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ASSESSMENT OF THE GENERAL WELL-BEING OF THE SENIOR BIOLOGY STUDENTS OF ILIGAN CITY, PHILIPPINES

LUCILYN L. MARATAS*[1] AND MIRACLE CLINTINE D. ANDOS[1]

[1]Department of Biological Sciences, College of Science and Mathematics, Mindanao State University-Iligan Institute of Technology, Iligan City, Philippines

***Corresponding Author E-mail: lucilyn.lahoylahoy@g.msuiit.edu.ph**

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ABSTRACT

Non-communicable diseases (NCDs) have been the leading cause of death worldwide. Its consistency has greatly affected the labour force of a lower middle income country like the Philippines causing the productivity rate to decrease. Risk factors found on adolescents like college students increases the possibility of having to develop NCD as they reached adulthood. Assessing the general well-being as early as possible could help determine what possible preventions are needed before risk factors develop to NCDs. The study was conducted to determine the general well-being of the senior BS Biology students of MSU-IIT in association with non-communicable diseases. General check-up and self-reported health assessment was utilized in this study in assessing general condition. A total of 50 students took part on the study. The general check-up had revealed conditions in the major systems of the body observed among the study population that are associated with non-communicable diseases such as in respiratory system and cardiovascular system. These include being prehypertensive (52%), shortness of breath (8%), chronic cough (6%), wheezing (12%), chest pain/ discomfort (14%), difficulty of breathing (8%), palpitations (8%) and irregular heart beat (2%).

Keywords: College students, non-communicable diseases, health risk factors, cardiovascular, and respiratory

INTRODUCTION

For the past years, the non-communicable diseases (NCDs) have been the leading cause of death worldwide. It is responsible for the 38 million deaths annually covering 68% of all deaths in

2014 (World Health Statistics 2015, n.d.). Once believed to be a disease of the affluent ones, there has been an epidemiological shift since then disregarding sociodemographic status ("Overview of Major Noncommunicable Disease," n.d.). NCDs are actually caused by any of these three factors namely: biological, environmental and social or behavioural risk factor. But most NCDs are attributed to one or more factor with synergistic effects (Ulep et al., 2012).

Most of the NCD-related deaths worldwide are attributed to low- and middle-income countries (Maimela et al., 2016). Being a lower middle income country, NCDs have been the major cause of death in the Philippines since 2010 ("Overview of Major Noncommunicable Disease," n.d.).The occurrences of NCD below age 70 have been alarming to the country affecting the labour force that had result to a decrease in productivity rate (Maryse et al., 2011). Factors like urbanization, change of lifestyle, trade, and urban migration have been identified to drive non-communicable diseases to surpass the communicable diseases in terms of mortality (Ulep et al., 2013).

A study have shown that risk factors occurring at adolescents are more likely to develop to a non-communicable disease when they reached adulthood (Desouky et al., 2014). Assessing the general well-being of college students could help determine what possible preventions that would be necessary in controlling such factors before it develops into a non-communicable disease (de Macedo et al., 2014) and there are only few studies in the Philippines that focus on the general well-being amongst college students. Thus, the general aim of this study is to determine the general well-being of the senior BS Biology students of MSU-IIT in association with non-communicable diseases.

MATERIALS AND METHODS

Study Design and Sampling

The study was a cross-sectional study conducted at the Mindanao State University- Iligan Institute of Technology in Iligan City, Philippines. The study population were composed of senior undergraduate students and special students taking up Bachelor of Science in Biology. The subjects were oriented beforehand about the cause and confidentiality of the study. Verbal consents were obtained after from all of the subjects before participating.

General Medical Check-up

The medical check-up was based on Bates' Guide to Physical Examination and History-Taking by Bates, Bickley and Szilagyi (2013). It was a general survey of the health condition of the subjects

executed by a health professional. The check-up includes physical examinations and review of systems.

Physical Measurements

The following physical measurements were recorded which are regarded to be vital as determinants for health risk factor: height, weight, BMI, blood pressure, respiratory rate, heart rate and oxygen saturation level.

