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Biosocial Conditions and Academic Performance: A Case Study of Post Graduate Students of Utkal University

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ABSTRACT

The term bio-social conditions refers to some selected indicators related to health status, social background and psychological traits. Academic achievement or performance is the extent to which a student achieved his/her short-term or long-term goals, like cumulative GPA, completion of educational degrees such as high school, bachelor's degree et cetera. The present study linkages between the academic performances of P.G students with their biosocial conditions. The survey area is confined to the Department of Analytical & Applied Economics, Utkal University, Bhubaneswar, Odisha. This study is based on primary data. The population size is 123. The respondents are the P.G. students of the department. Descriptive Statistics, Correlation Analysis and Independent Sample T-tests have been used for analysing data. It was found that the relationship between a biological variable (BMI) and behavioural variable with academic performance is negative. The independent sample T-test for mean differences in academic performance across normal and non-normal BMI groups shows a significant difference only in the case of 'hours of self-study'. There is also an insignificant mean difference in academic performance (overall attendance, % hours of class and self-study) across income group below the mean income of 35757 and income group above the mean income of 35757. This may be due to sampling fluctuation. There is no significant relationship between mark scored in the last exam as the dependent variable and two indicators of consumption habits that is junk food as % of the preferred food items, outside food taken as % of total food in a usual week as the independent variables whereas there exists a significant relationship between cumulative attendance as the dependent variable and two same indicators of consumption habits as the independent variables.

Keywords: Body Mass Index, Academic Performance, Grade Point Average, Post Graduate Students

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I. INTRODUCTION

This study largely falls under the disciplinary interface of biology and economics (bioeconomics). The word "Bioeconomics" was first introduced by British Biologist Hermann Reinheimer in his journal article "Evolution by cooperation: A Study in Bioeconomcs". It is an interdisciplinary field of economics and biology. Many years ago the concept of Bioeconomics was applied in various research fields but the

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evolutionary development process of modern Bioeconomics in research area was started in 1970's with the help of pioneering work of economist (Gordon Tullack, Gary Backer etc.) and biologist (Micheal Ghiselin). The purpose of Bioeconomics is to integrate two disciplines in order to get the theoretical and empirical bases which are helpful for the development of new theories, theorems, hypothesis, paradigms etc. (Ghiselin, 1999).

The purpose of this study is to examine the link between bio-social conditions and academic outcome of the university students. For this we have taken the post graduate students of the Department of A & A Economics in Utkal University as the basis for this study by taking into account their biological indicators, social & behavioural indicators and educational outcome. The term Bio-social conditions include some selected indicators related to health status, social background and psychological traits. Academic achievement or performance is the extent to which a student achieved his/her short-term or long-term goals, like- cumulative GPA, completion of educational degrees such as high school, bachelor degree et cetera. The term health status includes health condition (chronic health problem, frequently occurred disease etc.) and health indictor (BMI) whereas social background indicator includes sex, caste, family income and occupation of the respondents. The behavioral indicator includes physical exercise, consumption pattern, sleeping order & socialisation etc. Here, we also studied about some specific categorical variables of the respondents like Intelligence level, emotional quotient, career aspiration and risk tolerance. Body mass index (BMI) is a measure of weight adjusted for height, calculated as weight in kilograms divided by the square of height in meters. BMI is often considered an indicator of the amount of fat in the body. BMI is a simple, inexpensive, and non-invasive surrogate measure of body fat. While current health status of an individual is defined by the level of resilience against health hazards, BMI is widely used as a proxy for it (https://journals.lww.com/nutritiontodayonline/Fulltext/2015/05000/Body_Mass_Index__Obesity, BMI, and Health). Mathematically, BMI = Weight in kg/ Height in m^2. BMI of < 18.5kg/m^2 is categorized as underweight, between 18.5-23kg/m^2 as normal, and >23kg/m^2 as overweight, in Indian context. Academic performance is the extent to which a student, teacher or institution has achieved his / her short or long term educational goals. Cumulative GPA, overall percentage of marks secured, attendance in classes, time spent on studies, et cetera are some common indications of academic performance. The current study makes an attempt to analyze possible links between BMI and academic performance.

