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A Comparative Cross-Sectional Study on the Influence of Work Modality (Work-From-Home vs Work-From-Office) on Dietary Patterns, Meal and Snacking Behaviour, Physical Activity, and Perceived Stress in Adult Employees

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Abstract:

Background- Work modality shifts from work-from-office (WFO) to work-from-home (WFH) have altered lifestyle behaviours including diet, physical activity, and stress, yet comparative Indian data remain limited.

Aim- To compare the influence of work modality (WFH vs WFO) on dietary patterns, meal and snacking behaviour, physical activity, and perceived stress among adult employees.

Methodology- A comparative cross-sectional study was conducted among 100 employees (50 WFH, 50 WFO; aged 25–50 years) using convenience sampling, with ethical approval from the Inter System Biomedica Ethics Committee. Data was collected using a Food Frequency Questionnaire (FFQ) to derive dietary patterns via principal component analysis, along with meal and snacking behaviour assessment, IPAQ-SF, and PSS-10. Analysis was performed using Jamovi (v2.6.26). As data were non-normally distributed (Shapiro–Wilk $p<0.05$), results were expressed as median (IQR) and percentages, and analyzed using Mann–Whitney U and Chi-square tests ($p<0.05$ significant).

Results- WFH participants consumed more home-cooked meals ($p=0.045$), reported increased snacking ($p=0.023$), and had higher nut intake ($p=0.008$), while WFO participants showed higher physical activity ($p=0.045$). Work schedule differed significantly ($p=0.002$), with greater flexibility in WFH. The western dietary pattern was positively associated with fat intake ($p=0.017$) and BMI ($p=0.045$), and the animal protein pattern with protein intake ($p=0.002$).

Conclusion- Work-from-home was associated with higher home-cooked meal intake, increased snacking, and lower physical activity, whereas work-from-office showed higher physical activity but greater reliance on outside or mixed food sources. These patterns may differentially influence long-term health outcomes.

Keywords: Work-from-home, Work-from-office, Dietary patterns, Snacking Behaviour, Physical activity, Perceived stress

Introduction:

Work organisation has undergone a substantial transformation with the widespread adoption of work-from-home (WFH) models alongside traditional work-from-office (WFO) systems, particularly following the pandemic, leading to significant changes in daily routines and lifestyle behaviours. A growing body of evidence indicates that remote working influences multiple domains including dietary intake, physical activity, and psychological well-being, although the nature of these changes varies considerably across populations (Scoditti et al., 2024; Alah et al., 2021). Dietary behaviour appears particularly sensitive to this occupational shift, with studies reporting increased food intake, higher frequency of eating occasions, and greater snack consumption, reflecting the less structured eating patterns that home-based work environments tend to produce (Białek-Dratwa et al., 2022; Coşkun et al., 2022). WFH has also been associated with increased reliance on home-prepared meals, likely reflecting greater time available for cooking in the absence of a daily commute (Sato et al., 2021). Evidence from Indian populations further suggests that prolonged working hours contribute to meal skipping and irregular meal timing, highlighting the distinct role of occupational structure in shaping dietary behaviour (Manchanda et al., 2024). Concurrently, significant reductions in physical activity and increases in sedentary behaviour have been consistently reported among remote workers, largely due to reduced occupational movement and increased screen exposure (Wilms et al., 2022; Rapisarda et al., 2021; Tronco Hernández et al., 2021), with population-level data from the early pandemic period corroborating substantial declines in physical activity associated with home confinement (Peçanha et al., 2020). These changes carry important clinical implications, as sedentary behaviour and physical inactivity have been independently associated with increased risk of cardiovascular disease, type 2 diabetes, and all-cause mortality (Biswas et al., 2015). The psychological impact of WFH is similarly heterogeneous, with evidence indicating both increased stress and depressive symptoms and considerable context-dependent variation shaped by individual, domestic, and organisational factors (Afonso et al., 2021; Galanti et al., 2021; Scoditti et al., 2024). Despite growing international literature across these domains, evidence from the Indian context remains limited, particularly studies that simultaneously evaluate dietary patterns, meal and snacking behaviour, physical activity, and perceived stress in relation to work modality. Given the scale of India's knowledge-worker population and the rapid post-pandemic normalisation of remote work arrangements, this gap is of considerable public health relevance. Therefore, the present study aims to compare the influence of work modality- WFH versus WFO, on these lifestyle factors among adult employees.