Statistical Analysis

Data was entered using Microsoft Excel and analyses were done in IBM SPSS version 22. Data was listed as mean and standard deviation for quantitative data and proportions for qualitative data. Chi-square test was utilized for the relationship between factors. Spearman correlation was used to test significant association between variables. A p-value that was lesser than 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Demographic Information

Fifty students were able to complete the process of data collection where 14 (28%) were males and 36 (72%) were females. Their ages ranged from 18 to 24 years old and the population were composed of different ethnicities with Cebuano as the most prevalent (68%).

In order to determine the Body Mass Index classification, the study population was divided into two groups. One group was composed of subjects with ages 21-24 while the other group was composed of subjects with ages 18-21. Weight distribution of the group with ages 21-24 were: three (6%) were underweight, one (2%) was overweight and the nine have normal weights (18%). This classification is based on BMI for adults for subjects with ages 21-24. For the group with subjects ages 18-20, their BMI were classified according to BMI-for-age percentile. With BMIs below 5^{th} percentile, five (10%) were underweight while twenty-six (52%) had normal weights with their BMIs between the range of 5^{th} to 95^{th} percentile. A total of eight (16%) were underweight, thirty-five (70%) with normal weights, and one (2%) overweight. The classification was based on Center for Disease Control and Prevention. The result is in contrast with studies in India and Saudi Arabia. A study by Al-Ammar et al. (2017) reported that the larger proportion, second to normal weights (50.3%), is overweight (26%). This was followed by underweight (9.9%) and lastly overweight (8.9%) which had a small difference with the former. In India, a high proportion of overweight and obese (31.5%) was observed and a small proportion of underweight of 8.22%.

Information about the current residence of the subjects were also noted as the physical

and environmental components of one's living quarters was found to affect the well-being of students as a whole (Brilliantes et al., 2012). Twenty-three (46%) reported to be living with their parents during the time of the survey, while twenty (20%) were temporarily residing in boarding houses. Two (4%) are living with either guardians or relatives. Living away from home influences the lifestyle of college students (Ansari, 2012) as it allows them to grow independently into a lifestyle they wanted, it poses a great threat to their mental and physical health since they are still susceptible to do undesirable types of way of life.

Assessment of General Well-being

The assessment was done by a medical professional that included physical examination, measuring of vital signs and review of systems.

A. Vital Signs

Only one subject was diagnosed to have elevated blood pressure at the time and more than half of the subjects (26, 52%) were classified as prehypertensive as reflected in Table 2. Being a prehypertensive means having the risk of hypertension. A study in Uganda (2016) indicates that the high prevalence of prehypertension could be due to increasing urbanization and change in lifestyle. Though not significant, the prevalence rate for prehypertension is high in this study. It is higher compared to the study in India in 2015 among medical students (37.45%) and lower (64%) in a study in India in 2013 (Chitrapu et al., 2015).

Respiratory rates of all 43 subjects (the proportion of study population who had the available data) were classified as normal. Forty-eight subjects (96%) having available data on O2 saturation, were all classified to have normal readings. This indicates that there is a normal level of oxygen in the blood (Holl, 2017).

Out of forty-six (92%) available data for heart rate, five (10%) subjects were reported to have beyond normal heart rate, which is 60-100 beats per minute for adults (Laskowski, 2015).According to an article ("Tachycardia", 2017), one of the causes an increase in heart rate is blood pressure. Out of the five subjects, four (80%) were reported to be prehypertensive. Vital signs were taken at the same day of the same time.

A. Review of Systems

Part of the assessment of the general well-being of the respondents was to check the common symptoms related to each major system of the body. Table 3 shows that only four individuals (8%) reported to have shortness of breath. There were three subjects (6%) who claimed to have chronic cough and six subjects (12%)

reported to have experience wheezing. Although these individuals comprise only a small proportion of the study population, these symptoms are significant as these are common symptoms of some non-communicable diseases.

Wheezing is one of the symptoms of asthma (Asthma, n.d.) and shortness of breath and chronic cough are both prevalent in young adult smokers (An et al., 2009). The results obtained in this study showed a positive correlation between individuals exhibiting shortness of breath and their association with smokers in their residences (Table 4). When exposed to smoke, airways irritate which results to shortness of breath ("Asthma and Second Hand Smoke", n.d.).