Social behaviour can be defined as the behaviour that influences or is influenced by other members of the same species. The examples of social influences include influences of being specific demographic communities (people from same income group, same districts etc.), place of residence, etc. This study explores the effect of peers on a real network formed by a cohort of students enrolled. Studies say these social influences have a potential to affect academic performance. This study also makes an attempt to analyze possible links between some selected social factors and academic performance.

Again for behavioral aspect, we have taken consumption habits and Time use. In general, consumption refers to the process in which the substance of a thing is completely destroyed, used up, or incorporated or transformed into something else. Consumption of goods and service is the amount of them used in a particular time period. Whereas, Consumption habits basically refer to the frequency and composition of major meals like breakfast, lunch, dinner, et cetera. It takes into

account the regularity of meal timings, consumption of outside food, Proportion of junk food in major meals et cetera. Many Studies find out that a disciplined consumption habits have a potential effect on academic performance. This study also makes an attempt to find out possible links between consumption habits and academic performance. Generally, Time use refers to how an individual broadly spends his/her day. In this study, we focused how a student spends his/her time in a normal day i.e how a student spends his/her time on class, self-study, physical exercise and socialisation etc. Various literatures find out that Existence of direct relationship between reading habit and academic performance and inverse relationship between socialisation and academic performance. This study also makes an attempt to find out possible links between time use and academic performance.

II. REVIEW OF LITERATURE

Previous Works

Most of the literature related to the field of Bioeconomics is based on non-human biology and economics. (MAGEE, 1993) found some theories of biology (like Pecking orders) are having similar implication with some theories (rent seeking) of economic behavior.BMI is defined as body weight measured in kilograms divided by the square of height in meters (www.webmd.com). Educational performance is the student's performance or achievement which is evaluated or assessed by some standardized test within the institution or any educational settings. There was already large no. of study has been done on this particular topic .The summary of some reviewed literature on this respect have find that there is an inverse relationship between BMI and academic achievement. (Belinda L. Needham R. C., 2004) found that, adolescents with risk of obesity had lower academic performance than others. Similarly (Sabia, 2007) also find that is a significant inverse relationship between BMI and academic grades for white females aged 14-17 but less prominent in case of non-white females. Similarly various short term and long lasting health problems are also inversely related to academic performance.(Sheniz Moonie, 2008) shows that there was no overall difference in test achievement between those with and without asthma. (Luigi Mazzone, 2007) find out that as per self-reported levels of anxiety, it increases in frequency with age and was negatively associated with school performance.(Fletcher, Adolescent Depression: Diagonasis, Treatment,And Educational attainment, 2007) found that, female adolescents with depression were 3.5 percentage points less likely to graduate from high school. Depressed adolescents were almost 6 percentage points less likely to enrol in college; the effect was larger for females.

There are also some literature were reviewed which are related to some behavioural aspects of an individual, it includes life style habits (physical activity, sleeping order, time use etc.) and consumption habits (dietary habit, low fat eating, meal skipping etc.). (Álfgeir Logi Kristjánsson, 2008) find that lower BMI, more physical activity, and good dietary habits (consumption of fruits and vegetables) associated with high academic performance and higher self-esteem.(Phillips) find that eating breakfast seems to have positive effect on performance in biology exam i.e. higher percentage of students who ate breakfast passed the examination, there is a significant relationship between low fat eating behaviour & academic achievement and there is insignificant association between meal skipping, emotional snacking and convenience eating behaviour & self-esteem toward academic achievement. (Torstveit, 2014) found that high academic achievement positively associated with a regular consumption of breakfast, lunch and dinner; high intake of fruits, berries, vegetables; high leisure time and physical activity and inversely related with low

intake of lemonade, sugar –sweetened soft drinks, salty snacks, smoking. (Jessie-Lee D. McIsaa, 2015) find that those students with unhealthy lifestyle behaviour exhibit poorer academic performance. (Siew Foen Ng, 2016) find out that time use for school related activities shows statistically significant positive relationship with CGPA and time use for non-school related activities shows statistically insignificant negative relationship with CGPA. (Owusu-Acheaw, 2014) also find that there is existence of direct relationship between reading habit and academic performance. There are also studies which are a bit more comprehensive (Mohanty & Rath, 2018). Throughout reviewed literature only one Indian context article we find which explains about the role of social capital on academic performance i.e. The Mechanics of Social Capital and Academic Performance in an Indian College" (2013)by Sharique Hasan and Surendra Kumar Bagde. The results of their study are that students with able roommates perform better, and the magnitude of this roommate effect increases when the roommate's skills match the student's academic goal and students benefit equally from same- and different-caste roommates, suggesting that social similarity does not strengthen peer (Bagde, 2013).

