The International Journal of Indian Psychology
ISSN 2348-5396 (e) | ISSN: 2349-3429 (p)
Volume 6, Issue 2,DIP: 18.01.071/20180602
DOI: 10.25215/0602.071
http://www.ijip.in | April - June, 2018

Research Paper

The Impact of Sleep Duration on Health, Academic Performance and Social Activity of Students

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ABSTRACT

This study investigated the relationship between sleep duration and academic performance among Ukrainian students of veterinary. A cross-sectional design was used. The biodata paper and self-administered questionnaire of Vasserman P.P. were administered to first-year through third-year students at an University of Podillya (Kamyanets-Podilsky, Ukraine). Questionnaires were completed by 110 student veterinarians from 19 to 22 years old. More than 80% of student veterinarians obtained less than 7 hours of sleep at night during a typical academic week. 79% of students sleep for 1-2 hours every day during the daytime. Shorter sleep duration was associated with higher level of neuroticism, headache, sleepiness, tremor, depression, scarce memory, apathy, diarrhea, diarrhea, distraction, and other. According to the National Sleep Foundation (NSF) report majority of student veterinarians had inadequate durations of sleep, defined as fewer than 7 hours while the sleep range in younger adults is 7-9 hours. Insufficient sleep duration was associated with student health problems, scarce academic performances, asocial characteristics and evident tendency to antisocial behavior.

Keywords: *Sleep, Academic Performance, Students, Health, Social Activity*

The quality of sleep determines the quality of daily wakefulness and students' performances. The adequate night body rest is associated with cognitive activity levels in the daytime.

The recommended 7 hours of sleep each night has an optimal impact on cognitive characteristics such concentration, psychomotor reactions, emotional stability and capacity of stress management. The insufficient sleep duration is associated with physical health problems and quality mental of mental processes. According to recent Ukrainian research the short sleep in students and adult people can be related to the sleeping conditions, as the quality of bad.

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Received: May 19, 2018; Revision Received: June 3, 2018; Accepted: June 25, 2018

Sufficient sleep time is the objective of the health care and it is accompanied by a decreased capacity for work, deterioration in cognitive function, health and quality of life.

Analizing, as example, the American population in 2005, it's possible to evidence that the duration of night sleep in 40% of adults was less than 7 hours, while in 1960 this figure did not exceed 15%, what is the sing of the process of decreasing of duration of night sleep in the world. 25% of Americans noted that sleep problems have negative affect on their daytime life. 65% stated that their attending physician never asked them about their quality of sleeping. Thus, we can see that, this problem is still not evident in the medicine practice.

Shortened sleep duration can reduce knowledge retention, the effect of hippocampus' affection.

The negative impact of poor sleep duration on health, academic performance and social activity of students principally was assessed in subjects of preschooler, scholar and university students ages. Such according to researches of Brown et al. (2006), and Chervin and Hershner (2014).

there is a relation between sleeping quality of and students' academic performance, including it's reinforcing negative effect of intrusive light or noise evidenced by Chen et al. (2014). The sleep-deprived students in study of Giannotti et al. (2002) during their daily life represented fatigue, depression, difficulties with learning, decision-making, concentration, attention, and facilitating memories. Milner and Cote (2008) and Gomes et al. (2011) suppose that shorted sleep time can affect student's quality of sleep by delaying the body's natural circadian rhythm and homeostatic sleep drive.

Negative effects on academic performance have: anxiety disorders and the same anxiety for exam, alcohol use and drug use disorders also not verified in all studies, major depressive disorder. The subjects with these disorders was excluded from this study.

Aim

The objective of the present study was to determine the effect of sleep duration in veterinary students of the University of Podillia on their health, academic performance, level of neuroticism and social activity. It was hypothesized that sleeping duration can be significant predictor of academic performance, but in lower level that is demonstrated in numerous studies.

METHODS

Sample Recruitment

Participants ($n = 110$) were healthy veterinary students from 19 to 22 years, ¼ of which were men and ¾ - women. The subjects recruitment criteria were: appurtenance for the Khmelnitsky region of Ukraine, excluding the representatives of other regions; Ukrainian nationality; heterosexual orientation; age older than 18 and younger than 23; absence of

history of depressive disorder, anxiety disorders, alcohol use and drug use disorders, mood disorders or psychosis assessed by a clinical psychologist according to the DSM-V criteria. This trial was approved by the Institutional Review Board at the University of Podillya.

