A Study on the Relationship Between Dietary Diversity and Nutrient Adequacy Among Working Adults

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***Abstract-* This study aimed to examine the relationship between dietary diversity and nutrient adequacy among 145 working adults in the Mumbai Metropolitan Region. Participants were evaluated using 24-hour dietary recalls, anthropometric assessments, physical activity patterns, lifestyle behaviors, and emotional factors. Statistically significant gender differences were found in age distribution (p = 0.017) and employment type (p = 0.026), with more females being younger and part-time employed, while males were primarily in full-time roles. Males also had significantly higher weight, height, and BMI (p = 0.001). Gender differences in physical activity frequency (p = 0.048), intensity (p = 0.025), and sitting duration (p = 0.009) were observed. Lifestyle behaviors showed males had significantly higher rates of smoking (p = 0.000) and alcohol use, while emotional eating tendencies were more common in females (p = 0.002). Nutrient analysis revealed suboptimal intake of protein, calcium, iron, vitamin A, and fiber across both genders. A significant negative correlation was noted between dietary diversity and added sugar intake (r = –0.340, p = 0.001). Working adults showed a moderate level of dietary diversity, underscoring its value as a marker of overall diet quality .Despite this variety, gaps in key micronutrients persisted, revealing that diversity alone doesn't guarantee adequate nutrient intake. Factors like meal timing, activity levels, work schedules, stress, and mood significantly shaped both dietary variety and nutrient adequacy. Higher diversity scores were associated with better nutrient adequacy, particularly when the chosen foods were rich in micronutrients.**

***Index Terms-* Dietary Diversity, Nutrient Adequacy, Working Adults, Gender Differences, Lifestyle, Emotional Eating, Physical Activity**

I. INTRODUCTION

Nutrition plays a pivotal role in enhancing health, preventing disease, and supporting optimal functioning particularly among working adults who often struggle to maintain balanced dietary habits amid time constraints and demanding schedules (Popkin,et.al,2012). The modern urban lifestyle has prompted a shift toward convenient, processed, and calorie-dense foods that are often deficient in essential nutrients (Misra,et.al,2011). This transition poses significant challenges to achieving nutrient adequacy and maintaining long-term well-being.

Dietary diversity, defined as the number of different food groups consumed over a reference period, has gained recognition as a practical and robust proxy for micronutrient adequacy, especially in population-level assessments (Ruel,et.al,2003). A varied diet helps ensure broader nutrient coverage, enhancing intake of vitamins and minerals such as calcium, iron, vitamin A, and folate (Arimond,et. al, 2010). The inclusion of diverse, nutrient-dense food items is particularly vital in adult populations exposed to high occupational stress and limited time for meal planning (Lachat,et.al,2009).

Several studies have consistently linked higher dietary diversity with better nutritional status, improved metabolic outcomes, and lower incidence of chronic diseases including cardiovascular disorders, type 2 diabetes, and obesity (Mirmiran, et al, 2006) . Beyond physiological health, diverse diets have been positively associated with mental well-being, immune resilience, and sustained energy levels (Beck ,et al,2013). However, working adults often face unique barriers such as erratic work hours, reliance on street or packaged foods, and minimal access to fresh produce—all of which compromise their ability to meet daily nutritional requirements (Torheim ,et al,2010).

Gender differences in food choices further complicate dietary adequacy. Research indicates that women are more likely to consume fruits, vegetables, and low-fat products, while men tend to favor meat, alcohol, and energy-dense foods (Wardle,et.al,2024). These patterns influence both dietary diversity and nutrient intake, potentially leading to deficiencies in specific micronutrients across genders. Emotional well-being, sleep cycles, and physical activity levels also exert considerable influence on dietary decisions (Lassal, et.al,2018), particularly under stress—an often overlooked yet powerful modulator of food preferences and eating frequency in working individuals.

From a public health perspective, achieving nutrient adequacy through diet diversity offers a cost-effective strategy to prevent micronutrient malnutrition, especially when individualized dietary monitoring is impractical (Kennedy,et.al,2007). In India, the dual burden of undernutrition and overnutrition coexists due to disparities in food access, cultural norms, and economic factors (Misra,et.al,2011). Consequently, the urban working population emerges as a high-priority target group for nutritional surveillance and tailored dietary interventions.