Aim- To compare the influence of work modality (work-from-home vs Work-From-Office) on dietary patterns, meal and snacking behaviour, physical activity, and perceived stress among adult employees in Mumbai, India.

Material and Methodology:

A comparative cross-sectional study was conducted among 100 adult employees in Mumbai, India, comprising 50 work-from-home (WFH) and 50 work-from-office (WFO) participants. The study population included adult employees aged 25-50 years working across various sectors who had been engaged in their respective work modality for a minimum duration of three months. Participants were selected using a non-probability convenience sampling method based on eligibility criteria. Individuals with major psychiatric disorders and other specified exclusion conditions were not included in the study. Ethical approval for the study was obtained from the Inter System Biomedica Ethics Committee prior to data collection. Data were collected using a structured questionnaire designed to assess multiple domains.

Dietary patterns were evaluated using a Food Frequency Questionnaire, and principal component analysis (PCA) was applied to derive dietary patterns based on food group loadings, while meal timing and snacking behaviour were assessed through specific behavioural questions. Physical activity levels were measured using the International Physical Activity Questionnaire- Short Form (IPAQ-SF), and perceived stress was assessed using the Perceived Stress Scale (PSS-10). In addition, information on sociodemographic characteristics, anthropometric measurements, work-related variables, and lifestyle behaviours was obtained. Data were analyzed in Jamovi (v2.6.26). As variables were non-normally distributed (Shapiro–Wilk $p < 0.05$), data are presented as median (IQR) or frequencies (%). Mann–Whitney U and Chi-square tests were used for group comparisons, Spearman for correlations, and linear/logistic regression for predictors. Significance was set at $p < 0.05$.

Results:

The results of the present study compare work-from-home (WFH) and work-from-office (WFO) participants across baseline characteristics, work patterns, dietary behaviour, physical activity, and perceived stress. Data are presented as median (interquartile range) and frequencies (%), and group comparisons were performed using appropriate non-parametric tests. The two groups were comparable in baseline and anthropometric characteristics. Statistically significant differences were observed in work schedule, meal sourcing, snacking behaviour, nut consumption, and physical activity levels, while perceived stress did not differ significantly between groups.

Table 1- Baseline Characteristics of Study Population by Work Modality

Sociodemographic characteristics	Overall n= 100	WFH n=50 Median (IQR)	WFO n=50 Median (IQR)	test value	p value
Age (in years), Median (IQR)	29.0 (26.0-39.0)	28.0 (26.0-36.8)	31.0 (26.3-40.8)	1090^	NS
Number of years employed, Median (IQR)	5.0 (3.0-12.0)	4.0 (3.0-9.0)	7.0 (3.0-12.8)	1041^	NS
Height (in cm), Median (IQR)	165.5 (160.0-175.0)	165.0 (160.0-175.0)	168.0 (159.3-175.0)	1244^	NS
Weight (in kgs)	70.0 (59.0-80.0)	68.5 (59.0-79.8)	70.0 (60.3-79.8)	1206^	NS
BMI (kg/m^2) (to be added after gender)	25.5 (22.0-28.0)	25.6 (22.1-28.1)	25.5 (21.8-27.6)	1243^	NS
		n (%)	n (%)		
Gender Male Female	 52 48	 23 (46) 27 (54)	 29 (58) 21 (42)	 1.44#	 NS

