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EFFECT OF RAMADAN ON EXCESSIVE DAYTIME SLEEPINESS, HEART RATE, BLOOD PRESSURE, AND PULSE PRESSURE OF SPORTS PERSONS

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ABSTRACT:
   Effect of Ramadan on excessive daytime sleepiness (EDS), heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and pulse pressure (PP). Total 300 sports persons were selected randomly after their informed consent. Data was collected with the help stop watch, sphygmomanometer, and stethoscope. The EDS was collected with help of Epworth Sleepiness scale. Comparative analysis ANOVA was employed to evaluate the difference in pre and post Ramadan effects. Result of present study depicted that significant changes was not witnessed in HR. In contrast, statistically significant changes was seen in

SBP ($p<0.05$), DBP ($p<0.05$), PP ($p<0.05$), and EDS ($p<0.05$) . In conclusion, the HR fell under average of 72 beats/min. blood pressure fell under normal range in both pre and post Ramadan condition. The PP increased post Ramadan.

KEYWORDS : *excessive daytime sleepiness, Ramadan, heart rate, blood pressure, pulse pressure.*

INTRODUCTION:
   Environmental factors such as the timing of the rest-activity cycle and meals may affect almost all body functions. Moreover, it has been seen that daytime fasting, modifications in sleep schedule, and psychological and social habits during Ramadan induce changes in the rhythmic pattern of a number of hormonal (Bogdan et al., 2001) and nutrition-related biological variables (Iraki et al., 1997).Although it has been seen that Ramadan can result in a delayed bedtime and shortened sleep with partial sleep deprivation, the effects of this altered sleep pattern on physical performance remain unknown. Indeed, there are very few investigations on the effects of partial sleep deprivation on performance. However, it has been seen that three nights of sleep restriction of at least 2 h does not seem to affect gross motor functions, including muscle strength and lung power or endurance running performance in both men and women (Bambaeichi et al., 2005). It has also been reported that one night of total sleep deprivation did not have any negative effects on muscular strength and power (Meney et al., 1998).
   Physiological changes during Ramadan are expected to result from both long-term dietary restriction and repeated partial sleep loss (Reilly & Waterhouse, 2007). Change in eating habits during Ramadan is in the form of reduction in frequency of food and fluid intake, and increased tendency to consumption of higher calorie foods and drinks. Change in lifestyle may lead to nocturnal sleep reduction, followed by an increase in daytime sleeping. Further findings indicated that there is also an alteration in sleep parameters attributed to the inversion of drinking and meals schedule.

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Cardiovascular diseases are considered the leading cause of mortality worldwide, and hypertension is one of the most common risk factors associated with increased risk of atherosclerotic cardiovascular disease or stroke. During the month of Ramadan, repeated cycles of fasting and feeding, along with alterations in the daily patterns of sleep and activities and medication timing might contribute to changes in blood pressure among hypertensive patients. Studies on the effects of fasting on the blood pressure of hypertensive patients are scarce, and have provided inconclusive results. However, previous studies have indicated that Ramadan fasting has beneficial effects on cardiovascular risk factors, specially blood pressure and heart rate.

METHODOLOGY

In this present study total three hundred (300) subjects (age range: 18 – 25 years) Muslim male sports persons were selected after their informed consent. All the data were collected at the time of holy month of Ramadan. All the subjects were regular practisers of sports and games. During the time of Ramadan all the subjects were in free living condition (not practicing sports and games). Excessive daytime sleepiness, heart rate, systolic blood pressure, diastolic blood pressure, and pulse pressure were studied before and after the Ramadan. The physiological parameter HR, SBP, DBP, PP, and EDS was measure with the help of stop watch, sphygmomanometer, stethoscope, and EDS was assessed with the help of Epworth Sleepiness Scale. The details are portray below:

- Heart Rate (HR)
- Heart rate is also important indicators of health.
- Instrument Used: Stop Watch
- Make: Casio HS-60W-1EF Stopwatch
- Unit of Measurement: Counts min^{-1}
- Methodology: Subject was asked to lie down in supine position, after one minute rest, HR, was measured and recorded for one minute.