This study aims to examine the correlation between diet diversity and nutrient adequacy in working adults and to explore how lifestyle factors such as physical activity, stress, and work schedules—mediate this relationship. By identifying critical gaps and associations, this research seeks to inform workplace nutrition strategies and public health programs tailored to the nutritional needs of India's urban workforce.

II. MATERIALS AND METHODOLOGY

A descriptive cross-sectional study was conducted among 100 working adults aged 25–60 years in Mumbai, India, across various professional environments such as corporate offices, co-working spaces, and shared workplaces. Participants were selected using purposive sampling to ensure a diverse representation of occupational backgrounds, dietary habits, and health conditions. The inclusion criteria consisted of male and female employees from upper-middle and lower-middle socioeconomic classes, including shift workers and those employed in full-time or part-time roles. Pregnant or lactating women, individuals with severe comorbidities, or those following medical dietary interventions were excluded from the study.

Ethical clearance was obtained from the Intersystem Biomedical Ethics Committee (ISBEC) prior to data collection, and written informed consent was secured from all participants to ensure voluntary participation and data confidentiality. Data were collected over ten months using a structured offline questionnaire, including both self-developed and validated tools.

The tools administered included socio-demographic and lifestyle questionnaires, anthropometric measurements (height, weight, BMI), a 24-hour dietary recall for nutrient intake, the Dietary Diversity Score (DDS), Nutrient Adequacy Ratio (NAR), and the Perceived Stress Scale (PSS). Dietary diversity was assessed based on the number of food groups consumed in the previous 24 hours. Nutrient adequacy was evaluated by comparing macronutrient and micronutrient intake against ICMR-NIN RDA (2020) standards.

Data were analyzed using SPSS version 25 for Windows (version 25, 2017, IBM Corporation, Armonk, New York, United States). Data presented as Mean ± SD or frequency (percentage). Cross tabulations were computed for categorical data according to gender and compared using the chi-square test. Anthropometry, PSS, DDS and dietary data were compared between males and females using the Independent Sample T test. Pearson's Correlation was used to assess correlation of anthropometry, PSS, DDS and dietary data. Spearman's correlation was used to assess correlation of ordinal data with anthropometry, PSS, DDS and dietary data. $p < 0.05$ was considered to be statistically significant. Paired sample T test or One Sample T test was used to analyze dietary data in comparison to RDA values.

III. RESULTS

This section presents the key findings of the study comparing male and female working adults in terms of socio-demographic characteristics, physical activity patterns, lifestyle behaviors, emotional influences, and nutrient intake. Statistical analyses were conducted to identify significant gender-based differences and to explore correlations between dietary diversity and nutrient adequacy. The results provide insight into how gender, lifestyle, and emotional factors influence nutritional status, dietary behaviors, and overall diet quality among working adults in urban environments.

TABLE NO. 1 SOCIO- DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

Variables		Males (n = 42)		Females (n = 58)		Total (N = 100)	P value
	N		N		N		
Age Group							
25–29 years	18	42.9	32	55.2	50	50.0	0.017*
30–39 years	15	35.7	24	41.4	39	39.0	
40–49 years	9	21.4	2	3.4	11	11.0	
Marital Status							
Divorced	1	2.4	0	0.0	1	1.0	
Widowed	0	0.0	2	3.4	2	2.0	0.404
Married	20	50.0	27	46.6	48	48.0	
Single	21	47.6	29	50.0	49	49.0	
Employment Status							
Self-employed	5	11.9	11	19.0	15	15.0	
Employed part-time	1	2.4	9	15.5	10	10.0	0.026*
Employed full-time	37	88.1	38	65.5	75	75.0	
Household Size							
1–2 members	10	23.8	16	27.6	26	26.0	
3–4 members	18	42.9	21	36.2	39	39.0	0.817
5–6 members	12	28.6	16	27.6	28	28.0	
7 or more members	2	4.8	5	8.6	7	7.0	
Type of Family							
Living alone	0	0.0	3	5.2	3	3.0	
Living with spouse	0	0.0	2	3.4	2	2.0	0.214