Research Gap

- From the reviewed literature we find that the emerging field of bioeconomics has been basically developed by researchers from non-academic background such as statistics, biology, ecology etcetera and so the study of the linkages mostly reside in non-economic paradigms
- This type of research is rare in under developed countries like India i.e. most of the study related to this topic has been done in developed country
- Even at the global level, the availability of literature studying the linkages of biological and social aspects with academic performance is limited. And so any research pertaining to this topic shall contribute substantially to the existing body of knowledge

III. OBJECTIVES

The main purpose of this study is to observe the link between student's bio-social conditions and academic performance in university level; in particular, the research is aimed at accomplishing the following:

- To assess the link or association between selected biological indicators and academic performance of the university students
- To study the link between social context and academic performance of the university students
- To study the links between selected behavioural aspects and academic performance of the university students.

IV. DATA AND METHODS

This study is based on primary data; the data has been collected by adopting census method through a well-structured questionnaire. The study area has been confined to the department of A& A Economics, Utkal University. The Post Graduate students of Utkal University are the respondents of the study. The population size is 123. The questionnaire consists of some short type, MCQ and Likert Scale questions. Throughout this study following variables are used. These are Basic Personal Information, Life Style Habits, Specific Consumption Habit, Biological Indicators, and Indicators of Academic Productivity etc. Statistical tools

like Descriptive Statistics, Correlation analysis and Independent Sample 't' Test has been used to analyse the data.

V. ANALYSIS AND RESULTS

Demographic and Socio-Economic Profile of the Respondents

The summary of socio-economic profile suggests that out of total participation of P.G respondents, more than 50% of the respondents are from 2017 admission batch and female than 2016 batch and male respondents are participate in the survey. In social group wise, out of total respondents, majority of the respondents who are belong to general category i.e. 40.5% are participate in the survey than the other social group. The percentages of respondents of other social group like OBC, SC and ST are participating in the survey are 22.31, 20.66 and 16.53 respectively. Income is categorized quintile group wise that approximately 20% respondents included in each group. The quintile group Q1 (0-3560) shows the lowest 20% family income group respondents and Q5 (more than 38700) shows the highest income group respondents. Out of total respondents, majority i.e. 36.59 % of the respondents in the survey are comes from the family whose father's occupation is farming. Similarly, more than 82% mothers of our respondents are housewives.

Linkages between Bio-Social Conditions with Academic Performance

In this study BMI taken as only biological indicator. It is commonly used as an indicator for assessing the weight status of individuals. Body mass index (BMI) is defined as body weight measured in kilograms divided by the square of height in meters. Social factors like place of current residence and same income group people and some life style habits like consumption habits and sleeping order under bio-social conditions are taken. Academic performance is the student's performance or achievement which is evaluated or assessed by some standardized test within the institution or any educational settings. The subsequent sections explain the possible linkages between these bio-social conditions with academic performance.

Link between Biological Indicators (BMI) with Academic Performance

Table-1 shows that more than 50% of our respondents come under normal BMI group irrespective of batch, sex, caste and income quintile group. Among the non-normal BMI respondents, a higher proportion is overweight than underweight, more so in case of 2016 batch.

The correlation matrix of the selected variables shows weak negative association of BMI with the three indicators of academic performance: % overall attendance, % overall marks scored in last examination, % hours spent for class and self-study. That implies, as BMI increases academic performance deteriorates, but then the relationship is not statistically significant (the p-value in case of all the three indicators of academic performance is > 0.05).

Since many literature suggested strong association between BMI and academic performance (also split the hours spent on class and self-study separately), we extended our analysis by undertaking an independent sample T-test for the mean differences in performance with BMI (binary; i.e., normal =0) and found that for hours spent on self-study, there is statistically significant difference across normal and non-normal BMI group.

The independent sample T-test for mean differences in academic performance across normal and non-normal BMI groups shows a significant difference only in case of '% hours of self-study' (p-value < 0.05).

