

IMPACT OF CHRONOTYPE MORNINGNESS–EVENINGNESS ON MEAL TIMING, FOOD CRAVINGS, AND SNACKING PATTERNS IN YOUNG ADULTS

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Abstract:

Background: Circadian rhythms regulate key physiological functions including sleep–wake cycles, metabolism, and eating behavior. Chronotype influences these rhythms and may affect dietary patterns, especially in young adults prone to irregular lifestyles and circadian misalignment.

Aim: To investigate the impact of chronotype on meal timing, food cravings, snacking patterns, and sleep–wake behavior among young adults.

Methodology: An cross-sectional study was conducted among 100 young adults aged 18–25 years using purposive and snowball sampling techniques. Ethical approval for the study was obtained from the Inner System Biomedical Ethics Committee (ISBEC), Mumbai, prior to data collection, and written informed consent was obtained from all participants. Data were collected using validated tools including the Morningness–Eveningness Questionnaire (MEQ) to assess chronotype preference, the Munich Chronotype Questionnaire (MCTQ) to evaluate sleep–wake behavior and social jetlag, and the Food Cravings Questionnaire–Trait (FCQ-T) to assess food craving tendencies. A structured questionnaire was also used to collect information on meal timings, snacking patterns, and sociodemographic details, while dietary intake was assessed through a three-day dietary recall. Anthropometric measurements such as height, weight, and Body Mass Index (BMI) were also recorded. Data were entered in Microsoft Excel and analyzed using appropriate statistical software. Descriptive statistics were expressed as frequency, percentage, median, and interquartile range. Inferential statistics including the Chi-square test, Kruskal–Wallis test, Spearman's correlation, and multinomial logistic/linear regression analysis were applied to examine associations between chronotype, meal timing, food cravings, snacking patterns, and sleep behaviors. A p-value <0.05 was considered statistically significant.

Results: The findings revealed that chronotype distribution was independent of sociodemographic factors ($p>0.05$) but showed a significant association with BMI categories ($p=0.049$). A strong negative correlation was observed between chronotype and sleep timing ($\rho = -0.57$, $p<0.001$), indicating delayed sleep patterns in evening types. Meal timings were significantly delayed with increasing eveningness ($p<0.001$), with a higher prevalence of breakfast skipping among evening chronotypes (workdays: $p=0.041$; free days: $p<0.001$). Snacking patterns differed significantly across groups, with intermediate and evening types showing higher snacking frequency ($p=0.049$) and increased late-night eating ($p=0.015$). Food cravings were significantly higher in evening types ($p=0.001$; high vs low: $p<0.001$), and chronotype emerged as an independent predictor of craving behavior ($p<0.001$). However, total nutrient intake did not differ significantly across chronotypes ($p>0.05$).

Conclusion: Chronotype significantly influences meal timing, cravings, snacking behavior, and sleep patterns, highlighting the importance of chrononutrition-based personalized interventions.

Keywords: Chronotype, Chrononutrition, Meal Timing, Food Cravings, Snacking Patterns

Introduction:

Human physiology and behavior are regulated by an internal circadian system that synchronizes biological processes with the external environment through a near 24-hour cycle (Roenneberg T, 2019). This system governs essential functions such as sleep–wake patterns, hormone secretion, metabolism, and eating behavior (Montaruli A et al., 2021). Chronotype, defined as an individual’s preference for the timing of daily activities and sleep, reflects inter-individual variability in circadian rhythms, typically categorized as morning, intermediate, or evening types (Druiven S et al., 2021). These differences influence not only sleep timing but also dietary behaviors, energy metabolism, and overall health outcomes (Zhao Y et al., 2025). Disruptions in circadian alignment, commonly observed in modern lifestyles due to irregular schedules, artificial light exposure, and social obligations, may contribute to adverse metabolic and behavioral consequences (McHill AW et al., 2022).