Occupation of the Head					
Unemployed					
Elementary Occupation					
Plant and Machine Operators Assemblers					
Craft and Related Trade Workers					
Skilled Agricultural and Fishery	12	5 (10)	7 (14)		
Workers	8	4 (8)	4 (8)		
Skilled Workers and Shops and Market	0	0 (0)	0 (0)		
Sales Workers	7	3 (6)	4 (8)		
Clerks	3	2 (4)	1 (2)		
Technicians and Associate	16	2 (4)	14 (28)		
Professionals	6	5 (10)	1 (2)		
Professionals	14	9 (18)	5 (10)		
Legislators, Senior Officials and	28	18 (36)	10 (20)		
Managers	6	2 (4)	4 (8)	16.57#	0.03*
Sector of Employment					
IT	16	13 (26)	3 (6)		
Corporate/ Finance	37	18 (36)	19 (38)		
Education	17	8 (16)	9 (18)		
Administration	4	2 (4)	2 (4)		
Media/ Design	20	7 (14)	13 (26)		
Business	5	1 (2)	4 (8)		
Medicine	1	1 (2)	0 (0)	10.94#	NS

Footnote- *p<0.05, **p<0.005; ^Mann Whitney U test; #Chi Square test

Table 1 presents the baseline characteristics of the study population. The median age and years of employment were comparable between WFH and WFO participants, with no statistically significant differences observed. Anthropometric parameters including height, weight, and BMI were also similar across both groups, indicating comparable nutritional status. Gender distribution, marital status, education level, income, and sector of employment showed no significant variation. A significant difference was observed only in the occupation of the head of the household (p=0.03), suggesting some variation in socioeconomic background.

Table 2- Work Characteristics and Occupational Patterns of the Study Population by Work Modality

Work Habits	Overall n= 100	WFH n=50	WFO n=50	test value	p value
		n (%)	n (%)		
How many hours per week do you work?		1 (2)	0 (0)		
<40 hrs	1	46	41		
40-60 hours	87	(92)	(82)	4.29#	NS

>60 hours	12	3 (6)	9 (18)		
How long have you been in this current work modality?		12 (24)	5 (10)		
3–6 months	17	5 (10)	8 (16)		
6–9 months	13	33	37		
>9 months	70	(66)	(74)	3.8#	NS
What type of work schedule do you mainly follow?		21	29		
Fixed daytime schedule (e.g., mostly between 9 am – 6 pm)		(42)	(58)		
Rotating shifts (different timings on different days/weeks)	50	3 (6)	12		
Predominantly evening / night shifts	15	4 (8)	(24)		
Flexible / self-selected working hours (no fixed start and end	6	22	2 (4)		
time)	29	(44)	7 (14)	15.11#	0.002**
How often do you work continuously for more than 2 hours			9 (18)		
without a		13	15		
standing or walking break?		(26)	(30)		
Never / rarely	22	23	16		
1 time per day	38	(46)	(32)		
2–3 times per day	25	9 (18)	10		
More than 3 times per day	15	5 (10)	(20)	6.04#	NS

Footnote- *p<0.05, **p<0.005; ^Mann Whitney U test; #Chi Square test

Table 2 shows the work-related characteristics of the participants. The majority of individuals in both groups reported working 40–60 hours per week, with no significant difference observed. Duration in the current work modality was also comparable between groups. A statistically significant difference was observed in the work schedule (p=0.002), with WFH participants more likely to follow flexible schedules, while WFO participants predominantly followed fixed or shift-based schedules. Sedentary behaviour patterns were similar between groups, with no significant differences in prolonged sitting duration.

Table 3- Meal Patterns and Snacking Behaviour by Work Modality

Meal and Snacking Characteristics	Overall n= 100	WFH n=50	WFO n=50	test value	p value
		n (%)	n (%)		
Number of meals per day					
2	6	3 (6)	3 (6)		
3	60	26 (52)	34 (68)		
>3	34	21 (42)	13 (26)	2.95#	NS
Do you have fixed meal timings:			19 (38)		
No	34	15 (30)	15 (30)	0.76#	NS