Table-1: Demographic Profile of the BMI (Batch, Sex, Social and Family income Group Wise Percentage of Respondents in different BMI Group)

	Normal	Non-Normal	
		Over Weight	Under Weight
2016	55	31	14
2017	57.37	23.6	19.03
F	52.05	34.25	13.7
M	63.05	15.21	21.74
GEN	55.32	29.79	14.89
OBC	70.83	16.66	12.5
SC	55	15	30
ST	44.44	40.74	14.81
Q1	55	20	25
Q2	80	5	15
Q3	55	20	25
Q4	60	25	15
Q5	40	50	10

Source - Primary Data

Table-2: Batch, Sex, Social group and Income quintile Group Wise Explanation of Mean Value in % of Different Indicators of Academic Performance

	Overall Attendance	Mark Secured in Last Examination	% of Hours Spent for Class & Self-Study
2016	74.71	61.51	33.25
2017	70	55.39	40
Female	72.13	60	35.7
Male	72.95	56.36	37.72
GEN	76.79	59.47	36.95
OBC	67.05	54	38.69
SC	69.79	57.26	36.63
ST	72.89	63.42	32.9
Q1	68.47	59.16	34.39
Q2	68.35	46.03	38.73
Q3	75.3	64.26	36.18
Q4	76.2	62.94	36.87
Q5	73.7	61.9	36.24

Source - Primary Data

Link between Some Selected Social Aspects with AP

Social behavior can be defined as the behavior that influences, or is influenced by other members of the same species. Examples of social influences include influences of being a member of specific demographic communities, place of residence etc. To study the current social impact on academic performance, some selected social aspects which are treated as proxies for social influence like place of

current residence, peers from same districts, students from same income group (income range was classified in two groups as be below and above mean income) and number of hours spent for socialisation (friendly association). For academic performance we take only those indicators which are reliable for current social aspects.

The above table shows that day scholars generally have more class attendance and more % of hours spent on class than those staying in hostels whereas the hostellers spend more time in self-study as well as in socialisation. Income group wise, class attendance and % of hours spent in class is more for richer groups of students whereas richer group spend less time in self-study and even less time in socialisation efforts.

Table-3: Correlation Matrix of BMI, Overall attendance, Last Examination Mark Scored and % of Hours Spent for Class and Self-study

		BMI	Overall Attendance	Last Examination Marks Scored	% Hrs Spent for Class and Self-Study
BMI	Pearson Correlation	1	-.108	-.009	-.128
	Sig. (2-tailed)		.249	.923	.169
	N		117	112	117
Overall Attendance	Pearson Correlation		1	.142	-.017
	Sig. (2-tailed)			.134	.858
	N			112	117
Last Examination Marks Scored	Pearson Correlation			1	.118
	Sig. (2-tailed)				.217
	N				112
% Hrs Spent for Class and Self-Study	Pearson Correlation				1
	Sig. (2-tailed)				
	N				

Source - Primary Data

Table-4: Independent Sample T-Test for Mean Difference of Academic Performance with BMI (Binary: Normal='0')

Independent Sample T-Test (BMI Dummy Nor '0')				
		t	df	Sig (2-tailed)
Mark Scored in Last Examination	Equal variances assumed Equal variances not assumed	-0.224 -0.249	110 107.815	0.808 0.804
Overall Attendance	Equal variances assumed Equal variances not assumed	0.589 0.574	113 92.498	0.557 0.567
% of Hrs Spent for Class	Equal variances assumed Equal variances not assumed	-1.162 -1.134	115 94.989	0.248 0.260
% of Hrs Spent for Self-Study	Equal variances assumed Equal variances not assumed	3.122 3.182	115 111.893	0.002 0.002

Source - Primary Data

Table-5: Overall Attendance, % of Hours Spent on Class & on Self-Study and % of Hours Spent on Socialisation as per Place of Current Residence and Mean Income

	Overall Attendance	% of Hours Spent on Class	% of Hours Spent on Self-Study	% of Hours Spent towards Socialisation
Hosteller	70.1	16.3	20.4	4.2
Day Scholars	75.6	18.7	15.9	2.9
Income Group below the Mean Income of 35757	70.43	16.67	19.38	4.22
Income Group above the Mean Income of 35757	74.6	17.45	18.88	2.86

Source - Primary Data

Table-6: Independent Sample T-Test for Mean Difference of Academic Performance with Place of Current Residence (Binary: Hosteller='0')

