Abstract

Objective: To identify the stress levels and sleeping habits of students from the Physical Education college during the diurnal and nocturnal periods.

Method: This is an exploratory and descriptive study with 103 subjects. Data were collected through the Lipp Stress Symptom Inventory and the Horne & Östberg Morningness-Eveningness Identification Questionnaire, and sociodemographic data.

Results: The stress indexes showed 53.40% of students without stress and 46.6% with stress. When comparing gender and stress using the chi-square test, one obtained (p=0.0411), indicating that women are more stressed than men. There were 61.1% of students classified with indifferent chronotype. Among the students, 80.4% from the diurnal period were not suitable for the chronotype, as well as 74.5% of the students from the nocturnal period were not either.

Conclusion: The majority of the students did not present the chronotype adequate for the study schedule and they presented stress, being more frequent in the female group.

Introduction

Nowadays, living life without experiencing stressful situations is somewhat impossible. The ideal is to learn to manage it correctly, to switch between being and not being alert. The body needs to have a
recovery period after being alert so that it recovers, but if it gets alert after the recovery, there is no damage [1, 2].

Stress is a nonspecific response of the organism to any demand, regardless of its nature [3]. Some terms define different levels of stress. Eustress is a positive stress, in which the effort of adaptation generates a sense of personal fulfillment, well-being and satisfaction of the needs, is an effort to guarantee the survival. In the eustress, the emotion of joy predominates, there is an increase in concentration ability, mental agility, muscular emotions are harmonious and well-coordinated, there is feeling of vitalization of pleasure and trust [1, 2, 3].

The word stress is not always a threat to the health and well-being of an individual. It is not possible to end the stress, and it is not necessary, because we depend on it to reach our objectives [2].

Observations on academic activities show us that temporal organizations, when committed to biological equilibrium, can lead to good learning outcomes [4].

Routine activities, such as studying and working, are conditions of modern times with a strong tendency to increase. For further understanding, researches indicate that studying sleep habits and chronotype is important to determine the periods of better performance and greater well-being. Their identification can be used to improve the quality of learning and related disorders [4].

Chronotype is an established concept designed to identify the different phase relationships between the expression of circadian rhythms and external synchronizers in humans. The late adolescence phase and advancing stage of the elderly seem to be phenomena that are more markedly present in men than in women [5].

Knowing students’ chronotypes, in general, can contribute to indicate the best moment to perform their activities. From that referential, identifying the existence of stress levels, as well as its symptoms, will contribute to the promotion of the quality of life, respecting the harmony of the biological rhythms, that is, the chronotype [6, 7, 4].

Chronotypes can be classified into three types, considering individual differences in the temporal allocation of biological rhythms: morning (divided into extreme and moderate types), indifferent or intermediate and evening (divided into extreme and moderate types) [8]. Adapting to schedules depends on an individual tendency to choose and prefer certain times to perform his/her activities, such as bedtime or wake up time, whether in the morning, afternoon or evening.

Morning people are those who prefer to sleep early (around 9:00 p.m. or 10:00 p.m.) and also wake up early, around 6:00 a.m., without difficulty, being, at that time, perfectly able to work, with good alertness, having a good physical and mental performance. In general, those individuals characterize by an advance of biological rhythm in great part of their endogenous rhythms, when compared with the population in general [8].

Evening ones, on the other hand, prefer to sleep and wake up late, with a better mood in the afternoon and early evening. The maximum values of their endogenous rhythms show a delay relation of a biological rhythm in comparison with the general population. Finally, the indifferent types are those who demonstrate greater flexibility, opting for intermediate schedules according to their routine needs. Those three chronobiological types react differently to sleep habits or deprivation [8].

The college routine corresponds to a phase of transformation for an individual. In that period, there is the transition from adolescence to adulthood. Along with this, more responsibilities and commitments arise. The students’ families often reside in another city, so they will live alone or with other people, away from parents and family. Some students view that issue positively, as they feel more freely, but they become responsible for all the domestic activities, in addition to commitments to the university [9]. With the daily rush and the eventual
need to study during dawn, students end up stressed and with the sleep quality changed [9, 10]. Therefore, according to the described approaches, analyzing sleep habits and identifying the stress of the population of university students may contribute to new findings regarding better planning of activities that will contribute to a better quality of life.