Main outcome measures

A protocol composed of a socio-demographic questionnaire including information as age, sex orientation, university faculty, geographic distribution, and nationality was administered for 256 veterinary students. Only 188 of them were selected for the second step of selection - for the psychological assessment. The clinical psychologist assessed students for the psychological disorders for 5 days. Finally only 110 subjects met all the requirements of socio-demographic criteria and psychological assessment. The third step included the administration of the specific examination instruments: biodata questionnaire (general information about student, middle night duration of sleep, presents of neurological symptoms, middle academic performance, level of social activity, presents of the chronic diseases and frequency of its exacerbation) and the Scale of Neuroticism (Vasserman P.P.) composed by 40 questions.

Statistical Analysis

To perform the statistical analysis Microsoft Office Excel 2010 was used.

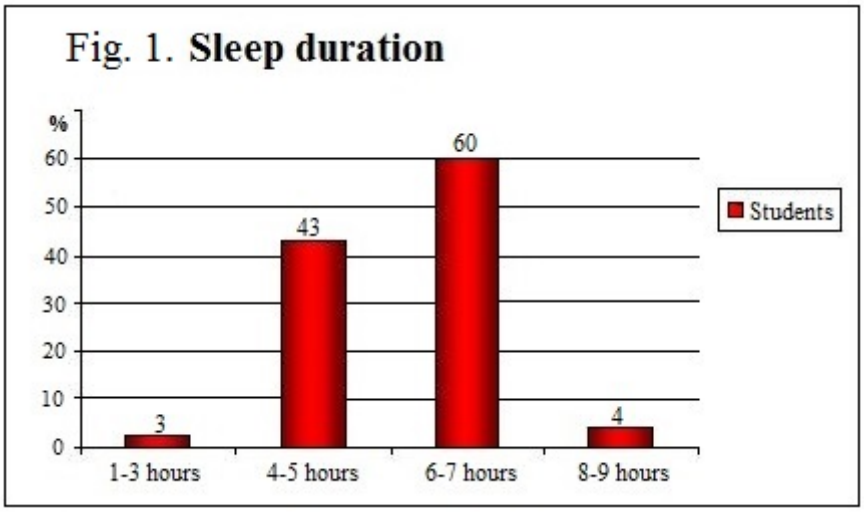
RESULTS

Summary of sample

The participants were appurtenants for the Khmelnitsky region of Ukraine (100%), Ukrainian (100%), heterosexual (100%), from 19 to 22 years old (100%), without history of psychological and psychiatrical disorders (100%).

Obtained Results

According to the obtained data the duration of sleep at night was reveled that 1-3 hours for night sleeps 3 (2.8%) students, 4-5 hours – 43 (39.0%), 6-7 hours – 60 (54.6%), 8-9 hours – 4 (3.6%) presented in Fig.1.



Also were identified that 87 (79%) of respondents sleep for 1-2 hours in the daytime.

In the biodata questionnaire the respondents affirm to have the next symptoms: feeling of lack of sleep - 81.8%; anxiety is 29.1%; irritability and headache - 51,8%; memory loss 37.3%; tremor - 5,4%; weight reduction - 12,7%; tinnitus - 9,1%; reduction of vision - 35,4%; apathy - 23.6%; fast fatigue - 53,6%; decrease in efficiency - 48,2%; reduction of attention - 49.1%; diarrhea - 5,4%; aggression - 24,5%; law sexual desire - 31,8%; sexual unsatisfaction - 6.4%.

According to the average academic performance 8.2% had an excellent academic performances, 53.6% had a good academic performances, and 38.2% had a middle academic performances.

The assessment of the social activity on a five-point scale, it was revealed that the best communication ability had 28.2% of respondents, moderate communication ability - 36.4%, scarce communication ability (with close friends and relatives) - 30.0%, bad communication ability (only with parents) - 3,6%, worst communication ability (do not communicate with anyone) - 1,8%.

The presence of chronic diseases, as myopia and gastritis, was affirmed by 36.4% of the respondents.
The level of neuroticism according to obtained results using the Vasserman's Neuroticism Scale (Appendix 1.**)** there was established the average value from 14 to 24 points.