Symptoms associated with cardiovascular diseases have also been observed among the subjects as reflected in Table 6. Out of 50 subjects, seven (14%) experienced chest pain/ discomfort. This symptom is commonly called as angina. Difficulty of breathing and chronic fatigue is associated with heart failure.

A. Pre- And Post- Self-Rated Assessment

One of the recognized academic stresses encountered by college students is examinations (Agolla & Ongori, 2009). As reflected in Table 5, twenty-eight (56%) of the subjects reported to have felt good prior to examination week. But after the examination week, fourteen (28%) reported that they felt quite good while twelve (28%) reported that they felt not that good. The number of subjects who felt bad before and after examination week was consistent (2 subjects- 4%). A statistically significant association was reported between genders and before and after assessment. Although a large number of subjects said they felt good before examination week, twenty (40%) of the subjects were experiencing more than 3 conditions based on their self-assessment. And after examination week, only seven (14%) experienced more than 3 conditions while fifteen (30%) reported to have 2-3 conditions. This is in contrast to the decline of the number of subjects who reported that they felt good after examination week.

The largest number of conditions reported before and after examination was Acne with fifteen (30%) and eighteen (36%) subjects respectively. A drastic decline of number was reported in conditions like chronic cough from 10 (20%) to 1 (2%). Flu had seen to decline as well from 13 (26%) to 2 (4%). Few conditions had reported to have declined as well before and after examination: headache (from 5 to 3 subjects), heartburn (from 7 to 3 subjects), scratchy throat (from 9 to 6 subjects) and sinus congestion (from 9 to 3

subjects). Chronic cough has been found to have association with non-communicable disease concerning the respiratory system like asthma (An et al., 2009).

The observed decline of number of subjects experiencing such conditions was due to the fact that they were able to strengthen their immune system once more by sleeping enough hours. Sleep has found to have a specific role in the formation of immunological memory. Deprivation of sleep is considered an unspecific state of chronic stress and it affects immune functions and the general health as a whole (Besedovsky et al., 2012). Also, after examination means there was a reduction of encounter of stress.

Table 1: Demographic information of the study population

VARIABLES	n (%)	VARIABLES	MEAN ± SD	RANGE
Sex		**Age**		
Male	**14 (28)**	**Male**	**20.42±1.28**	**19-24**
Female	**36 (72)**	**Female**	**20.28±0.94**	**18-23**
Total	**50**		**20.32±1.03**	**18-24**
Race or Ethnicity		**BMI**	**n (%)**	
Cebuano	**34 (68)**	**Underweight (<18.5)**	**3,+5*=8 (16*)**	**16.64 ±1.01**
Ilokano	**1 (2)**	**Normal Weight (18.5-24.99)**	**9+28*=37 (70%)**	**21.43 ±1.85**
Ilonggo	**1 (2)**	**Overweight (25-29.99)**	**1 (2%)**	**26.31 ±0.46**
Kamayo	**1 (2)**			
Manobo-Kamayo	**1 (2)**	**Current Residence**		
Maranao	**8 (16)**	**Apartment**	**5 (10)**	
Subanon	**1 (2)**	**Boarding House**	**20 (40)**	
Suirigaonon	**1 (2)**	**Guardian/ Relative**	**2 (4)**	
Tausug	**1 (2)**	**Parents**	**23 (46)**	
Iranun	**1 (2)**			

Legend: *-BMI category based on BMI-for-age percentiles

Table 2: Summary of the vital signs of the study population

BLOOD PRESSURE			**HEART RATE**		
	n (%)	**p-value**		**n (%)**	**p-value***
Normal	**23 (46)**	**0.672**	**Normal**	**41 (82)**	**0.000**
Prehypertension	**26 (52)**		**Abnormal**	**5 (10)**	
Stage 1 Hypertension	**1 (2)**				
Mean±SD	**109.8±13.63 (SBP)**			**84.59±16.22**	
	73±7.63 (DBP)				
RESPIRATORY RATE			**O_2 SATURATION**		
	n (%)	**p-value***		**n (%)**	**p-value***
Normal	**43 (86)**	**0.000**	**Normal**	**48 (96)**	**<0.000**
Mean±SD	**19.26±1.05**			**97.08±1.16**	