Blood Pressure

Blood pressure (Systolic and Diastolic blood pressure) was measured using sphygmomanometer and stethoscope. The score of the subjects was recorded in the units of millimeters of mercury (mmHg).

Pulse Pressure

- Pulse pressure was calculated by subtracting the diastolic pressure from the systolic pressure.
- Formula for calculation pulse pressure
- Pulse pressure = Systolic blood pressure – diastolic blood pressure

Excessive Daytime Sleepiness

Sleepiness: Sleepiness level of each individual in a sample was determined with the help of Epworth Sleepiness Scale (ESS). This inventory is used to ascertain the sleep problems of human subjects.

Measurements: This scale consists of eight items referring to chance of dozing/sleep in eight different situations of real life: 1) sitting and reading, 2) watching TV, 3) sitting, inactive in a public place, 4) as a passenger in a car for an hour without a break, 5) lying down to rest in the afternoon when circumstances permit, 6) sitting and talking to someone, 7) sitting quickly after a lunch without alcohol, and 8) in a car, while stopped for a few minutes in traffic.

Subjects were asked to read each statement carefully and indicate the extent to which they normally experience about the given feeling at that moment. After assessing the levels of the given feeling correctly, they were requested to encircle the code number against each of the statement.

Scoring: Each item of the ESS questionnaire consisted of the following 4-point response, such as no chance of dozing, slight chance of dozing, moderate chance of dozing, and high chance of dozing:

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	Response categories			
	No chance of dozing	Slight chance of dozing	Moderate chance of dozing	High chance of dozing
Weights	0	1	2	3

The questions are of the multiple-choice type and the total score is the sum of the eight item scores (range: 0 to 24). Patients were classified into two major categories based upon sum total of the scores, i.e., ≤ 10 and > 10. The higher score depicts higher level of sleepiness.

Statistical Analysis

All statistical analysis was performed in computer in MS Excel and SPSS-23. Analysis of data was done by using descriptive method and inferential analysis. Comparative analysis was done by applying one way ANOVA to observe differences between pre Ramadan and post Ramadan measurements.

Results

Table 1: Showing the comparison ofheart rate (beats/min)between pre and post Ramadan

Pre Ramadan	Post Ramadan	ANOVA	
Mean ± SE	Mean ± SE	F -ratio	Significance
75.41 ± 0.12	75.23 ± 0.11	1.39	*NS*

Table 1clearly depicted that the average heart rate of players were not altered after the Ramadam. The inferential analysis (ANOVA) revealed statistically ($p > 0.05$) insignificant difference between pre Ramadan and post Ramadan. Post Ramadan heart rate (75.23 ± 0.11 beats/min) of players did not differ significantly ($p > 0.05$) than that of pre Ramadan (75.41 ± 0.12 beats/min) heart rate.

Table 2: Showing the comparison ofsystolic blood pressure (mmHg)between pre and post Ramadan

Pre Ramadan	Post Ramadan	ANOVA	
Mean ± SE	Mean ± SE	F -ratio	Significance
114.40 ± 0.32	116.04 ± 0.28	15.02	*p<0.01*

The table 2 clearly depicted that the average post Ramadan systolic pressure (116.04) of players were increased after the Ramadam. The inferential analysis (ANOVA) revealed statistically ($p< 0.05$) significant difference between pre Ramadan and post Ramadan systolic blood pressure. Post Ramadan Systolic blood pressure (116.04 ± 0.28 mmHg) of players increased significantly ($p< 0.05$) than that of pre Ramadan (114.40 ± 0.28 mmHg) systolic blood pressure.