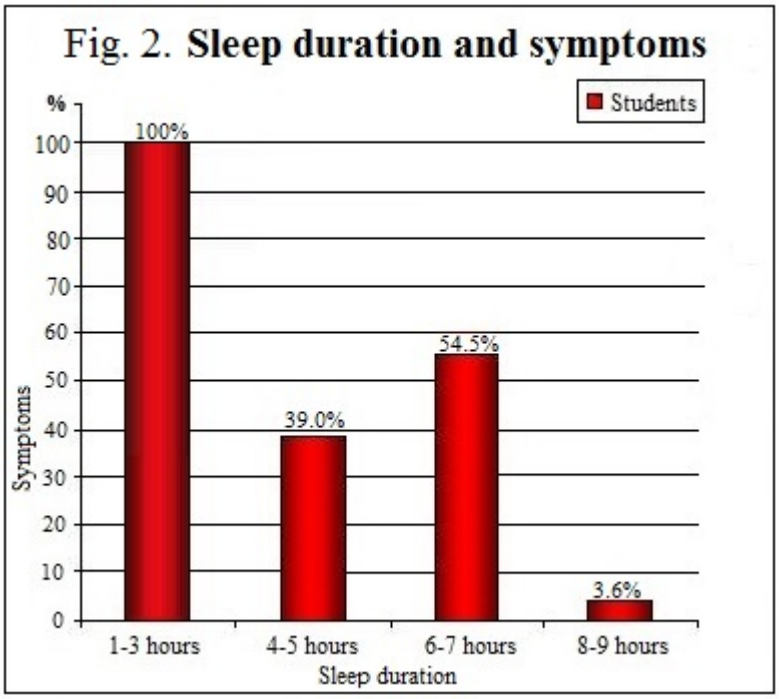
Analysis of the obtained results
1. Establish a connection between the duration of sleep and the observed symptomatology in students.
After analyzing of students' groups with the same night sleep duration were obtained the following data (Fig. 2):
a) Students with a sleep duration of 1-3 hours per night (2.7%) has in 100.0% of cases a presence of next symptoms: feeling of lack of sleep, anxiety, irritability, decreased efficiency, scarce attention, headache, rapid fatigue, depression and memory loss; particularly in 66.0% of cases - weight reduction, noise in the ears, decreased vision and apathy; 33.0% of them has a diarrhea, aggression and tremor. The presence of chronic physical diseases was confirmed by 66% of this group students.

b) Subjects with a sleep duration of 4-5 hours per night has in 39.0% of cases a presence of next symptoms: a feeling of lack of sleep in 90.7%; anxiety in 27.9%; irritability, decreased efficiency in 51.2% of cases; decreased memory, decreased vision in 41.9%; personality disorders, noise in the ears, tremor in 6.9% of cases; rapid fatigue, headache in 58.1%; weight reduction in 18,6%; depression, aggression, apathy in 25,6%, attention decrease in 60,4% and diarrhea in 4,6% of cases.

The presence of chronic physical diseases confirmed in 37.2% of this group of students.

c) Students with a sleep duration of 6-7 hours per night has in 54.5% of cases a presence of next symptoms: feeling of lack of sleep – in 78.0% of cases; anxiety in 23.7%; irritability in 50,8%; decreased memory, depression in 30.5% of subjects; personality disorders, noise in the ears in 5.0%; headache in 47,4% of subjects; tremor in 3,4%; weight reduction in 6,8%; reduction of vision in 27,1%; aggression, apathy in 22,0%; fast fatigue in 50,8% and decrease in working capacity, attention decrease in 40,7% of students. The presence of chronic physical diseases confirmed in 33.9% of this group of students.

d) Students with a sleep duration of 8-9 hours per night has in 3.6% of cases a presence of next symptoms: feeling of lack of sleep, anxiety, reducing of vision, decreased efficiency, diarrhea, irritability in 50,0% of subjects; decreased memory, noise in the ears, headache, rapid fatigue, depression in 25.0%. The presence of chronic physical diseases confirmed in 75.0% of this group of students.