Nuclear family	28	66.7	31	53.4	59	59.0	
Joint family	14	33.3	22	37.9	36	36.0	

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

Table 1 outlines the socio-demographic profile of the 100 working adults, revealing both significant and non-significant gender-based variations. A significant difference was observed in age distribution (p = 0.017), where females were more concentrated in the 25–29 age group (55.2%) compared to males (42.9%), indicating a younger female employee. . Employment status also differed significantly between genders (p = 0.026), with males predominantly employed full-time (88.1%) versus 65.5% of females, suggesting greater workforce engagement among men. In contrast, marital status did not significantly differ (p = 0.404), with both genders similarly distributed across single and married categories. Household size was comparable (p = 0.817), with 3–4 member families being the most common for both groups. Family type also showed no significant variation (p = 0.214), though nuclear families were slightly more common among males (66.7%) than females (53.4%). These findings highlight age and employment as key differentiators by gender, while other socio-demographic aspects remained relatively balanced.

TABLE NO 2. Gender-wise Comparison of Anthropometric Measurements with Reference Ranges

Parameter	Males (n = 42)	Females (n = 58)	Total Mean ± SD	Reference Range	P Value
Weight (kg)	79.8 ± 7.3	57.5 ± 12.3	66.8 ± 15.2	M: 60–80 F: 50–70	0.001*
Height (cm)	169.9 ± 7.9	158.7 ± 6.2	163.4 ± 8.9	M:165–180 F: 150–165	0.001*
BMI (kg/m²)	27.7 ± 2.4	22.8 ± 4.5	24.8 ± 4.5	18.5–24.9 (Normal)	0.001*

*P value being less than the typical significance level of < 0.05 indicates statistically significant results., Data Presented as Mean ± SD, M- Male, F- Female

Table No 2.represents the anthropometric assessment of the study participants that revealed notable gender-based differences in key parameters including weight, height, and BMI. The overall mean weight was 66.8 ± 15.2 kg, mean height was 163.4 ± 8.9 cm, and mean BMI was 24.8 ± 4.5 kg/m². Males exhibited significantly higher values across all three parameters—weight (79.8 ± 7.3 kg), height (169.9 ± 7.9 cm), and BMI (27.7 ± 2.4 kg/m²)—compared to females, whose respective averages were 57.5 ± 12.3 kg, 158.7 ± 6.2 cm, and 22.8 ± 4.5 kg/m². These gender differences were statistically significant (p = 0.001), highlighting distinct variations in physical build between male and female working adults.

When assessed against standard reference ranges and Asian-specific BMI cut-offs, these differences gain further relevance. The average weight for males approached the upper limit of the typical adult male range (60–80 kg), while female weight averages remained well within the normal range (50–70 kg). Similarly, the average height of males and females fell within expected adult ranges (165–175 cm for males, 152–165 cm for females). BMI classification revealed that the mean BMI of males placed them in the overweight category, whereas the mean BMI for females fell within the normal range. These findings suggest that males in this population may be at higher risk of overweight-related health concerns and underscore the importance of gender-sensitive nutrition and wellness interventions.

TABLE NO 3. Correlation Between Dietary Diversity Score (DDS), Lifestyle and Health Factors

DIETARY DIVERSITY SCORE		
Variables	**Correlation Coefficient (r)**	**P-value**
Hours of physical activity per week	0.261	0.009*
Hours of physical activity per day	0.279	0.005*
Physical activity frequency (days/week)	0.132	0.189
Intensity of activity	0.060	0.556
Employed in current job	0.087	0.389
Hours/day spent sitting	0.312	0.002*
Currently smokes cigarettes	0.172	0.086
Consistent meal schedule	0.131	0.194
Specific dietary restrictions	0.132	0.192
Diabetes	0.198*	0.048*
Hypertension (HTN)	0.148	0.140
Thyroid	-0.066	0.515
Heart disease	0.098	0.331
Specific food triggers	0.157	0.119
Other health problems	0.019	0.851
Chronic pain	0.041	0.683

* Correlation is significant at the 0.05 level (2-tailed)

In Table No 3. DDS showed a significant positive correlation with both hours of physical activity per week ($\rho = 0.261$, $p = 0.009$) and per day ($\rho = 0.279$, $p = 0.005$), suggesting that individuals with more diverse diets tend to engage in greater physical activity. A positive association was also observed between DDS and hours spent sitting per day ($\rho = 0.312$, $p = 0.002$). Other factors such as employment status, frequency, and intensity of activity were not significantly associated with DDS. A significant positive correlation was observed between DDS and diabetes ($r = 0.198$, $p = 0.048$). Other factors like smoking, meal timing, dietary restrictions, and conditions such as HTN, thyroid, or chronic pain showed no significant association with DDS. A weak negative trend with thyroid ($r = –0.066$) was noted, but it was not significant