Young adulthood represents a critical life stage characterized by increased independence, academic pressures, and lifestyle irregularities, all of which may lead to circadian misalignment (Mortas H et al., 2023). Individuals with an evening chronotype, in particular, are more likely to experience delayed sleep–wake cycles, irregular meal timings, and a tendency toward unhealthy eating behaviors (Bazzani A et al., 2022). Emerging evidence in the field of chrononutrition suggests that the timing of food intake plays a crucial role in metabolic regulation, with late eating patterns being associated with impaired glucose metabolism, increased adiposity, and higher risk of chronic diseases (Franzago M et al., 2023). In contrast, morning-oriented individuals tend to exhibit more structured routines, including earlier meal timing and better dietary quality (Luz C et al., 2024).

Food cravings and snacking behaviors are important aspects of eating patterns that may also be influenced by chronotype. Cravings, often driven by hedonic and emotional factors rather than physiological hunger, are typically directed toward energy-dense, palatable foods rich in sugar and fat (Tuna T et al., 2025). Evening chronotypes have been shown to exhibit stronger food cravings, increased frequency of snacking, and a greater tendency toward late-night eating, which may contribute to poor dietary habits and long-term health risks. Additionally, irregular snacking patterns and increased consumption of processed foods may further exacerbate metabolic disturbances associated with circadian misalignment. Sleep–wake behavior is another critical component closely linked to chronotype. Evening types often experience “social jetlag,” a condition characterized by a mismatch between biological rhythms and socially imposed schedules, leading to sleep deprivation, daytime fatigue, and compensatory behaviors such as irregular eating patterns (Lang C et al., 2022). This misalignment not only affects sleep quality but also influences appetite regulation, hormonal balance, and overall lifestyle behaviors. Therefore, the present study aims to assess the impact of chronotype on dietary behaviors and sleep patterns among young adults, while exploring its implications for health and lifestyle management.

Methodology:

This analytical cross-sectional study was conducted among 100 young adults aged 18–25 years to assess the impact of chronotype on meal timing, food cravings, snacking patterns, and sleep–wake behavior. Ethical approval was obtained from the Inner System Biomedical Ethics Committee (ISBEC), Mumbai, and written informed consent was taken from all participants. Participants were recruited using purposive and snowball sampling techniques based on inclusion and exclusion criteria. Data were collected using a structured questionnaire including sociodemographic details, anthropometric measurements (height, weight, BMI), and validated tools such as the Morningness–Eveningness Questionnaire (MEQ) for chronotype classification, the Munich Chronotype Questionnaire (MCTQ) for sleep–wake patterns, and the Food Cravings Questionnaire–Trait (FCQ-T) for assessing craving behavior. Meal timing and snacking patterns were recorded using a structured dietary questionnaire, and nutrient intake was assessed using a three-day dietary recall. Data were analyzed using appropriate statistical methods, including descriptive statistics, chi-square test, Kruskal–Wallis test, correlation analysis, and regression analysis, with $p < 0.05$ considered statistically significant.

Result: The study found that chronotype distribution was independent of sociodemographic characteristics, with no significant differences observed in gender ($p=0.411$), marital status ($p=0.864$), household size ($p=0.75$), employment status ($p=0.782$), education ($p=0.482$), or occupation of the head of the family ($p=0.515$). Anthropometric measures such as weight ($p=0.309$), height ($p=0.916$), and median BMI ($p=0.207$) were comparable across chronotypes; however, BMI categories showed a significant association ($p=0.049$), with evening types having a higher prevalence of overweight individuals (24%). The median FCQ-T score

was 57.5 (IQR: 52.0–64.3), and 51% of participants reported high food cravings, indicating moderate to high craving tendencies. Meal timing differed significantly across chronotypes for breakfast on workdays ($p=0.041$) and free days ($p<0.001$), with evening types showing delayed meals and higher breakfast skipping rates. Snacking frequency also varied significantly ($p=0.049$), with intermediate and evening chronotypes consuming more frequent snacks, while late-night eating was highest among evening types (28%) and showed a significant association ($p=0.015$). Sleep–wake behavior differed significantly across chronotypes, with MCTQ scores increasing from morning (3.2 [3.1–4.0]) to intermediate (4.4 [3.8–5.2]) and evening types (5.4 [4.4–5.7]) ($p<0.001$). Significant differences were also observed in time taken to wake up ($p=0.002$), additional sleep on free days ($p=0.049$), wake-up latency on free days ($p=0.009$), and daylight exposure on free days ($p=0.025$), highlighting delayed and irregular sleep patterns among evening chronotypes.