The conclusion on the received data is the following:

- The percentage of occurrence of various symptoms listed in the questionnaire is higher in students which sleep 1-3 hours per night. The longer duration of sleep is associated with the less percentage of symptoms.
- The percentage of occurrence of chronic diseases is higher among students which sleep 8-9 hours per night. The reason for this may be a limited number of students in this group. In general, the greatest incidence of chronic diseases is present in students with a 1-3 hour sleep, and this figure decreases with increasing of sleep duration.
- The effect of the duration of sleep on the frequency of exacerbations of chronic diseases wasn't revealed.

2. The influence of sleep duration on the social activity of students, the level of neuroticism and academic performance.

After analyzing of students' groups with the same night sleep duration were obtained the following data (Fig. 3):

a) Students with a sleep duration of 1-3 hours per night has in 2.7% of cases a presence of next symptoms: 33.3% of students in this group can easily start communicating with anyone (on a five-point scale of social activity - 5 points), 33.3% communicate with close friend relations and relatives (3 points), 33.3% - with no one do not communicate (1 point).

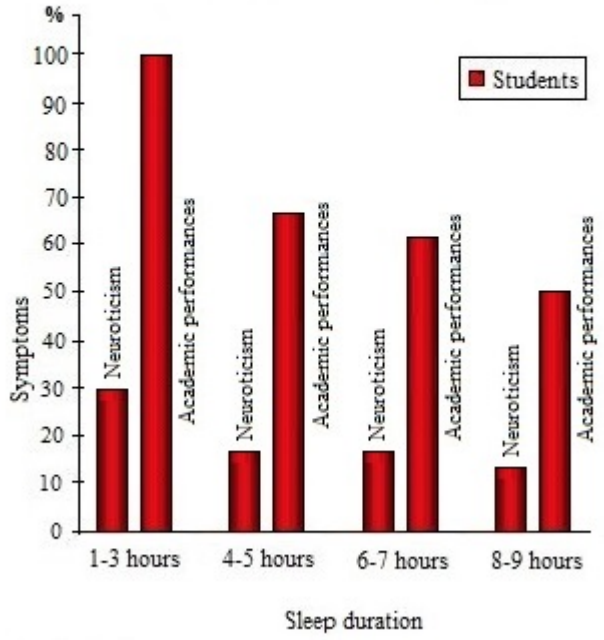
The average level of neuroticism in this group was 30. The academic performances level in 66.6% was satisfactory and in 33.4% of cases was excellent.

b) Students with a sleep duration of 4-5 hours per night has in 39.0% of cases a presence of next symptoms: 37.2% of students in this group can easily start communicating with anyone (on a five-point scale of social activity - 5 points), 30.2% communicate with everyone in the team (4 points), 28.0% communicate with strict friends and relatives (3 points), 2,3% communicate only with relatives (2 points) and 2,3% do not communicate with anyone (1 point). The average level of neuroticism in this group is 18. The academic performances level in students with a sleep duration of 4-5 hours per night in 37.2% of cases is satisfactory, in 53.5% good and in 9.3% excellent.

c) Students with a sleep duration of 6-7 hours per night has in 54.5% of cases a presence of next symptoms: 20.0% of students in this group can easily start to communicate with anyone (on a five-point scale of social activity - 5 points), 43.3% communicate with everyone in the team (4 points), 33.3% communicate with close friends and relatives (3 points), 3.4% communicate only with relatives (2 points). The average level of neuroticism in this group is 18. The academic performances level was in 38.3% satisfactory, in 56.7% good, and in 5.0% excellent.

d) Students with a sleep duration of 8-9 hours per night has in 3.6% of cases a presence of next symptoms: 50.0% of students in this group presented an exceptional communicating ability with anyone (on a five-point scale of social activity - 5 points), 25.0% communicate with everyone in their team (4 points), 25.0% communicate only with their relatives (2 points). The average level of neuroticism in this group of subjects is 13.5. The academic performances level was in 50.0% of cases satisfactory and in 50.0% good.

Fig. 3. **The influence of sleep duration on the social activity of students, the level of neuroticism and academic performance**



The conclusion on the received data is the following:

- The correlation between social activity and the sleep duration is insignificant: it increases slightly with an increasing of the sleep duration.
- The level of neuroticism is higher in people who sleep 1-3 hours. This indicator is lower in people with longer sleep duration.
- The influence of the duration of sleep on academic performance in this case is established. The shorter sleep duration correlate with the high level of academic performance. This relationship is explained by the fact that students are supposed to spend the sleeping time for studying.