TABLE NO 4. Mean Daily Nutrient Intake and Percentage of Recommended Allowances Among Study Participants

Nutrient Intake	Mean ± SD	% RDA Fulfilled (Mean ± SD)	% EAR Fulfilled (Mean ± SD)
Energy (kcal)	2127.5 ± 326.2	105.1 ± 18.7	119.4 ± 22.2
Protein (g)	47.7 ± 10.3	93.8 ± 23.9	123.1 ± 28.7
Carbohydrate (g)	219.9 ± 41.7	—	—
Fat (g)	81.8 ± 15.5	—	—
Calcium (mg)	271.4 ± 86.9	27.1 ± 8.7	33.9 ± 10.9
Vitamin A (µg)	211.0 ± 91.6	23.6 ± 10.8	51.0 ± 23.3
Fiber (g)	12.8 ± 2.0	47.6 ± 8.8	—
Iron (mg)	5.9 ± 1.7	25.1 ± 8.3	44.9 ± 14.0

Values are presented as Mean ± Standard Deviation, Percentage of RDA and EAR is based on ICMR-NIN 2020 guidelines for adults

Table No.4 illustrates the mean daily nutrient intake of the participants along with the percentage fulfillment of Recommended Dietary Allowance (RDA) and Estimated Average Requirement (EAR). The average energy intake (2127.5 ± 326.2 kcal) exceeded both RDA (105.1%) and EAR (119.4%), indicating overall caloric sufficiency. Protein intake (47.7 g) met 123.1% of EAR but only 93.8% of RDA, suggesting borderline adequacy. However, micronutrient intake showed major shortfalls—calcium (27.1% RDA), vitamin A (23.6% RDA), iron (25.1% RDA), and fiber (47.6% RDA) were all significantly below recommended levels.

Micronutrient intakes were notably low: calcium intake (271.4 mg/day) was only 27.1% of RDA; vitamin A intake met just 23.6% of RDA; and iron intake was only 25.1% of RDA. These values show a significant gap in micronutrient adequacy, especially in bone health and immunity-related nutrients like

calcium, vitamin A, and iron. Fiber intake was also suboptimal, fulfilling only 47.6% of RDA, indicating low intake of whole grains, fruits, and vegetables. Overall, while energy intake was adequate, the diet was imbalanced, lacking in key vitamins and minerals, and low in protein quality. These results emphasize the need for dietary interventions focused on micronutrient-rich and protein-dense foods to improve nutritional adequacy in the population.

TABLE NO 5. Correlation Between Dietary Diversity Score and Nutrient Intake

Nutrient Variable	DIETARY DIVERSITY SCORE	
	Pearson Correlation (R)	**P-value**
Energy (kcal)	0.184	0.067

Protein (g)	0.134	0.184
Carbohydrate (g)	0.153	0.127
Fat (g)	0.107	0.289
Calcium (mg)	-0.094	0.352
Vitamin A (mcg)	-0.129	0.201
Fiber (g)	0.097	0.337
Iron (mg)	-0.047	0.641

* Correlation is significant at the 0.05 level (2-tailed),

Table No.5 presents the correlation between Diet Diversity Score (DDS) and nutrient intake, highlighting both positive and negative trends. A positive correlation was observed between DDS and energy intake (r = 0.184), indicating that as dietary diversity increases, energy intake also tends to increase. However, this association was not statistically significant (p = 0.067), but showed a positive trend. Similar positive but non-significant correlations were found with protein (r = 0.134), carbohydrates (r = 0.153), fat (r = 0.107), and fiber (r = 0.097). This suggests that individuals with more diverse diets may consume slightly higher amounts of these macronutrients, though the association is weak and not significant. In contrast, negative correlations were observed with calcium (r = -0.094), vitamin A (r = -0.129), and iron (r = -0.047), indicating that increased dietary diversity does not necessarily translate to higher intake of these micronutrients