Table 3: Showing the comparison ofdiastolic blood pressure (mmHg)between pre and post Ramadan

Pre Ramadan	Post Ramadan	ANOVA	
Mean ± SE	Mean ± SE	F -ratio	Significance
72.28 ± 0.17	73.07 ± 0.12	14.47	*p<0.01*

The table 3 clearly depicted that the average post Ramadan diastolic pressure (73.07) of players were increased after the Ramadam. The inferential analysis (ANOVA) revealed statistically ($p< 0.05$) significant difference between pre Ramadan and post Ramadan diastolic blood pressure. Post Ramadan diastolic blood pressure (73.07 ± 0.12 mmHg) of players increased significantly ($p< 0.05$) than that of pre Ramadan (72.28 ± 0.17 mmHg) diastolic blood pressure.

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Table 4: Showing the comparison of pulse pressure (mmHg)between pre and post Ramadan

Pre Ramadan	Post Ramadan	ANOVA	
Mean ± SE	Mean ± SE	F -ratio	Significance
42.12 ± 0.20	42.97 ± 0.19	9.43	$p<0.01$

The table 4 clearly depicted that the average post Ramadan pulse pressure (42.97) of players were increased after the Ramadam. The inferential analysis (ANOVA) revealed statistically ($p< 0.05$) significant difference between pre Ramadan and post Ramadan pulse pressure. Post Ramadanpulse pressure (42.97 ± 0.19 mmHg) of players increased significantly ($p< 0.05$) than that of pre Ramadan (42.12 ± 0.20 mmHg) pulse pressure.

Prevalence charecteristc excess daytime slepiness of sports persons

Table. 5   Prevalence of EDS (Excessive daytime sleepiness) among sports persons

	EDS 10 ≤	%	EDS >10	%
Pre Ramadan	226	75.00	74	25.00
Post Ramadan	130	43.00	170	57.00

Table 5 depicts prevalence statistics of EDS score, based upon sum total of the scores, as function of different intensities of sleepiness (EDS score > 10 vs. EDS score ≤ 10). Results indicate that out of 300 subjects, 226 (75%) had EDS 10 ≤ (low EDS) and 74 (25%) had EDS >10 high EDS score before the Ramadan. In contrast, after the Ramadan EDS scores were altered. In post Ramadan, out of 300 subjects, 130 (43%) had EDS 10 ≤ (low EDS) and 170 (57%) had EDS >10 high EDS score after the Ramadan.

Table 6: Showing the comparison ofEDSbetween pre and post Ramadan

Pre Ramadan	Post Ramadan	ANOVA	
Mean ± SE	Mean ± SE	F -ratio	Significance
8.71 ± 0.11	10.70 ± 0.09	183.05	$p<0.01$

The average post Ramadan sleepiness (10.70) of players were increased after the Ramadam.The inferential analysis (ANOVA) revealed statistically ($p < 0.05$) significant difference between pre Ramadan and post Ramadan sleepiness of players. Post Ramadan excesive daytime sleepiness (10.70 ± 0.09) of players increased significantly ($p < 0.05$) than that of pre Ramadan (8.71 ± 0.11) excessive daytime sleepiness.

CONCLUSION

On the basis of result it is concluded that the effect of Ramadan have not been seen on heart rate of sports persons. In contrast, the effect of Ramadan have been seen on systolic blood pressure, diastolic blood pressure, pulse pressure,and excessive daytime sleepiness. Lower heart rate indicate more blood filld in chamber before contraction. The slower heart rate alows extended relaxation time during diastole for the pressure to drop below the normal level of 80 mmHg. The pulse pressure, the difference between systole and diastole ressures, with an average value of 42.97 mmHg after Ramadan was higher than that of normal value 40 mmHg. The sleep length during the Ramadan was lesser than the normal length. Lesser sleep length induced excessive sleepiness during the Ramadan. The post Ramadan sleepiness was greater than that of pre Ramadan(8.71) sleepiness.

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