Table 1 -Sociodemographic Parameters of the study Population

Sociodemographic Parameters	Overall (n=100)	Definite morning (n=10)	Moderate Morning (n=17)	Intermediate (n=43)	Moderate Evening (n=24)	Definite Evening (n=4)	p value
Age (In years), Median (IQR)	22.0 (21.0-23.0)	22.5 (21.0-24.0)	23.0 (22.0-23.0)	22.0 (21.0-24.0)	22.0 (21.0-23.0)	22.5 (21.8-23.3)	NS
Gender, n (%)							0.411
Male	50 (50%)	5(50%)	6 (35%)	26 (59%)	12 (48%)	1 (25%)	
Female	50 (50%)	5 (50%)	11 (65%)	18 (41%)	13 (52%)	3 (75%)	
Marital Status, n (%)							0.864
Single	99 (99%)	10 (100%)	17 (100%)	43 (98%)	25 (100%)	4 (100%)	
Married	1 (1%)	0 (0%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	
Household Size, n (%)							0.75
1–2 members	13 (13)	2 (20%)	3 (18%)	3 (7%)	5 (20%)	0 (0%)	
3–4 members	69 (70)	6 (60%)	11 (65%)	32 (74%)	16 (64%)	4 (100%)	
5–6 members	17 (17)	2 (20%)	3 (18%)	8 (19%)	4 (16%)	0 (0%)	
Level of Education, n (%)							0.482
Professional Degree	21 (21%)	4 (40%)	4 (24%)	9 (20%)	3 (12%)	1 (25%)	
Graduate	45 (45%)	4 (40%)	9 (53%)	21 (48%)	8 (32%)	3 (75%)	
Inter/Diploma	14 (14%)	0 (0%)	1 (6%)	7 (16%)	6 (24%)	0 (0%)	
High Secondary	17 (17%)	2 (20%)	2 (12%)	7 (16%)	6 (24%)	0 (0%)	
Others	3 (3%)	0 (0%)	1 (6%)	0 (0%)	2 (8%)	0 (0%)	

Occupation of Head of Family, n (%)							
Professional	17 (17%)	0 (0%)	4 (24%)	8 (18%)	5 (21%)	0 (0%)	0.515
Semi-professional	33 (33%)	4 (40%)	2 (12%)	14 (32%)	11 (46%)	2 (50%)	
Clerical	28 (28%)	4 (40%)	6 (35%)	12 (27%)	5 (21%)	1 (25%)	
Skilled	9 (9%)	0 (0%)	1 (6%)	6 (14%)	1 (4%)	1 (25%)	
Semi skilled	11 (11%)	2 (20%)	3 (18%)	4 (9%)	2 (8%)	0 (0%)	
Unemployed	1 (1%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)	0 (0%)	

*p<0.05, **p<0.005; ^Mann Whitney U test

As per table 1, statistical analysis confirms there are no significant differences across the five chronotype groups ranging from "Definite morning" to "Definite evening" regarding key demographic indicators such as gender distribution (p=0.411), marital status (p=0.864), and household size (p=0.75). Furthermore, the groups maintained remarkable parity in socioeconomic markers, including employment status (p=0.782), level of education (p=0.482), and the occupation of the head of the family (p=0.515). This statistical independence suggests that the participants' biological clock preferences are not confounded by their external social environments or economic standing. By neutralizing these potential demographic biases, the study establishes a robust baseline, strengthening the premise that subsequent variations observed in lifestyle behaviors such as meal timing, specific food cravings, snacking habits, and sleep patterns are primarily driven by intrinsic circadian rhythms rather than external socioeconomic pressures.

