly correlated with higher intake of energy, fat, carbohydrates, and micronutrients such as sodium and calcium (p<0.01), consistent with findings that central obesity often aligns with increased caloric and nutrient consumption (Romaguera *et al.*, 2009) [25]. In contrast, higher body fat percentage was linked to lower potassium and iron intake, reflecting poorer dietary quality. Walking METs showed negative correlations with energy, fat, calcium, and vitamin D intake, while moderate METs positively correlated with nutrients like potassium and vitamin C, suggesting that moderate activity levels are associated with healthier eating patterns (Mujika & Burke, 2010) [21]. A positive correlation between vigorous METs and iron intake (r = 0.366, p<0.05) highlights the increased iron requirements in physically active individuals (Thomas *et al.*, 2016) [26].

Conclusion

The present study evaluated the impact of vegetarian and non-vegetarian diets on the nutritional status, body composition, and physical fitness of athletes aged 18-30 years. Vegetarians demonstrated higher intakes of dietary fiber and vitamin C, while non-vegetarians consumed more vitamin D and iron. Both groups showed similar energy and fat intake, with common deficiencies observed in calcium and vitamin D, highlighting the importance of balanced dietary planning. No significant differences were found in anthropometric measures or physical performance between the groups, indicating that both dietary patterns, when properly structured, can support athletic health and fitness. Physical activity levels and socioeconomic status were largely comparable and did not significantly influence outcomes.

Although supplement use varied, the findings emphasize the importance of individualized nutrition counseling. In conclusion, well-planned vegetarian and non-vegetarian diets can effectively support weight and fitness management in athletes when they are strategically designed to provide adequate macronutrients, ensure sufficient intake of key micronutrients, and are supported by appropriate supplementation, meal timing, and hydration strategies.

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