Methods
There were 103 students participating in the study, from the first to the eighth semester of the diurnal and nocturnal graduate courses in Physical Education.

After sending to the Research Ethics Committee (CEP), in compliance with the resolution of CNS 496/2012, the project was approved according to protocol No. 134.336. Every one voluntarily participated in the study, signed the Informed Consent Form, ensuring anonymity according to Resolution 416/2012.

Three instruments were used: Identification record for the sociodemographic data, Lipp Stress Symptom Inventory (ISSL) and Horne & Östberg (1976) Morningness-Eveningness Identification Questionnaire [8].

ISSL was used to assess the presence or absence of stress among students. The instrument consists of three frames referring to the stages of stress. In total, the ISSL presents 37 somatic and 19 psychological items, and the symptoms are often repeated, differing only in their intensity and seriousness [11].

The H&O Questionnaire was used to classify them regarding their chronotype. Benedito-Silva et al. adapted H&O to Brazil [12]. It is an instrument of self-assessment that contains 19 questions, assigning a value for each response, whose sum ranges from 16 to 86. Scores above 58 classify individuals as morning, below 42, as afternoon, and 42 to 58, as intermediate or indifferent. The final score is obtained by the arithmetic sum of the score corresponding to each option of each question, with an option per question [8].

That instrument allows the individual to express his/her preferences regarding bedtime and waking hours, start and finish work times, wakefulness or somnolence upon awakening, willingness to practice physical activities and the state of fatigue at certain times of the day and or the night. The objective, thus, is to know the characteristics of morningness, eveningness or indifference, individually, in order to understand that the organism is physiologically different at each moment of the day. Therefore, it justifies in accordance with circadian variability regarding the preferences in sleeping earlier and waking up soon in the morning (between 9:00 p.m. and 10:00 p.m., and 6:00 a.m. respectively), while others report better alertness and mood when they sleep and wake up later (01:00 a.m. and after 10:00 a.m., respectively) [8].

The Multidisciplinary Group of Development and Biological Rhythms (GMDRB), of the School of Arts, Sciences and Humanities, University of São Paulo (USP) applied the H&O in the Brazilian population. Due to the low frequency of subjects in the extreme typology, the extreme and moderate evening chronotypes ended up belonging to a single category, the same occurring in relation to the extreme and moderate morning chronotypes, constituting three groups: afternoon, indifferent and morning.

There was a descriptive analysis to evaluate the measures of the results using tests to compare the socio-demographic variables, such as the presence or absence of stress in men and women, chronotype score with the diurnal and nocturnal periods (non-parametric Chi-Square). In order to compare the BMI with the presence or absence of stress, the Fischer Exact test was used. In order to compare the chronotype score with the study period, the unpaired t test was used. The level of statistical significance adopted for the statistical tests was 5%, that is, the p-value equal to or less than 0.05 corresponds to the statistically significant result (p<0.05).
Results
The results showed mean age of 21.80 years (±3.3) for the students participating in the research. Regarding gender, 52.4% were men and 47.6%, women, and 54.4% studied in the morning and 45.60%, at night, in 2012.

Regarding the ingestion of alcoholic beverages, 67.96% reported drinking socially. As for the double shift, 51.78% of diurnal students work and study, while 37.50% only study. For nocturnal students, 74.46% reported working and studying and 25.53% only studied.

Regarding the Body Mass Index (BMI), 73.79% of the subjects were in the range considered normal, 20.39% were overweight and 5.83%, below. Among those who were overweight, 50% studied in the morning and 50%, at night.

There was a predominance of the indifferent chronotype (61.2%, n=63), followed by evening 24.3% (n = 25) and, in the minority, morning students accounted for 14.6% (n=15). Figure 1 shows the chronotype classification of the study participants.