Table 2 Anthropometric Parameters of study population

Anthropometric Parameters	Overall (n=100)	Morning Type (n=27)	Intermediate (n=44)	Evening Type (n=29)	p value
Weight (kg), Median (IQR)	56.0 (49.0–64.2)	56.0 (50.0–63.5)	57.0 (52.0–65.5)	54.0 (46.0–62.0)	0.309
Height (cm), Median (IQR)	162.0 (154.0–172.0)	163.0 (153.5–173.0)	163.0 (156.8–172.3)	159.0 (152.0–169.0)	0.916
BMI (kg/m ²), Median (IQR)	21.09 (19.3–22.8)	20.6 (19.3–23.9)	21.5 (20.1–22.4)	20.8 (18.7–21.5)	0.207
BMI Categories, n (%)					
Underweight (<18.5)	11 (11%)	4 (15%)	3 (7%)	4 (14%)	0.049*
Normal (18.5–22.9)	65 (65%)	17 (63%)	34 (77%)	14 (48%)	
Overweight (23.0–24.9)	13 (13%)	2 (7%)	4 (9%)	7 (24%)	
Obese (>25.0)	11 (11%)	4 (15%)	3 (7%)	4 (14%)	

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

As per table 2, physical dimensions like weight (p=0.309) and height (p=0.916) remained statistically consistent across the study population. Although the median BMI values did not differ significantly between groups (p=0.207), the categorization of BMI showed a significant association with chronotype (p=0.049), primarily driven by the "Evening Type" group which exhibited a notably higher prevalence of overweight individuals (24%) compared to "Morning Type" (7%) and "Intermediate" (9%) participants. This discrepancy suggests that while central tendencies may appear uniform, the evening chronotype may be more susceptible

to unhealthy weight gain or altered body composition patterns. Such a finding points toward a potential metabolic vulnerability in evening-oriented individuals, possibly linked to the delayed meal timings and snacking behaviors inherent to their circadian preference, which ultimately manifests in a higher risk for obesity despite a similar average BMI profile across the cohort.

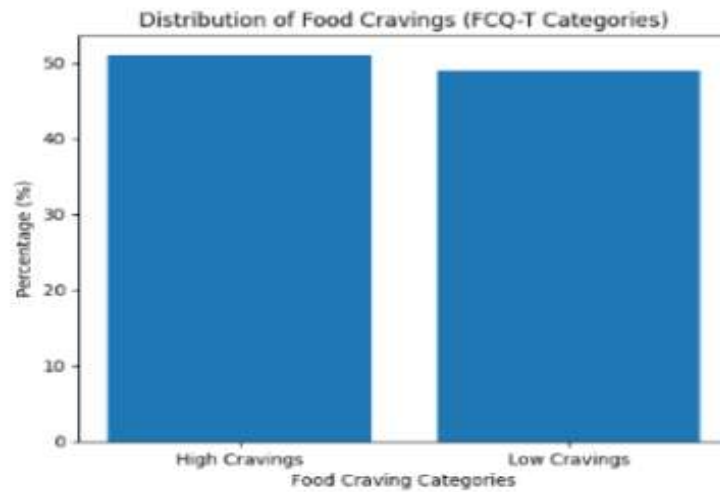


Figure 1- Distribution of Food Cravings (FCQ-T Categories) of study Population

Figure 1 shows the distribution of Food Craving Questionnaire-Trait (FCQ-T) categories among the study participants. A slightly higher proportion of participants reported high food cravings (51%) compared to low food cravings (49%), indicating that food cravings were relatively common among young adults in the study population. This suggests that a considerable number of participants may frequently experience strong urges for specific foods, which could influence their eating patterns and dietary behaviors.

Table 3 Distribution of Food Cravings Questionnaire–Trait (FCQ-T) Scores, Categories, and Item Responses among the Study Population

Individual FCQ-T Item Analysis	Never	Rarely	Sometimes	Often	Always
Inability to stop eating once started	4 (4%)	22 (22%)	29 (29%)	38 (38%)	7 (7%)
Loss of control when eating cravings	6 (6%)	29 (29%)	33 (33%)	25 (25%)	7 (7%)
Preoccupation with obtaining food	7 (7%)	19 (19%)	39 (39%)	26 (26%)	9 (9%)
Food constantly on mind	17 (17%)	21 (21%)	25 (25%)	29 (29%)	8 (8%)
Preoccupied with food	18 (18%)	22 (22%)	29 (29%)	21 (21%)	10 (10%)
Eating makes things seem perfect	3 (3%)	25 (25%)	23 (23%)	33 (33%)	16 (16%)
Cravings make me feel better	8 (8%)	17 (17%)	35 (35%)	33 (33%)	7 (7%)
Cravings when bored, angry, or sad	10 (10%)	13 (13%)	38 (38%)	29 (29%)	10 (10%)
Reduced anxiety after eating	12 (12%)	28 (28%)	30 (30%)	17 (17%)	13 (13%)
Inability to stop eating cravings	8 (8%)	19 (19%)	40 (40%)	27 (27%)	6 (6%)
Persistent thoughts of eating	15 (15%)	22 (22%)	33 (33%)	22 (22%)	8 (8%)
Thinking about next meal	15 (15%)	22 (22%)	36 (36%)	17 (17%)	10 (10%)