Independent Sample T-Test (Place of Current Residence Dummy Hosteller = 0)				
		t	df	Sig (2-tailed)
Overall Attendance	Equal variances assumed Equal variances not assumed	0.595 0.598	116 50.541	0.557 0.567
% of Hrs Spent for Class	Equal variances assumed Equal variances not assumed	-0.086 -0.075	116 40.654	0.932 0.941
% of Hrs Spent for Self-Study	Equal variances assumed Equal variances not assumed	-0.583 -0.630	116 58.349	0.561 0.531

Source - Primary Data

Table-7: Independent Sample T-Test for Mean Difference of Academic Performance with Mean Value of Monthly Family Income (Binary: Income Group below the Mean Income of 35757 =0)

Independent Sample T-Test (Income Group below the Mean Income of 35757 =0)				
		t	df	Sig (2-tailed)
Overall Attendance	Equal variances assumed Equal variances not assumed	-0.789 -0.789	98 72.541	0.432 0.432
% of Hrs Spent for Class	Equal variances assumed Equal variances not assumed	0.400 0.407	98 79.654	0.690 0.685
% of Hrs Spent for Self-Study	Equal variances assumed Equal variances not assumed	0.297 0.303	98 80.57	0.767 0.763

Source - Primary Data

Here, we did not take marks scored in last examination as a variable here as place of current residence might not have an influence on the marks scored in last

examination of all students. The independent sample T-test for mean differences in academic performance across hosteller and day scholar, shows an insignificant difference with the indicators of AP (Overall attendance, % hours of class and self-study) (p-value > 0.05). This may be due to sampling fluctuation.

The independent sample 't' test for mean differences in academic performance across income group below the mean income of 35757 and income group above the mean income of 35757 , shows also an insignificant difference with the indicators of AP (overall attendance, % hours of class and self-study) (p-value > 0.05).

Table-8: Batch, Sex and Social Group Wise Frequency of Outside Food Taken in a Usual Week and Proportion of Junk Food in Most Preferred Foods

	Average Frequency of Outside Food Consumed	Proportion of Junk Food in Most Preferred Foods
2016	2.94	48.5
2017	2.15	49.4
Male	4.3	32.7
Female	1.42	59.3
GEN	3.29	43.6
OBC	2.08	39.3
SC	3.3	51.7
ST	1	66

Source - Primary Data

Link between Selected Behavioural Aspects with AP

Consumption Habits and AP

Consumption habit refers to the frequency and composition of major meals like breakfast, lunch, dinner, et cetera. It takes into account the regularity of meal timings, consumption of outside food, et cetera. It lies within the bracket of learned behaviour response that has become associated with a frequently repeated situation. Frequency of food taken outside in a usual week, % of junk food taken in total food etc. is the indicators of consumption habits of the present study. Percentages of marks obtained in last qualifying examination, % Attendance in the class et cetera are used as indicators of academic performance.

The study on frequency of outside food taken by the respondents in a usual week reveals that there is not much difference among the two admission batch students i.e both the batch students usually taken 2 to 3 times outside food in a usual week.

male students is higher female students. This is probably because messing system is working better in ladies hostel than boy's hostel and another reason may be girl's students are not getting any facility for taking an outside food in night because of hostel rules i.e. compulsory meals.From the above study on proportion of junk food in most preferred foods helps to find out the proportion of junk food in major meals among the respondents. So, in batch wise there is not much difference among the students of 2016 and 2017 admission batch students. But between male and female students we find out that most female students are prefer junk food in their major meals. This is probably because major meals provided by the hostels are not so good. Similarly, among the social categories respondents, more ST students are preferring junk food in their most preferred food items followed by SC, GEN and OBC students. This may be probably because the type of food is available in this region is not match with their traditional food items.

Table-9: Correlation Matrix of Consumption Habits and Academic Performance

		Overall Attendance	Marks Scored in Last Exam	Outside Food Taken as % of Total Food	Proportion of Junk Food in Preferred Food Items
Overall Attendance	Pearson Correlation	1	0.142	-0.007	-0.06
	Sig. (2-tailed)		0.134	0.944	0.521
	N		112	116	116
Academic Performance (Marks Scored) in Last Exam	Pearson Correlation		1	-0.052	-0.078
	Sig. (2-tailed)			0.584	0.413
	N			113	113
Outside Food Taken as % of Total Food	Pearson Correlation			1	-0.113
	Sig. (2-tailed)				0.221
	N				119
Proportion of Junk Food in Preferred Food Items	Pearson Correlation				1
	Sig. (2-tailed)				
	N				