Table 1 shows that the diurnal period presented 19.64% (n=11) students identified with morning chronotype and the nocturnal period presented 25.53% (n=12) students identified with evening chronotype. However, 80.36% of diurnal students (n=45) were not adequate for that criterion, as well as 74.47% (n=35) of nocturnal students. We considered as an appropriate time when the subject presented the study time equal to his/her chronotype, and non-adequate when not corresponding to the schedules and chronotype, for example, morning chronotype studying in the morning. If the evening individual studied in the morning, it would not be adequate for his/her characteristics.

When comparing the gender and the presence of stress, the data were statistically significant using the Chi-Square test (p=0.0411), verifying that 62.96% of the male students did not present stress while 57.14% of the female students presented stress (Table 2).

Table 2 shows that, for both the period as the double-shift variables, there was an equal distribution of students with and without stress between in the morning study period. During the night period, most students did not present stress, as well as there was no stress in most students who did not double-shift.

The observed data regarding alcohol consumption were not significant, but it is important to point out that there were adjacent values when alcohol consumption associated with stress, since 54.29% of students consuming alcohol did not present stress, as well as 51.52% of those who reported not consuming alcoholic beverages did not present stress. (Table 2).

Most students (59.21%) with normal BMI showed absence of stress, while, in the other group with stress (40.79%), those differences were not statistically significant.

Regarding the responses on the chronotype adequacy of the subjects, most students (55.17%) did not present stress, while 44.83% of the students...
with adequate chronotype presented stress. In general, a minority with an inadequate chronotype showed stress or not. (Table 2)

As shown in Table 3, when comparing the chronotype score with the daytime and nighttime study period, there was a statistically significant difference by the unpaired t test (p=0.0249). When comparing the day and night periods, the data showed no significant difference, although 57.45% (Table 2) of the night course students did not show the presence of stress.

### Discussion

The predominance of individuals characterized with indifferent chronotypes in this study was (61.2%), since, when analyzing individual differences in the temporal allocation of the biological rhythms of the students, the subjects showed greater flexibility, opting for intermediate schedules according to their routine needs. It is consistent with the results observed in the literature that carried out the analysis of young populations [13].

On the other hand, the predominance of evening individuals over morning justifies by the mean age of the subjects (21.8 years) and the predominance of men. The literature on chronotype suggests that young men are prone to eveningness [14]. In this study, the chronotype proportion showed a statistically significant difference with respect to the gender (p=0.041), in which young men were in larger number of evening than t women, those data resemble the results of other studies [15,5].

Most students did not perform their study activities favoring the period that was the most compatible with their chronotype. That information is verified when we observe that 80.36% of diurnal students were not suitable for the study period. Those values are similar to those presented in the nocturnal period, in which 74.47% of the students did not correspond to the appropriate chronotype.

Adapting the chronotype to daily activities, such as study, work and leisure, aims at a better performance and, above all, respect for people’s quality of life. Until now, it remains a gap in knowledge, since the national literature does not point, with congruence, the influence of the chronotype and the adequacy of the period to perform activities [16]. It is necessary to know about circadian rhythms

### Table 2. Comparison between the variables with the presence or absence of stress. Campinas, SP.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No stress</th>
<th></th>
<th>Stressed</th>
<th></th>
<th>p-value</th>
</tr>
</thead>
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<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>34</td>
<td>62.96</td>
<td>20</td>
<td>37.04</td>
<td>0.041*</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>42.86</td>
<td>28</td>
<td>57.14</td>
<td></td>
</tr>
<tr>
<td>Study period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diurnal</td>
<td>28</td>
<td>50</td>
<td>28</td>
<td>50</td>
<td>0.4505*</td>
</tr>
<tr>
<td>Nocturnal</td>
<td>37</td>
<td>57.45</td>
<td>20</td>
<td>42.55</td>
<td></td>
</tr>
<tr>
<td>Alcoholic drink consumption</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>38</td>
<td>54.29</td>
<td>32</td>
<td>45.71</td>
<td>0.7925*</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
<td>51.52</td>
<td>16</td>
<td>48.48</td>
<td></td>
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<tr>
<td>Double shift</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>32</td>
<td>50</td>
<td>32</td>
<td>50</td>
<td>0.3758*</td>
</tr>
<tr>
<td>No</td>
<td>23</td>
<td>58.97</td>
<td>16</td>
<td>41.03</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
<td>33.33</td>
<td>4</td>
<td>66.67</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>45</td>
<td>59.21</td>
<td>31</td>
<td>40.79</td>
<td>0.1498**</td>
</tr>
<tr>
<td>High</td>
<td>8</td>
<td>38.1</td>
<td>13</td>
<td>61.9</td>
<td></td>
</tr>
<tr>
<td>Chronotype</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate</td>
<td>45</td>
<td>55.17</td>
<td>39</td>
<td>44.83</td>
<td>0.3999*</td>
</tr>
<tr>
<td>Non-adequate</td>
<td>7</td>
<td>43.75</td>
<td>9</td>
<td>56.25</td>
<td></td>
</tr>
</tbody>
</table>