DISCUSSION

The obtained data revel that the predictors of University students academic performance is correlated with the sleep duration. The hypothesis of the negative effect of the short nightly sleep duration on the academic performance wasn't confirmed despite the fact that the nightly sleep duration less 8 hours is important predictor of the health problems in the adult organism.

The contradicted correlation between negative symptoms and high academic performance was identified. The reduced sleep duration was the predictor of the physical health problems and scarce quality of mental processes, but it was also correlated with the best academic performance which is explained by more hours dedicated for the study.

All results are scientifically confirmed and the incomprehensive association of facts was successfully explained in subjects with short nightly sleeping by two factors: studying by night and fiesta's time during the day.

Nevertheless the negative fatigue symptoms was more present in groups of subjects with nightly sleep duration of 1-7 hours and the most healthy was subjects sleeping by night for 8-9 hours, which has also a less academic performances. For this fact in this case it seems that the optimal nightly sleep duration can be more than 7 recommended hours.

According to obtained results the majority of students slept less than 7 hours for adequate sleep. The majority of participants represented as consequences of sleep inadequacies a health problems.

One may argue that subjects which had less academic performance slept longer, because they were less prepared. The less preparation can be correlated hypothetically with the insufficient time to study. It was hypothesized that the best healthy conditions related with longer sleep duration can contribute for the better academic performance, but it can't be confirmed basing on obtained results.

The author supposes that the stress coping process applied in short sleepers will be no more impossible for the lowering of immunity, and health correlated cognitive capacities for the study: memory formation and consolidation. The impairment of cognitive functions, for example, of working memory is strictly related to the organic response for the prolonged stress influences caused by short period of sleeping. Night sleep deficit was presumably compensated by night sleep, but this did not exclude the occurrence/presence of cardiovascular diseases in students caused by insufficient sleep duration.

The obtained results are contrasting the results of Medeiros et al's research and Veldi et al's study that reported the correlation between sleeping for longer durations and academic progression.

This study was statistically significant because it evidenced that the duration of nightly sleep and the presents of disease are related to academic performance or it's predictors. The sleep hygiene is necessary to improve the health of university students. The time spent for the study is a good predictor of the future academic performance, but according for the obtained data the sleeping time used for the study is associated to physical diseases which is the predictor of future invalidity, less communication ability and perhaps the future less academic performances. The right time management can help students to ameliorate their academic performances without decrease the duration of nightly sleeping time.

CONCLUSION

The average duration of sleep in students of veterinary of University of Podillia is lower than physiological norms. Only the group that slept for 8-9 hour (3.6%) represented the normal

health quality and communicational ability, but this group has the less academic success than short sleeper's groups.

There was identified the relationship between the duration of sleep and following parameters: 1) The general symptoms of neurological disorders: the shorter sleep duration induce the greater the percentage of symptoms; 2) The presence of chronic diseases: the shorter sleep duration induce the higher percentage of chronic diseases; 3) The neuroticism level according to Vasserman's Scale: the shorter sleep duration induce the greater level of neuroticism; 4) The academic performance: the shorter sleep duration induce the higher percentage of academic progress. However, this item remains questionable. The author assume that academic progress increase with a decrease of sleep duration because the students spend the night time for study. To clarify this question is needed more data. It also remains unclear the influence of daily sleeping for 1-2 hours on sleeping necessity and duration at night.

LIMITATIONS

The present study has some limitations, which should be discussed. All participants were heterosexual, without psychiatric diseases and with restricted age that excluded a lot part of students. Furthermore, the students were recruited from one university, only from faculty of veterinary, from the same Ukrainian region and they was all Ukrainian nationality, which limits the generalizability of obtained results. Cross-cultural replication with a sample with a broader age range and a equal proportion of male and female participants is desirable.

Ethics Approval And Consent To Participate

This study was approved by the Institutional Review Board at the University of Podillia. All participants was fully informed of the procedures of the study and was sign an informed consent form prior to participation in the study.

SUPPORTING INFORMATION

Appendix 1. **Neuroticism Scale of Vasserman P.P.** (in Russian)

Инструкция: Ознакомьтесь с приведенными ниже суждениями и ситуациями, выбирая ответ «да» или «нет». Приводимые вопросы для определения уровня невротизации имеют ориентировочный характер.

