

# Intelligent Quotient (IQ) Comparison between Night Owls and Morning Larks Chronotypes in Medical Students

IQ Level between  
Night and Morning  
Medical Students

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## ABSTRACT

**Objective:** To compare the intelligent quotient between Night Owls and Morning Larks chronotypes in medical students of LUMHS Jamshoro Karachi.

**Study Design:** Descriptive / cross sectional study.

**Place and Duration of Study:** This study was conducted at the Department of Physiology and Pediatrics, Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro from November 2015 to October 2016.

**Materials and Methods:** 225 MBBS students altogether including 120 males and 105 females via Simple Random Sampling from first year with age group (18-20). The student profiles were unspecified. Stanford Binnet Intelligence Scale was used for the IQ. To determine the chronotypes, Lark and Owl questionnaire was used which has 19 questions related to the circadian rhythm and one's best feeling time. 1<sup>st</sup> year MBBS undergraduates belonging to the group of ages (18-20) were covered. Second year to final year MBBS students, Post-graduate students, house officers and those who were suffering from any major neurological or psychological illness were excluded. All the data was interpreted, Pearson's chi square test was applied and results were drawn with the help of SPSS version 22 which is the statistical package of social sciences.

**Results:** Among the extremely morning types out of 31 students in total, 10 (32.5%) were found to be genius, 3(9.6%) were had very superior IQ, 12(38.7%) were found to be superior and 5(16.1%) were average as shown in Table 2. In the moderately morning type category (n=12), 5 (41.6%) were found to be genius, 2(16.6%) had very superior IQ and 2(16.6%) were average. Among neutral types (n=87), 40 (45.9%) were found to be genius, 24(27.5%) were had very superior IQ, 15(17.2%) were found to be superior and 1(1.14%) were average. Moderately evening types (n=52) were found to have 8 (15.3%) genius, 22(42.3%) were had very superior IQ and 21(40.3%) were found to be superior. Among extremely evening type (n=43), 26(60.4%) were found to be genius, 7(16.3%) were had very superior IQ, 8(18.6%) were found to be superior and 1(2.3%) were average. The evening types were seemed to have higher IQ than morning type.

**Conclusion:** 21<sup>st</sup> century is advancing so much in psychology that it's important to know various dimensions of our own physiology that might improve the quality of our lives. In the light of previous literature and adding to this sparse data, this study showed that the medical students are more of evening types and that Eveningness has a positive correlation with intelligence.

**Key Words:** Circadian rhythm; Intelligence; Students, Medical

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## INTRODUCTION

In humans and mammals circadian rhythms are psychological, biochemical and physical variations that exhibit a cycle of 24 hours. Supra-chiasmatic nuclei of the hypothalamus controls these circadian cycles <sup>1</sup>.

Sleep wake rhythm and self-awareness are influenced by Morningness and Eveningness (Diurnal precedence). People who rise early in morning are called morning

larks, these like to go to bed early and achieve their maximum attentiveness in the early hours of the day. On the other side people who prefer to get up off the bed at late evening are called night owls, and these having peak alertness at night <sup>2</sup>.

Most of the children prefer Morningness and with advancing age this shifts to Eveningness. When adolescent's reaches age 20 years, they prefer total Eveningness and they delay phase preferences. At the age of 50 years adult person prefers Morningness once again <sup>3</sup>.

Intelligence quotient is defined as person's reasoning ability, that is measured by using problem-solving tests and this is compared to the statistical norm for their age, taken as 100 <sup>4</sup>. For the maintenance of normal cognition and alertness, there is need of sufficient amount of sleep.

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This hypothesis is supported by brain functional radiological studies that show adequate sleep is mandatory for cognitive ability. Because it reduces glucose metabolism in cortex of brain <sup>5</sup>. This is the genetic difference that causes variability among both chronotypes <sup>6</sup>. The gene that regulates circadian rhythm has been discovered in near past <sup>7</sup>. One study proved the relation between chronotypes and cognitive function, there was higher working memory in night owl groups, even when measured during early morning<sup>1</sup>. Now a days Psychologist are giving more attention to see the relationship between intelligence and chronotypes. We did this study to know the intelligence difference between these two chronotypes among medical students, as we can know the difference and can make further protocols.

## MATERIALS AND METHODS

This study was done over 225 MBBS medical students at the Department of Physiology and Pediatrics, Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro from November 2015 to October 2016. This was a cross sectional observational study done via random sampling technique contained both male and female medical students of age between 18-20 years. Written consent was taken from students before collecting data and they were counseled about the importance of this study. For the determination of IQ score Stanford Binnet Intelligence Scale was used. Questionnaire was used to determine Owl and Lark. 19 questions were asked about the one's best feeling time and circadian rhythm. Only 1<sup>st</sup> year MBBS medical students age between 18 to 20 years were included in the study. 1<sup>st</sup> year Medical student, suffering from psychological or neurological disorders were excluded from the study. SPSS version 22 used for the interpretation of data and Pearson's chi square test was applied.