Yes Sometimes	31 35	16 (32) 19 (38)	16 (32)		
Breakfast timing: Skipped Before 9 am 9-11 am	 18 30 52	 7 (14) 14 (28) 29 (54)	 11 (22) 16 (32) 23 (46)	 1.71#	 NS
Do you skip meals: Never 1-2 times/ week 3-4 times/ week Daily	 39 35 10 16	 23 (46) 17 (34) 3 (6) 7 (14)	 16 (32) 18 (36) 7 (14) 9 (18)	 3.13#	 NS
What proportion of your meals are: Mostly home cooked (>75%) Mixed (50:50) Mostly outside/ delivery (>75%)	 65 29 6	 38 (76) 11 (22) 1 (2)	 27 (54) 18 (36) 5 (10)	 6.22#	 0.045*
How many snacks do you consume per day: None 1 2 3+	 23 63 13 1	 12 (24) 28 (56) 9 (18) 1 (2)	 11 (22) 35 (70) 4 (8) 0 (0)	 3.74#	 NS
Snacking time pattern Mid-morning Evening Late night Throughout the day	 10 60 10 19	 1 (3) 23 (61) 4 (11) 10 (26)	 7 (18) 23 (59) 4 (10) 5 (13)	 6.15#	 NS
Change in snacking behaviour after WFH/ WFO shift No Change Increased Decreased	 65 28 7	 30 (60) 19 (38) 1 (2)	 35 (70) 9 (18) 6 (12)	 7.53#	 0.023*

Footnote- *p<0.05, **p<0.005; ^Mann Whitney U test; #Chi Square test

Table 3 presents the meal patterns and snacking behaviour of the study population. Meal frequency, meal timing, and breakfast habits were comparable between WFH and WFO participants, with no statistically significant differences observed. However, a significant difference was found in the source of meals (p=0.045), with WFH participants consuming more home-cooked meals, while WFO participants relied more on outside or mixed food sources. Snacking behaviour showed a significant difference (p=0.023), with increased snacking more common among WFH participants.

Table 4- Distribution of Snack Types Consumed by the Study Population According to Work Modality

Types of Snacks	Overall n= 100	WFH n=50	WFO n=50	test value	p value
		n (%)	n (%)		
Biscuits/ Bakery items	49	29 (58)	20 (40)	3.24#	NS
Namkeen/ Chips	46	22 (44)	24 (48)	0.16#	NS
Chocolates/ Sweets	26	16 (32)	10 (20)	1.87#	NS
Fruits	30	19 (38)	11 (22)	3.05#	NS
Nuts	28	20 (40)	8 (16)	7.14#	0.008*
Tea/ Coffee	49	26 (52)	23 (46)	0.36#	NS
Sugar Sweetened Beverages	13	6 (12)	7 (14)	0.09#	NS

Footnote- *p<0.05, **p<0.005; ^Mann Whitney U test; #Chi Square test

Table 4 shows that biscuits/bakery items, tea/coffee, and namkeen/chips were the most commonly consumed snacks, with no significant differences between WFH and WFO groups. Intake of chocolates/sweets and fruits was slightly higher among WFH participants but not statistically significant. Nut consumption was significantly higher in the WFH group (p = 0.008), suggesting a relatively healthier snacking pattern. Tea/coffee and sugar-sweetened beverage intake were comparable across both groups.