Source - Primary Data

Table-10: Batch, Sex and Income Group Wise % of Hours Spent on Classes, Self-Study, Physical Activity, Time Spent on Socialization and Time Spent towards Sleeping

	% of Hrs Spent on Classes and Self-Study	% of Hrs Spent on Sleep	% of Hrs Spent on Exercise	% of Hrs Spent on Socialisation
2016	33.1 (7.9)	34.3 (8.2)	3.2 (0.6)	2.7 (0.7)
2017	39.3 (9.4)	35 (8.4)	5 (1.2)	3.6 (0.9)
Female	35.3 (8.5)	35.2 (8.4)	1.9 (0.5)	3.9 (0.9)
Male	37.8 (9.1)	33.8 (8.1)	5.2 (1.2)	3.4 (0.8)
Q1	34.4 (8.25)	35.6 (8.55)	3.3 (0.8)	3.3 (0.8)
Q2	38.8 (9.30)	33.1 (7.95)	2.5 (0.6)	4.6 (1.1)

Q3	36.2 (8.68)	34 (8.16)	4.4 (1.05)	2.2 (0.53)
Q4	36.9 (8.85)	33.3 (8)	4.4 (1.05)	1.7 (0.4)
Q5	36.3 (8.70)	35.8 (8.6)	2.7 (0.65)	3.3 (0.8)

Source - Primary Data

Note - The numerical value in bracket shows the number of hours spent on respective of activities

Similarly as per sex wise frequency of outside food taken in a usual week among The above correlation matrix shows the correlation of each indicator with other three indicators. The outside food taken as % of total food has a negative correlation with the proportion of junk food in preferred food items, academic performance in last exam and overall attendance but that negative correlation with overall attendance insignificant than other two indicators .other three indicators have a positive correlation among themselves except the outside food taken as % of total food. There is no significant relationship between mark scored in last exam as the dependent variable and two indicators of consumption habits that is junk food as % of the preferred food items, outside food taken as % of total food in a usual week as the independent variables whereas there exists significant relationship between cumulative attendance as the dependent variable and two same indicators of consumption habits as the independent variables.

Life Style Habits (Time Use) and AP

Life style habits are defined by the daily activity of a person (students). E.g. Classes, Self Study, physical activity, time spends on socialization (Friendly Association), time spent towards sleeping etc. or in other words how an individual broadly spends his/her time in a day. In this segment we study the link between life style habits with academic performance.

Table-11: Correlation (Pearson) Matrix of Time Use and Academic Performance

		Overall Attendance	% Hrs Sleep	% Hrs Socialisation	% Hrs Self-Study
Overall Attendance	Correlation	1	-0.016	-0.031	0.107
	Sig. (2-tailed)		0.868	0.744	0.254
	N		116	116	116
% Hrs Sleep	Correlation		1	-0.032	-0.149
	Sig. (2-tailed)			0.731	0.107
	N			118	118
% Hrs Socialisation	Correlation			1	0.087
	Sig. (2-tailed)				0.347
	N				118
% Hrs Self-Study	Correlation				1
	Sig. (2-tailed)				
	N				

Source - Primary Data

Here, on an average, the 2017 admission batch spends more time on all activities (class and self-study, sleep, socialization, exercise) than the 2016 batch. This could be because they are new to the course and so spend more time on studies; they have more leisure time too since they don't have dissertation and associated work so they perhaps spend more time on sleep too; and they are new to the timetable and the locality and so spend more time on socialization and exercise as well. On an average, female students spend fewer hours on study and more on sleep, than male students. This could be because most female students are hostel boarders and the early hostel entry hours prevent their access to the library and so they sleep early. Female students spend more time on socialization than male students on an average. This could be because of restrictions on entry and exit in girls' hostels. So girls could be spending more time on social media or in friendly association. Male students spend more time on exercise than female students on an average. This could be because boys' hostels don't have curfew hours thus giving them chance to indulge in walking and jogging as and when they want. Though girls' hostels have gyms, but the equipment are not adequate as per the number of boarders. Among all income brackets, Q2 (3560-7790) on an average spends more time on studies than other family income groups. This could be because it comes in the upper rung of the economically weaker group, who mostly aspire for govt. jobs as they are believed to be secure.Q5 (38700-95083), on an average spends more time on sleep than other groups. This could be because they are from well to do families and so can afford the luxury of more sleep.Q3 (7790-18650) and Q4 (18650-38700), on an average spends more time on exercise than other groups. This could be because they belong to the middle class section and are eager to adopt modern lifestyles.Q2 (3560-7790), on an average spends more time on socialization than other groups. This could be because their work hours are relatively less given their not-so-high profile jobs and their incomes don't give much opportunity for other modes of relaxation other than socialization.