## RESULTS

In this study, there were 53% males and 47% females were. Medical students were more night owls, 19.10% (42 / 225) were extreme evening type, 12.8% (29 / 225) were the extreme morning type, 38.2% (86 / 225) were the neutral, 24% (54 / 225) and 6.2% (14 / 225) were moderately evening and moderately morning type (Table 1). Among the extremely morning types 10 (32.5%) were genius, 3(9.6%) were very superior IQ, 12(38.7%) were superior and 5(16.1%) were average (Table 2). In the moderately morning type category 5 (41.6%) were genius, 2(16.6%) had very superior IQ and 3(25.0%) were average. Among neutral types (n=87), 40 (45.9%) were genius, 24(27.5%) were very superior IQ, 15(17.2%) were superior and 4(4.59%) were average. Moderately evening types (n=52) were 8 (15.3%) genius, 22(42.3%) were very superior IQ and 21(40.3%) were superior. Among extremely evening

type (n=43), 26(60.4%) were genius, 7(16.2%) were very superior IQ, 8(18.6%) were superior and 1(2.3%) were average. The X value is 76.995 and p-value is <0.000001, and this is highly significant statically, calculated by Pearson's chi square test. As compared to morning type, evening types had higher IQ.

**Table No.1: Percentage of Chronotypes n=225**

|                                 |            |
|---------------------------------|------------|
| Extremely Morning Type (70-89)  | 29 (12.8%) |
| Moderately Morning Type (59-69) | 14 (6.2%)  |
| Neutral Type (42-58)            | 86 (38.2%) |
| Moderately Evening Type (31-41) | 54 (24%)   |
| Extremely Evening (16-30)       | 42 (18.6%) |

**Table No.2: Percentage of Intelligent Quotient of different chronotypes**

|                                      |            |
|--------------------------------------|------------|
| <b>Genius (over 140)</b>             |            |
| Extremely Morning Time               | 10 (32.5%) |
| Moderately Evening Type              | 8 (15.3%)  |
| Moderately Morning Type              | 5 (41.6%)  |
| Extreme Evening Type                 | 26 (60.4%) |
| Neutral Type                         | 40 (45.9%) |
| <b>Very Superior (120-139)</b>       |            |
| Extremely Morning Time               | 3 (9.6%)   |
| Moderately Evening Type              | 22 (44.3%) |
| Moderately Morning Type              | 2 (16.6%)  |
| Extreme Evening Type                 | 7 (16.2%)  |
| Neutral Type                         | 24 (27.5%) |
| <b>Superior (110-119)</b>            |            |
| Extremely Morning Time               | 12 (38.7%) |
| Moderately Evening Type              | 21 (40.3%) |
| Moderately Morning Type              | 3 (25%)    |
| Extreme Evening Type                 | 8 (18.6%)  |
| Neutral Type                         | 15 (17.2%) |
| <b>Average (90-109)</b>              |            |
| Extremely Morning Time               | 5 (16.1%)  |
| Moderately Evening Type              | 1 (1.92%)  |
| Moderately Morning Type              | 2 (16.6%)  |
| Extreme Evening Type                 | 1 (2.3%)   |
| Neutral Type                         | 1 (1.14%)  |
| <b>Dull (80-89)</b>                  |            |
| Extremely Morning Time               | 1 (3.2%)   |
| Moderately Evening Type              | 0          |
| Moderately Morning Type              | 1 (8.3%)   |
| Extreme Evening Type                 | 1 (2.3%)   |
| Neutral Type                         | 4 (4.59%)  |
| <b>Borderline Deficiency (70-79)</b> |            |
| Extremely Morning Time               | 0          |
| Moderately Evening Type              | 0          |
| Moderately Morning Type              | 0          |
| Extreme Evening Type                 | 1 (2, 3%)  |
| Neutral Type                         | 1 (1.14%)  |

## DISCUSSION

As scientists are uncovering various mysteries of mind, so IQ levels determination and its various aspects are

gaining attention. In human psychology intelligence and nocturnality are two important factors. In this study we focused that which types has more intelligence among evening type or morning type. Our study showed that night owls had more IQ as compared to morning larks.

A similar study from United States, which was done on 420 air force recruits showed the positive correlation between intelligence and Eveningness, proving evening types to be more intelligent than Morningness<sup>8</sup>. In another study results did not showed any relation between chronotypes and cognition<sup>6</sup>.

Our hypothesis shows that there might be more problems in night owl chronotypes in performing early morning jobs and institutional work. Other spectrum of night owls chronotypes shows that they require less amount of sleep and thus they require less sleep to reach their maximum neuronal activity.

It is postulated that mating intelligence has caused greater night owl intelligence<sup>1</sup>. According to various studies it is proved that Eveningness is seen more in university students that lead to higher cognitive abilities. As the age advances, cycle shift towards Morningness, that's why there is fall in intelligence with, advanced age<sup>8</sup>.

Although above mentioned research are recent, but we still need more research in this field to make it more authentic and acceptable.

## CONCLUSION

With the advancement in psychology and for the improvement in our life quality, we should know more about the different dimensions of our own physiology.

According to this study results we can say that Eveningness is more common in medical students, and this chronotypes has positive correlation with intelligence.

### Author's Contribution:

|                            |                                |
|----------------------------|--------------------------------|
| Concept & Design of Study: | Urooj Bhatti                   |
| Drafting:                  | Rubina Ahmadani                |
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| Revisiting Critically:     | Muhammad Nadeem                |

|                            |                 |
|----------------------------|-----------------|
| Final Approval of version: | Chohan          |
|                            | Urooj Bhatti,   |
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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