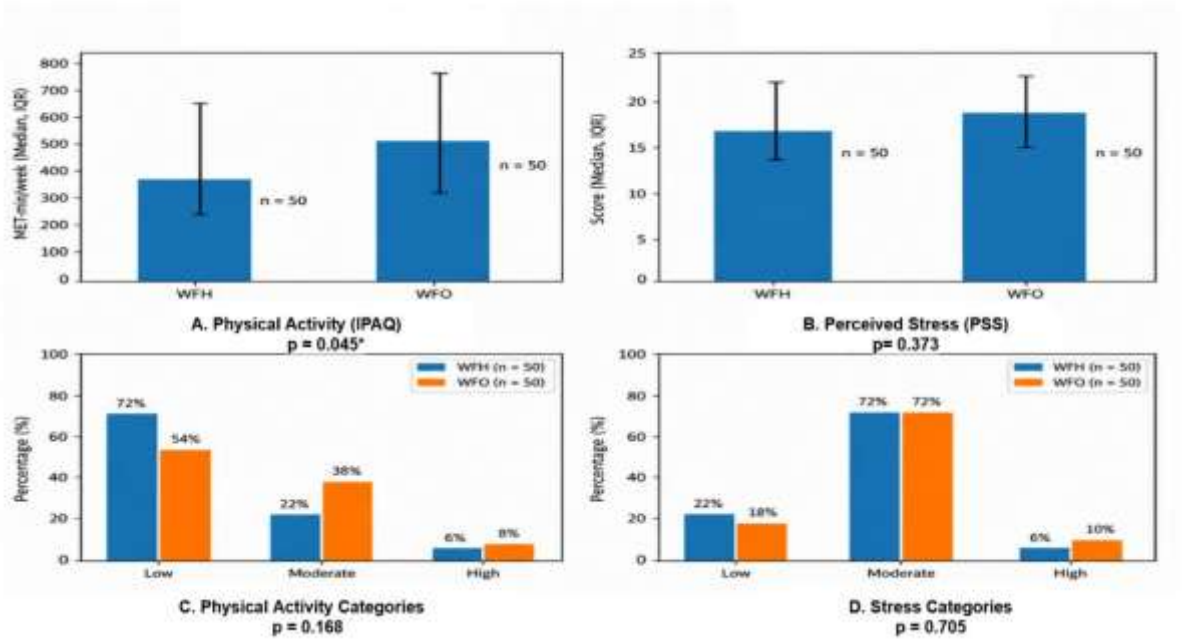

Figure 1- Physical Activity and Perceived Stress by Work Modality

Figure 1 shows that physical activity levels were significantly higher among WFO participants compared to WFH participants (median IPAQ: WFO = 505.5 MET-min/week; WFH = 368.0 MET-min/week; p = 0.045), whereas perceived stress levels were comparable between the two groups with no statistically

significant difference (median PSS: WFO = 19.0; WFH = 17.0; p = 0.373). The distribution of physical activity categories did not differ significantly (p = 0.168), although a greater proportion of WFH participants were in the low activity category, while WFO participants had relatively higher proportions in moderate and high activity levels. Similarly, stress categories showed no significant difference between groups (p = 0.705), with the majority of participants in both groups falling under the moderate stress category.

Table 5- Correlation Between Dietary Patterns, Nutrient Intake, and BMI Among Study Participants

PCA Component	Nutrient	Correlation Coefficient	p value
Traditional Plant Based Pattern	Energy	-0.07	NS
	Protein	-0.15	NS
	Carbohydrates	0.11	NS
	Fats	-0.13	NS
	Sodium	-0.09	NS
Western/ Ultra-Processed Pattern	Energy	0.18	NS
	Protein	0.13	NS
	Carbohydrates	0.12	NS
	Fats	0.24	0.017*
	Sodium	0.06	NS
Animal Protein Pattern	Energy	0.03	NS
	Protein	0.31	0.002**
	Carbohydrates	-0.06	NS
	Fats	-0.04	NS
	Sodium	-0.02	NS
Traditional Plant Based Pattern	BMI	-0.19	NS
Western/ Ultra-Processed Pattern	BMI	0.2	0.045*

Footnote- *p<0.05, **p<0.005; ^Mann Whitney U test; #Chi Square test

Table 5 presents the correlation between dietary patterns, nutrient intake, and BMI. A significant positive correlation was observed between the western/ultra-processed dietary pattern and fat intake (p=0.017), indicating higher fat consumption with increased adherence to this pattern. The animal protein pattern showed a significant positive correlation with protein intake (p=0.002). Additionally, the western dietary pattern demonstrated a significant positive association with BMI (p=0.045). No significant correlations were observed for the traditional plant-based pattern with nutrient intake or BMI.