The correlation matrix shows weak and negative association of overall attendance with the two indicators of time use: % of hours spent of sleeping and socialisation. That implies, as the time spent on sleeping and socialisation increases the overall attendance decreases.

Results

First Objective suggests that there is an inverse and weak association between BMI and three indicators of academic performance like % of overall attendance, % of overall marks scored in last examination and % of hours spent for class and self-study. That implies, as BMI increases academic performance deteriorates, but then the relationship is not statistically significant (the p-value in case of all the three indicators of academic performance is > 0.05). The independent sample 't' test for mean differences in academic performance across normal and non-normal BMI groups, shows a significant difference only in case of '% hours of self-study' (p-value < 0.05). So we reject the null hypothesis for % hours of self-study. And infer that there exists a significant difference across normal and non-normal BMI groups in case of % hours of self-study.

Second Objective proposes that there is an insignificant mean difference in academic performance (overall attendance, % hours of class and self-study) across hosteller and day scholar. There is also an insignificant mean difference in academic performance (overall attendance, % hours of class and self-study) across

income group below the mean income of 35757 and income group above the mean income of 35757. This may be due to sampling fluctuation.

Third Objective recommend that, food taken as % of total food has a negative correlation with the proportion of junk food in preferred food items, academic performance in last exam and overall attendance but that negative correlation with overall attendance is significant than other two indicators. There is no significant relationship between mark scored in last exam as the dependent variable and two indicators of consumption habits that is junk food as % of the preferred food items, outside food taken as % of total food in a usual week as the independent variables whereas there exists significant relationship between cumulative attendance as the dependent variable and two same indicators of consumption habits as the independent variables.There is a weak and negative association of overall attendance with the two indicators of time use: % of hours spent of sleeping and socialisation. That implies, as the time spent on sleeping and socialisation increases the overall attendance decreases. There is an insignificant relationship between overall attendances with the indicators of life style habits.

VI. CONCLUSION

The existing literature on the association between BMI and academic performance conclude that adolescents with risk of obesity had lower academic performance than others. Adolescents did better in schools where average BMI was higher (Belinda L. Needham, 2004). Similarly, (Khaled A. Alswat, 2017) conclude that there is no correlation between BMI and school performance except for the subject Physics in which there exist a negative relationship between BMI and academic score. In this study, we concluded that there is a weak inverse relationship between BMI and AP but the relationship is insignificant. But the mean differences is significant in academic performance (% of hours spent for self-study) across normal and non-normal BMI groups through Independent Sample‘t’ Test. The literature on the association between different social aspects like peers effect on academic performance conclude that students with able roommates perform better, and the magnitude of this roommate effect increases when the roommate's skills match the student's academic goal and students benefit equally from same and different caste roommates, suggesting that social similarity does not strengthen peer (Bagde, 2013). However, in this study there is an insignificant mean difference in academic performance across hosteller and day scholar as well as across income group below and above the mean income. Similarly there are also some existing literature on some behavioral aspects like consumption habits and time use with academic performance. They conclude that high academic achievement positively associated with a regular consumption of breakfast, lunch and dinner; high intake of fruits, berries, vegetables; high leisure time and physical activity and inversely related with low intake of lemonade, sugar –sweetened soft drinks, salty snacks, smoking and snuffing (Torstveit, 2014). (Siew Foen Ng, 2016) Conclude that time use for school related activities shows statistically significant positive relationship with CGPA and time use for non-school related activities shows statistically insignificant negative relationship with CGPA. But our study conclude that there exists significant relationship between cumulative attendance as the dependent variable and two same indicators of consumption habits as the independent variables and there is an insignificant relationship between overall attendances with the indicators of life style habits. Overall, this study concludes that there is a link between biosocial conditions with academic performance.

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