Cravings during stress	12 (12%)	20 (20%)	25 (25%)	34 (34%)	9 (9%)
Consumed by thoughts of eating	11 (11%)	29 (29%)	27 (27%)	23 (23%)	10 (10%)
Emotions driving urge to eat	10 (10%)	22 (22%)	29 (29%)	31 (31%)	8 (8%)
Overeating at buffets	8 (8%)	21 (21%)	32 (32%)	25 (25%)	14 (14%)
Overeating in presence of others	3 (3%)	30 (30%)	36 (36%)	16 (16%)	15 (15%)
Feeling comforted by food	3 (3%)	17 (17%)	34 (34%)	33 (33%)	13 (13%)
Cravings when hungry	2 (2%)	23 (23%)	34 (34%)	29 (29%)	12 (12%)

As per table 3, the clustering of 33–38% of responses for loss of control and 25–34% for emotional triggers in the "sometimes" and "often" categories underscores a pervasive pattern of moderate but frequent craving behavior. These results highlight that eating habits in this cohort are significantly driven by emotional reactivity and behavioral cues, suggesting that cravings serve as a persistent cognitive distraction beyond simple physiological hunger.

Table 4 Comparison of Meal Timings, Perceived Chronotype Evolution, and Snacking Behaviors of study participants

Meal Timings	Morning Type (n=27)	Intermediate (n=44)	Evening Type (n=29)	test value	p value
Average (DA) Meal Timings, Median (IQR)					
DA Breakfast Time	08:30 AM	09:30 AM	10:45 AM	24.312	<0.001**
DA Lunch Time	01:15 PM	02:00 PM	02:45 PM	12.564	0.002**
DA Dinner Time	08:15 PM	09:15 PM	10:30 PM	18.941	<0.001**
Breakfast Timing (Workdays), n (%)					
Before 8 AM	6 (22%)	1 (2%)	0 (0%)	11.583	0.041*
8 – 10 AM	21 (78%)	33 (75%)	14 (48%)		
Skip Breakfast	0 (0%)	10 (23%)	15 (52%)		
Breakfast Timing (Free Days), n (%)					
Before 9 AM	3 (11%)	0 (0%)	0 (0%)	23.31	<.001**
9 – 11 AM	24 (89%)	29 (66%)	14 (48%)		
Skip Breakfast	0 (0%)	15 (34%)	15 (52%)		
Current Perceived Chronotype, n (%)					
Normal / Intermediate	12 (44%)	11 (25%)	0 (0%)	4.621	0.328
Slight / Moderate Late	15 (56%)	25 (57%)	17 (59%)		
Extremely Late	0 (0%)	8 (18%)	12 (41%)		
Chronotype Evolution (Childhood), n (%)					
Early (Extremely to Slight)	18 (67%)	17 (39%)	3 (10%)	28.452	<0.001**
Normal / Late	9 (33%)	27 (61%)	26 (90%)		
Snacking Time Distribution, n (%)					

Daytime (Morning/Afternoon)	20 (74%)	30 (68%)	15 (52%)	10.360	0.170
Evening / Late Night	7 (26%)	14 (32%)	14 (48%)		
Snack Preferences, n (%)					
Healthy Snacks	8 (30%)	6 (14%)	3 (10%)	8.651	0.334
Processed / Fast Food	19 (70%)	38 (86%)	26 (90%)		

* $p < 0.05$, $p < 0.005$; ^Kruskal-Wallis test (Chi-Square approx); #Chi-Square test; DA = 3-Day Average
 As per table 4, meal timing differed significantly across chronotypes for breakfast on workdays ($p=0.041$) and free days ($p < 0.001$), with evening types showing delayed meals and higher breakfast skipping (52% on free days). No significant association was observed with snacking time ($p=0.170$), preferences ($p=0.334$), or perceived timing ($p=0.328$), indicating chronotype mainly influences main meal timing.