Legend: *-significant at p<0.05

Table 3: Summary of the prevalent common symptoms among the study group related to Respiratory Systems

VARIABLE		n (%)	p-value*
Shortness of Breath	No	45 (92)	0.000
	Yes	4 (8)	
Chronic Cough	No	46 (94)	0.000
	Yes	3 (6)	
Wheezing	No	43 (88)	0.000
	Yes	6 (12)	

Table 4: Correlation between smokers at home & common respiratory symptoms

			SMOKERS AT HOME	SHORTNESS OF BREATH	CHRONIC COUGH	WHEEZING
Spearman's Rho	Smokers at home	Correlation Coefficient	1.000	.327*	.039	-.083
		p-value		.022	.788	.569
		N	50	49	49	49
	Shortness of Breath	Correlation Coefficient	.327*	1.000	.235	.114
		p-value	.022		.104	.441
		N	49	49	49	48
	Chronic Cough	Correlation Coefficient	.039	.235	1.000	-.098
		p-value	.788	.104		.509
		N	49	49	49	48
	Wheezing	Correlation Coefficient	-.083	.114	-.098	1.000
		p-value	.569	.441	.509	
		N	49	48	48	49

*** Correlation is significant at p <0.05 using spearman correlations**

Table 5: Percentage of the self-rated assessment of the health conditions among the study group

CRITERIA	MALE		FEMALE		TOTAL	
	n (%)		n (%)		n (%)	
	Before	After	Before	After	Before	After
Over-all well being						
Very Good	2 (14.29)	2 (14.29)	1 (2.78)	1 (2.78)	3 (6)	3 (6)
Good	10 (71.43)	6 (42.86)	18 (50)	11 (30.56)	28 (56)	17 (34)
Quite Good	1 (7.14)	4 (28.57)	7 (19.44)	10 (27.78)	8 (16)	14 (28)
Not that good	0	0	8 (12)	12 (33.33)	9 (18)	12 (24)
Bad	1 (7.14)	0	1 (2.78)	2 (5.56)	2 (4)	2 (4)
Spearman Correlation					0.044*	0.004*
					0.824	
No. of Students experiencing illness/es						
Only 1	0	4 (28.57)	8 (22.22)	9 (25)	8 (16)	13 (26)
2-3 conditions	4 (28.57)	4 (28.57)	10 (27.78)	11 (30.56)	14 (28)	15 (30)
More than 3	8 (57.14)	1 (7.14)	12 (33.33)	6 (16.67)	20 (40)	7 (14)

Legend: *-significant at p<0.05 using Spearman Correlation

CONCLUSION

Although most of the subjects appeared to be healthy based on the result of the physical examination and low prevalence of symptoms related to body systems, the general check-up had revealed conditions in the major systems of the body observed among the study population that are associated with non-communicable diseases such as in respiratory system and cardiovascular system. These include prehypertensive (52%), shortness of breath (8%), chronic cough (6%), wheezing (12%), chest pain/ discomfort (14%), difficulty of breathing (8%), palpitations (8%) and irregular heart beat (2%).

Being the leading causes of death, the United Nation (UN) has been calling health agencies to speed up its efforts regarding non-communicable disease in order to meet the Sustainable Development Goals in reducing the premature deaths by one-third. NCDs do not just affect the elder ones but as well as of younger ages that results to chronic illnesses and premature deaths. The burden of NCDs causes a greater loss of productivity which is vital for economic development of the Philippines as a developing country. Many countries had conducted studies regarding health risk factors in college students with the same recommendation that there is a need to put up efforts in reducing the prevailing risk factors among youth. The failure of obtaining the family and medical history of the students are highly recommended as well in order to assess whether non-communicable diseases is caused by health risk factors or by genetic disposition. For further improvements of studies to be conducted similar to this, it is recommended to include the biochemical measurements for further assessment of the risk factors.

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