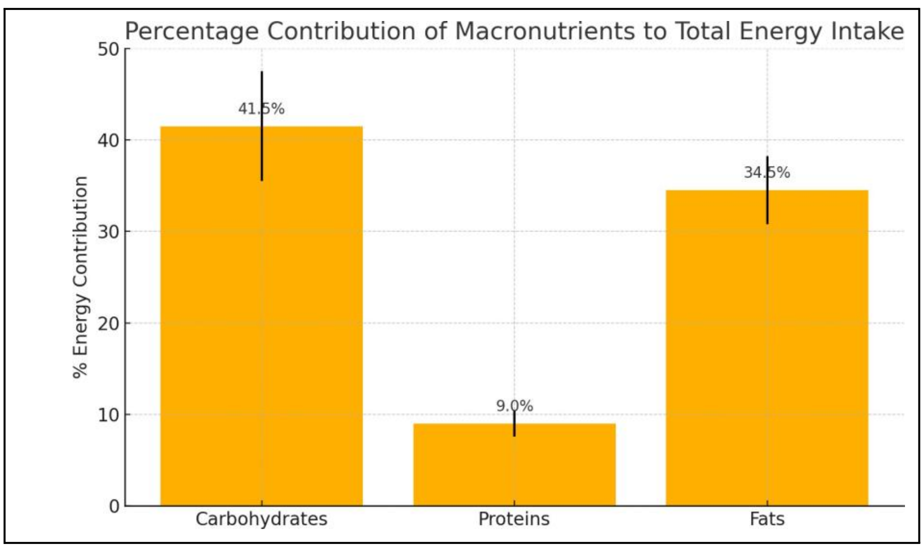

FIGURE No. 1 Percentage Contribution of Macronutrients to Total Energy Intake Values are presented as Mean ± Standard Deviation.

Figure No 1. represents the average energy intake of the participants was 2127.5 ± 326.2 kcal/day, which is 105.1% of RDA and 119.4% of EAR, indicating that total calorie intake was adequate on average. Protein intake averaged 47.7 ± 10.3 g, fulfilling 93.8% of RDA and 123.1% of EAR, suggesting that while the group met minimum requirements, they fell slightly short of the optimal RDA. Carbohydrate and fat intakes were 219.9 ± 41.7 g and 81.8 ± 15.5 g, respectively, with carbohydrates contributing 41.5%, fats 34.5%, and proteins only 9.0% to total energy intake. This indicates a high carbohydrate and fat-dominant diet, typical in Indian dietary patterns, and a low protein energy contribution, which may raise concern for long-term muscle mass and metabolic health.

TABLE NO.6 Correlation of Daily Nutrient Intake and Percentage of RDA and EAR

Nutrient / Variable	Compared With	Male: Mean Diff	p-value	Female: Mean Diff	p-value
Energy(kcal)	RDA	+118.81	0.026*	+61.62	0.250
	EAR	+359.05	0.000*	+299.38	0.000*
Protein(g)	RDA	–4.49	0.027*	–3.68	0.025*
	EAR	+8.56	0.000*	+8.82	0.000*
Vitamin A(mcg)	RDA	–714.05	0.000*	–680.53	0.000*
	EAR	–223.33	0.000*	–196.40	0.000*
Fiber(g)	RDA	–14.51	0.000*	–14.11	0.000*
Iron(mg)	RDA	–18.14	0.000*	–18.38	0.000*
	EAR	–7.57	0.000*	–7.43	0.000*
Calcium(mg)	RDA (1000 mg)	–745.50	0.000*	–716.37	0.000*
	EAR (800 mg)	–545.50	0.000*	–516.37	0.000*

* Correlation is significant at the 0.05 level (2-tailed)

Table No 6. represents the comparison of actual nutrient intake with the Recommended Dietary Allowance (RDA) and Estimated Average Requirement (EAR), revealing several key insights for both males and females. In terms of energy intake, males consumed significantly more than both the RDA ($p = 0.026$) and EAR ($p < 0.001$), while females exceeded only the EAR ($p < 0.001$) and not the RDA ($p = 0.250$). For protein, a contrasting trend was observed. Both males ($p = 0.027$) and females ($p = 0.025$) had significantly lower intakes compared to the RDA, yet they exceeded the EAR ($p < 0.001$ for both). A major gap was seen in Vitamin A intake, with both genders significantly below both the RDA and EAR ($p < 0.001$). Similarly, fiber intake was also significantly lower than the RDA in both males and females ($p < 0.001$). Iron intake followed the same pattern, where both males and females had significantly lower intakes than both RDA and EAR ($p < 0.001$). Lastly, calcium intake was found to be significantly lower than both RDA and EAR in both genders ($p < 0.001$).