Table 5: Comparison of Snacking Patterns, Preferences, and Late-Night Eating of Study Population

Snacking Patterns	Overall (n=100)	Morning (n=27)	Intermediate (n=44)	Evening (n=29)	Test Value	p value
Snack Types Preferred, n (%)						
Sweet snacks	38 (38%)	9 (33%)	16 (36%)	13 (45%)	10.224	0.421
Salty or fried snacks	72 (72%)	13 (48%)	33 (75%)	26 (90%)		
Healthy snacks	52 (52%)	15 (55%)	23 (52%)	14 (48%)		
Beverages	48 (48%)	14 (52%)	20 (45%)	14 (48%)		
Baked / Ready-to-eat	40 (40%)	12 (44%)	17 (39%)	11 (38%)		
Freq. of Packaged Snacks, n (%)						
Never	24 (24%)	8 (30%)	8 (18%)	8 (28%)	4.061	0.668
1–2 times/week	32 (32%)	10 (37%)	16 (36%)	6 (21%)		
3–4 times/week	32 (32%)	6 (22%)	15 (34%)	11 (38%)		
Almost Daily	12 (12%)	3 (11%)	5 (11%)	4 (14%)		
Snacks per Day, n (%)						
1 snack/day	15 (15%)	9 (33%)	2 (5%)	4 (14%)	12.652	0.049*
2 snacks/day	42 (42%)	10 (37%)	22 (50%)	10 (34%)		
3 snacks/day	34 (34%)	7 (26%)	15 (34%)	12 (41%)		
4 snacks/day	9 (9%)	1 (4%)	5 (11%)	3 (10%)		
Late Night Eating, n (%)						
No	85 (85%)	27 (100%)	37 (84%)	21 (72%)	8.403	0.015*
Yes	15 (15%)	0 (0%)	7 (16%)	8 (28%)		

As per table 5 Snacking frequency differed significantly across chronotypes ($p=0.049$), with intermediate and evening types consuming more snacks (2–3/day), and late-night eating was highest in evening types (28%) with a significant association ($p=0.015$). However, snack type and packaged food frequency showed no significant differences ($p=0.668$), indicating chronotype mainly influences timing and frequency of snacking.

Table 6 Comparison of Sleep–Wake Behavior and MCTQ Parameters across Chronotypes

MCTQ Parameters	Morning Type (n=27)	Intermediate (n=44)	Evening Type (n=29)	test Value	p value
MCTQ Score and Categories					
MCTQ Score, Med (IQR)	3.2 (3.1–4.0)	4.4 (3.8–5.2)	5.4 (4.4–5.7)	26.38 [^]	<0.001**
MCTQ Sleep Category, n (%)					
Early Chronotype	14 (52%)	8 (18%)	4 (14%)	19.88 [#]	<0.001**
Normal / Intermediate	12 (44%)	28 (64%)	14 (48%)		
Late Chronotype	1 (4%)	8 (18%)	11 (38%)		
Sleep–Wake Behavioral Parameters					
Wake-up Latency (WD) (mins)	10.0 (6.3–15.0)	15.0 (10.0–20.0)	20.0 (15.0–30.0)	12.34 [^]	0.002**
Sleep Latency (WD) (mins)	10.0 (10.0–15.0)	15.0 (10.0–20.0)	15.0 (10.0–20.0)	3.50 [^]	0.174
Additional Sleep (FD) (mins)	15.0 (10.0–30.0)	20.0 (10.0–30.0)	35.0 (20.0–60.0)	6.02 [^]	0.049*
Wake-up Latency (FD) (mins)	10.0 (8.1–15.0)	10.0 (10.0–20.0)	20.0 (10.0–22.5)	9.48 [^]	0.009**
Daylight Exposure (FD) (hrs)	3.0 (2.0–4.0)	2.0 (1.4–2.6)	2.5 (2.0–3.5)	7.39 [^]	0.025*
Reading time before sleep (mins)	30.0 (15.0–60.0)	15.0 (10.0–30.0)	27.5 (10.0–37.5)	3.88 [^]	0.143