*: *p*-value obtained from the Chi-square test (p<0.05); **: Fischer’s exact test.

### Table 3. Comparison between the chronotype score and the diurnal and nocturnal period of the course. Campinas, SP.

<table>
<thead>
<tr>
<th>Period</th>
<th>n</th>
<th>Mean</th>
<th>S.D.</th>
<th>Median</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diurnal</td>
<td>56</td>
<td>49.43</td>
<td>9.03</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Nocturnal</td>
<td>47</td>
<td>45.47</td>
<td>8.5</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Chronotype score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0249*</td>
</tr>
</tbody>
</table>

*: Significant result: p-value obtained by the unpaired t test (p<0.05).
of the wake-sleep cycle so that individuals adapt their routine to the individual characteristics and preferences of the temporal organization, and not the opposite, as seen in modern life, in which social commitments overlap the physiological needs of the human being.

Socio-demographic data showed that the population of this study consisted predominantly of men, perhaps due to the characteristic of the studied course, more attended by men, both in the diurnal as nocturnal periods. When comparing the gender with the stress indexes, there was a significant difference regarding the masculine gender. Other research has shown that there is similarity to our findings regarding the presence of stress, mentioning that women were more stressed than men [17]. Researches demonstrate that the society demands from women, in general, an overload of activities, in which the personal, biological, hormonal, sexual and social demands increase the professional or academic career [16]. Moreover, because of the double shift, most women develop, beyond the studies, the chores of the family environment.

Most students, from both the diurnal as the nocturnal periods, performed double shift, considered, in this study, as work and study. Nevertheless, there was no statistically significant difference between the diurnal and nocturnal stress groups, because it was not always possible to observe compatible results of stress in subjects who performed the double shift [17].

Regarding BMI, 20.39% of the students were above the normal index. Those values corroborate data from the national literature [15]. However, when considering that the population of this study consists of students from the graduate course in P.E., those values of percentage of BMI above normal are worrisome, considering their lifestyle and opportunity to perform daily physical activities, for the physical exercise constitutes an important action to prevent and control excessive body weight.

On the other hand, one speculation for those findings is inadequate food, which may result from the fact that many of them reside far from their families, alone or in republics. In addition, college students eat quickly due to study and work schedules imposed in the academic environment [9]. Another important consideration was the presence of stress in most of those individuals. Although there was no significant data regarding the comparison with the stress and study period, the majority of subjects with BMI above normal values were under stress (61.9%). The literature shows that there is a positive association between stress and obesity [18].

As for the chronotype score observed in the study periods, the results were statistically significant for the diurnal period, when the students’ scores were higher when compared to the those in the evening period (p=0.024). The analysis of those data suggests the search for the study period to be a physiologically preference determined by the circadian rhythm corresponding to its chronotype.

Variations in the rhythmic expression of biological and behavioral patterns have shown that diurnal students have a higher chronotype score when compared to nocturnal students. This result corroborates data from the literature, in which morning subjects have daytime preference and evening people have nocturnal preference [15].

**Conclusion**

The results showed that the majority of the students with the circadian type were not adequate for the study schedules.

There were differences regarding the presence of stress and gender, and the female group presented higher indexes, corroborating other similar studies.

The classification of the chronotype showed that the male college students showed a tendency towards evening. The students from the diurnal period presented a higher chronotype score when compared to the students from the nocturnal pe-
period, which confirms that morning individuals have diurnal preferences and evening ones have nocturnal preference.

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References