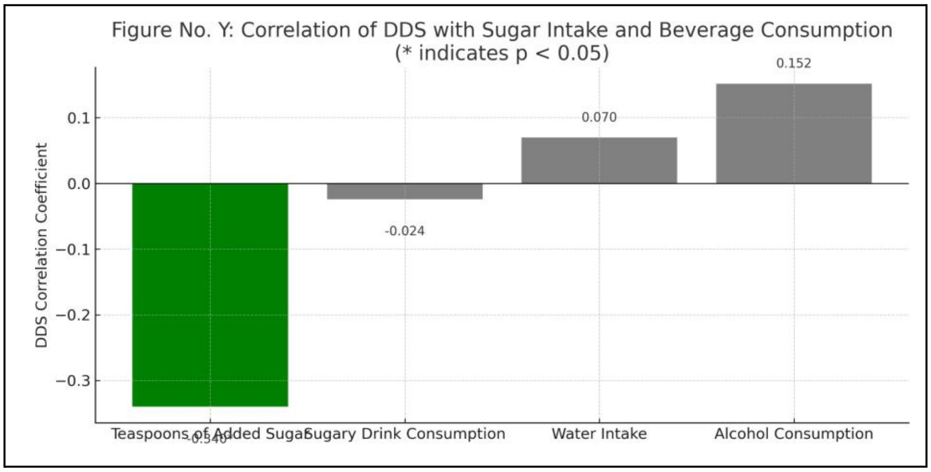

FIGURE NO 2. Correlation of Diet Diversity Score (DDS) with Added Sugar and Beverage Intake

* Correlation is significant at the 0.05 level (2-tailed)

Figure No 2. shows the correlation between Diet Diversity Score (DDS) and selected dietary and beverage factors. A significant negative correlation was observed with added sugar intake (r = –0.340, p = 0.001), indicating that higher diet diversity is linked to lower sugar consumption. The bar appears below the X-axis because the correlation value is negative — this is standard for inverse relationships.No significant associations were found with sugary drink intake, water intake, or alcohol consumption (p > 0.05), suggesting that DDS is more strongly influenced by food variety than beverage habits.

IV. DISCUSSION

A statistically significant gender difference was observed in the age distribution of the participants, with a higher proportion of females falling in the 25–29 age group. This concentration among younger females may reflect both workforce entry age and increased receptiveness to nutrition and health studies at this life stage (Appleton et al., 2015). Employment status also differed significantly between genders, with males more commonly engaged in full-time roles, while females were more frequently part-time or self-employed. These trends reflect broader urban labor patterns in India, where structural and familial factors often influence women's work participation (Chatterjee,et al, 2018). In contrast, variables such as marital status, household size, and family type showed no significant gender differences, suggesting a relatively uniform demographic base outside of employment and age structure.

Anthropometric analysis revealed that males had significantly higher mean values for weight, height, and BMI compared to females (p = 0.001). While both genders fell within acceptable height and weight ranges for Indian adults, the average BMI among males placed them in the overweight category based on Asian-specific cut-offs (WHO, 2004), whereas females remained within the normal range. These findings align with earlier studies highlighting greater overweight prevalence among urban men due to higher caloric intake and reduced physical activity (Misra et al., 2011). The observed gender disparity in body composition underscores the need for targeted interventions addressing weight-related risks, particularly in male working populations.

Dietary diversity showed a significant positive association with both weekly and daily physical activity (ρ = 0.261, p = 0.009; ρ = 0.279, p = 0.005), consistent with findings that more varied diets correlate with healthier lifestyle behaviors (Yu Liu,et.al, 2025). Unexpectedly, it also positively correlated with hours spent sitting per day (ρ = 0.312, p = 0.002), likely reflecting sedentary job roles where individuals compensate with higher dietary quality (Li,et.al, 2024) . No significant associations emerged between DDS and employment status or activity frequency/intensity.