* $p < 0.05$, $p < 0.005$; [^]Kruskal-Wallis test; [#]Chi Square test; WD = Workdays; FD = Free days; Med = Median; IQR = Interquartile Range, MCTQ= Munich ChronoType Questionnaire

As per table 6, findings showed a significant association between chronotype and sleep–wake behavior among young adults. MCTQ scores differed significantly across chronotypes (Morning: 3.2 [3.1–4.0], Intermediate: 4.4 [3.8–5.2], Evening: 5.4 [4.4–5.7]; $p < 0.001$), confirming delayed sleep patterns in evening types. Significant differences were also observed in time taken to wake up ($p = 0.002$), additional sleep on free days ($p = 0.049$), wake-up latency on free days ($p = 0.009$), and daylight exposure on free days ($p = 0.025$). Evening chronotypes showed longer wake-up latency, greater compensatory sleep, and delayed sleep recovery, whereas morning types demonstrated earlier and more stable sleep–wake patterns.

Discussion-

The findings of the present study highlight the significant role of chronotype in shaping dietary behaviors and sleep–wake patterns among young adults. Individuals with evening chronotype demonstrated significantly delayed meal timings ($p < 0.001$), increased breakfast skipping (workdays: $p = 0.041$; free days: $p < 0.001$), higher snacking frequency ($p = 0.049$), and greater prevalence of late-night eating ($p = 0.015$), reflecting circadian misalignment and irregular lifestyle patterns. These observations are consistent with existing evidence suggesting that evening types are more prone to unhealthy eating behaviors, including irregular meals and preference for energy-dense foods, due to delayed biological rhythms and social jetlag (Bazzani A et al., 2022).

Food cravings were also significantly higher among evening types ($p=0.001$), with a greater proportion categorized as high cravers ($p<0.001$), driven by both emotional and hedonic factors. This supports research indicating that circadian disruption can influence appetite regulation and reward-driven eating behavior (Tuna T et al., 2025). Furthermore, a strong negative correlation between chronotype and sleep timing ($\rho = -0.57$, $p<0.001$) reinforces that evening types exhibit delayed sleep–wake patterns, consistent with the concept of social jetlag described in circadian literature (Roenneberg T et al., 2019).

Despite these behavioral differences, total nutrient intake did not vary significantly across chronotypes ($p>0.05$), suggesting that chronotype primarily affects the timing and pattern of food intake rather than overall quantity, a finding supported by previous chrononutrition studies (Franzago M et al., 2023). Overall, these findings emphasize that chronotype is an important independent factor influencing eating behavior, cravings, and daily routines, highlighting the need for personalized nutrition and lifestyle interventions aligned with individual circadian preferences to improve long-term health outcomes.

Conclusion-

The present study examined the impact of chronotype on meal timing, food cravings, snacking patterns, and sleep–wake behavior among young adults. The findings indicate that while chronotype is independent of socio-demographic characteristics and does not significantly influence total nutrient intake, it plays a crucial role in shaping behavioral aspects of eating and daily routines. Evening chronotypes were more likely to exhibit delayed meal timings, frequent breakfast skipping, increased snacking frequency, and a higher tendency toward late-night eating. Additionally, food cravings were significantly higher among evening types, driven by emotional factors, whereas morning types demonstrated more structured and healthier eating patterns.

In conclusion, this study successfully identified the distribution of chronotypes among young adults and demonstrated how chronotype influences multiple aspects of lifestyle. It clearly showed that chronotype plays a significant role in determining meal timings, with evening types following delayed eating patterns and frequently skipping breakfast. Differences in snacking patterns were also evident, with non-morning types engaging in more frequent and late snacking. A strong link between chronotype and food cravings was established, with evening types showing higher craving tendencies. Additionally, the study confirmed that sleep–wake behavior is closely aligned with chronotype, with evening types experiencing delayed and irregular sleep patterns. Overall, the findings highlight that chronotype is a key factor shaping daily routines and behaviors, emphasizing the need to consider individual biological rhythms while planning dietary and lifestyle interventions for better health outcomes.

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