Table 6- Multivariable Regression Analysis for Predictors of Perceived Stress Among Study Participants

Predictive Factor	β (95% CI)	p value
Work Modality: WFO with respect to WFH	2.26 (-0.27-4.79)	NS
IPAQ Score (MET-min/ week)	0 (0-0)	NS
BMI (kg/m^2)	-0.2 (-0.5-0.11)	NS
Gender: Females with respect to males	2.62 (-0.02-5.27)	NS
Traditional plant-based pattern	-0.56 (-1.79-0.67)	NS
Western/ultra-processed pattern	-0.84 (-2.11-0.43)	NS
Animal protein pattern	1.18 (-0.09-2.44)	NS
Energy_Avg	0.01 (0-0.01)	0.027*
Protein_Avg	-0.09 (-0.16—0.02)	0.017*
Fats_Avg	0.04 (-0.1-0.18)	NS

Footnote- *p<0.05, **p<0.005; ^Mann Whitney U test; #Chi Square test

Table 6 presents the predictors of perceived stress among the study participants. A statistically significant positive association was observed between energy intake and perceived stress (p=0.027). In contrast, protein intake showed a significant negative association with stress (p=0.017). Other variables including work modality, physical activity, BMI, gender, and dietary patterns did not show statistically significant associations.

Discussion:

The present study examined the influence of work modality on lifestyle behaviours among adult employees and identified significant differences across key domains. A high prevalence of overweight and obesity was observed across the study population, with no significant difference between WFH and WFO groups, suggesting that anthropometric outcomes may be influenced more by broader lifestyle and behavioural factors than work modality alone. Evidence from remote work populations shows heterogeneous weight outcomes, with a substantial proportion reporting weight gain alongside increased sedentary behaviour and dietary changes during WFH (Coşkun et al., 2022; Abed Alah et al., 2021).

Dietary behaviour differed significantly in terms of meal sourcing, with WFH participants consuming more home-cooked meals, consistent with previous research demonstrating increased home food preparation during remote work (Sato et al., 2021). However, this did not necessarily translate into healthier overall dietary patterns. Meal frequency and timing were comparable between groups, although occupational structure may influence eating regularity. Evidence suggests that changes in work schedules and remote work arrangements are associated with altered eating patterns and less structured dietary behaviours, including skipping breakfast, lower meal frequency, and meal substitution (Kubo et al., 2021; Coşkun et al., 2022). Snacking behaviour was significantly higher among WFH participants, likely due to increased food accessibility and unstructured routines in home settings, a pattern consistently observed in

remote working populations (Kubo et al., 2021; Abed Alah et al., 2021). Despite this, higher nut consumption among WFH participants indicates the coexistence of both healthier and less healthy snacking behaviours within the home environment.

Physical activity levels were significantly higher among WFO participants, likely due to greater incidental movement associated with commuting and structured work routines. In contrast, WFH participants exhibited lower activity levels, consistent with evidence demonstrating increased sedentary time and reduced physical activity during remote work (Peçanha et al., 2020; Hall et al., 2021; Massar et al., 2023). These findings are further supported by observational data indicating that increased sedentary behaviour during WFH is associated with adverse lifestyle outcomes including weight gain and reduced physical movement (Scoditti et al., 2024). Additionally, significant associations were observed between dietary intake and stress, with energy intake positively associated with perceived stress and protein intake negatively associated with stress. These findings are supported by existing literature indicating that psychological stress is associated with increased energy intake and preference for highly palatable, energy-dense foods, often described as stress-induced hyperphagia (Yau & Potenza, 2013). Furthermore, neurobiological evidence indicates that dietary protein and amino acid availability, particularly tryptophan, influence mood and stress regulation through serotonin synthesis pathways (Höglund et al., 2019).

Overall, the findings suggest that work modality influences lifestyle behaviours in distinct ways rather than determining uniform health outcomes. Evidence indicates that remote work affects dietary patterns, physical activity, and psychological well-being through complex interactions involving environmental structure, behavioural regulation, and individual-level factors (Coşkun et al., 2022; Scoditti et al., 2024). These results highlight the importance of targeted interventions addressing behavioural patterns across both work settings rather than focusing solely on work modality.

Conclusion:

The study concludes that work modality significantly influences dietary behaviour and physical activity among adult employees, with work-from-home associated with increased snacking and reduced physical activity despite greater consumption of home-cooked meals, while work-from-office is associated with higher physical activity but greater reliance on outside food. No significant differences were observed in perceived stress between the two groups, although dietary factors such as energy and protein intake showed associations with stress levels. These findings highlight the need for targeted interventions promoting structured eating patterns, balanced nutrient intake, and physical activity across both work settings.

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