Among health factors, DDS correlated weakly but significantly with diabetes (r = 0.198, p = 0.048), suggesting that individuals with diabetes may adopt more diverse diets as part of disease management strategies, as earlier literature indicates (Kim et al., 2019). No meaningful associations were found with hypertension, thyroid disorders, chronic pain, smoking, dietary restrictions, or meal timing.

While energy intake exceeded both RDA (105.1%) and EAR (119.4%), macronutrient and micronutrient analyses revealed critical shortfalls. Protein intake met EAR but fell short of RDA (93.8%), possibly due to reliance on predominantly plant-based diets lacking complete amino acid profiles (Craig,et.al, 2009). Micronutrient deficits were more pronounced: calcium (27.1% of RDA), vitamin A (23.6%), iron (25.1%), and fiber (47.6%) mirroring national surveys flagging widespread micronutrient insufficiencies among urban Indians (Kumar,et.al,2023).These findings underscore a critical imbalance: caloric adequacy does not ensure nutrient adequacy, highlighting an urgent need for interventions promoting micronutrient-rich, protein-dense, and fiber-rich food choices.

Dietary diversity showed a weak positive correlation with energy ($r = 0.184$, $p = 0.067$), protein ($r = 0.134$), carbohydrates ($r = 0.153$), fat ($r = 0.107$), and fiber ($r = 0.097$), indicating a non-significant trend where individuals with more varied diets may consume marginally higher amounts of macronutrients. Conversely, negative correlations were observed with calcium ($r = –0.094$), vitamin A ($r = –0.129$), and iron ($r = –0.047$), suggesting that greater variety does not necessarily equate to improved micronutrient intake likely reflecting gaps in diet quality rather than quantity (Kim, et.al, 2019).

Energy intake exceeded both RDA and EAR, confirming overall caloric sufficiency. However, macronutrient contribution revealed a carbohydrate (41.5%) and fat-heavy (34.5%) profile, with protein contributing only 9.0% of total energy. This imbalance, typical in Indian diets, may pose long-term risks to metabolic health and lean mass maintenance (Craig ,et al,2009).

Gender-wise analysis of nutrient intake showed that males consumed significantly more energy than both RDA ($p = 0.026$) and EAR ($p < 0.001$), while females exceeded only the EAR ($p < 0.001$). Protein intake fell below RDA in both genders ($p < 0.05$) but surpassed EAR, indicating minimum adequacy. Intakes of vitamin A, fiber, calcium, and iron were significantly below both RDA and EAR for males and females ($p < 0.001$), confirming consistent micronutrient inadequacy.

A significant negative correlation was also observed between dietary diversity and added sugar intake ($r = –0.340$, $p = 0.001$), supporting the notion that more varied diets are associated with healthier food choices. No significant links were found with sugary drinks, water, or alcohol, suggesting that DDS is more reflective of solid food quality than beverage patterns (Li,et.al, 2024).

V. CONCLUSION

The present study underscores marked gender-based divergences in both socio-demographic and anthropometric profiles where younger women predominate in the workforce and men more commonly occupy full-time roles, with males exhibiting significantly greater weight, height, and BMI (often within the overweight range) compared to females' normal BMI ranges highlighting the imperative for gender-responsive health interventions. Despite average energy intakes exceeding RDA and EAR benchmarks, protein adequacy remained marginal and critical micronutrient shortfalls in calcium, iron, vitamin A, and fiber persisted, revealing a troubling gap between caloric sufficiency and nutrient density. Dominant carbohydrate- and fat-centric dietary patterns with low protein contributions raise concerns for long-term metabolic and musculoskeletal health in largely sedentary urban adults. Although dietary diversity moderately correlated with higher energy and macronutrient intake and lower added-sugar consumption from solid foods, it failed to bolster micronutrient adequacy or influence beverage choices, indicating that diversity scores primarily reflect the quality of solid-food variety rather than overall dietary behavior. These results highlight the need for comprehensive workplace nutrition initiatives that go beyond calorie assessment to include culturally tailored, cost-effective dietary diversification, mitigation of occupational stress and irregular work schedules, reduction of sedentary behavior, and provision of personalized counseling to promote balanced, nutrient rich diets and enhance the health and well-being of urban working adults.

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