Опросник:

1. В различных частях своего тела я часто чувствую жжение, покалывание, ощущение мурашек, онемение.
2. Я иногда задыхаюсь, и у меня бывают сильные сердцебиения.
3. Раз в неделю или чаще я бываю очень возбужденным или взволнованным.
4. Голова у меня болит часто.
5. Два-три раза в неделю по ночам меня мучают кошмары.
6. В последнее время я себя чувствую хуже, чем когда-либо.
7. Почти каждый день случается что-нибудь, что пугает меня.
8. У меня бывали периоды, когда из-за волнения я терял сон.
9. Обычно работа стоит мне большого напряжения.

10. Иногда я бываю так возбужден, что это мешает мне заснуть.
11. Большую часть времени я испытываю неудовлетворенность жизнью.
12. Меня постоянно что-нибудь тревожит.
13. Я стараюсь реже встречаться со своими знакомыми и друзьями.
14. Жизнь для меня почти всегда связана с напряжением.
15. Мне трудно сосредоточиться на какой-либо задаче или работе.
16. Я очень устаю за день.
17. Я не верю в светлое будущее.
18. Я часто предаюсь грустным размышлениям.
19. Временами мне кажется, что моя голова работает медленнее, чем обычно.
20. Самая трудная борьба для меня ─ это борьба с самим собой.
21. Я почти всегда о чем-нибудь или о ком-нибудь тревожусь.
22. У меня мало уверенности в себе.
23. Я часто чувствую неуверенность в себе.
24. Несколько раз в неделю меня беспокоят неприятные ощущения в верхней части живота (под ложечкой).
25. Иногда у меня бывает такое чувство, что передо мной выросло столько трудностей, что одолеть ихпросто невозможно.
26. Раз в неделю или чаще я без видимой причины внезапно ощущаю жар во всем теле.
27. Временами я изматываю себя тем, что слишком много насебя беру.
28. Я очень внимательно отношусь к тому, как я одеваюсь.
29. Мое здоровье ухудшилось в последнее время.
30. В отношениях между людьми чаще всего торжествует несправедливость.
31. У меня бывают периоды такого сильного беспокойства, что я даже не могу усидеть на месте.
32. Я стесняюсь танцевать в незнакомой компании.
33. По возможности я стараюсь избегать большого скопления людей.
34. Мой желудок сильно беспокоит меня.
35. Должен признаться, что временами я волнуюсь из-за пустяков.
36. Часто сам огорчаюсь, что я такой раздражительный и ворчливый.
37. Несколько раз в неделю у меня бывает такое чувство, что должно случиться что-то страшное.
33. Мне кажется, что близкие меня плохо понимают.
39. У меня часто бывают боли в сердце или груди.
40. В гостях я обычно сижу где-нибудь в стороне или разговариваю с кем-нибудь одним.

Обработка и интерпретация результатов

При обработке результатов надо подсчитать число положительных ответов. Чем больше полученный результат, тем выше уровень невротизации.

Уровни выраженности невротизации:

• 0-14баллов ─ низкий;

• 15-24 балла ─ средний;
• 25-32 балла ─ отчетливо выраженный;
• 33-40 баллов ─ высокий.

Высокий уровень невротизации свидетельствует о выраженной эмоциональной возбудимости, в результате чего появляются негативные переживания (тревожность, напряженность, беспокойство, растерянность, раздражительность), о безынициативности, которая формирует переживания, связанные с неудовлетворенностью желаний, об эгоцентрической личностной направленности, приводящей к ипохондрической фиксации на соматических ощущениях и личностных недостатках, о трудностях в общении, о социальной робости и зависимости.

Низкий уровень невротизации свидетельствует об эмоциональной устойчивости, положительном фоне переживаний (спокойствие, оптимизм), инициативности, чувстве собственного достоинства, независимости, социальной смелости, легкости в общении.

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Acknowledgments

The author appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interests: The author declared no conflict of interests.

How to cite this article: Tuziak, B (2018). The impact of sleep duration on health, academic performance and social activity of students. *International Journal of Indian Psychology*, *6*(2), 105-117. DIP:18.01.071/20180602, DOI:10.25215/0602.071