ภาวะสุขภาพและพฤติกรรมสุขภาพของนักศึกษาชั้นปีที่ 1 มหาวิทยาลัยรังสิต
Health Status and Health Behaviors of First-Year Students in Rangsit University

นิพนธ์ต้นฉบับ

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Original Article

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาภาวะสุขภาพและพฤติกรรมสุขภาพของนักศึกษาชั้นปีที่ 1 และค้นหากลุ่มเป้าหมายในการดูแลสร้างเสริมสุขภาพ **วิธีการศึกษา:** การศึกษาข้อมูลแบบย้อนหลังโดยศึกษาจากข้อมูลรายงานผลการตรวจสุขภาพของนักศึกษาชั้นปีที่ 1 ประจำปีการศึกษา 2559 - 2561 จาก 30 คณะ/วิทยาลัย/สถาบัน ในสังกัดมหาวิทยาลัยรังสิต กำหนดให้นักศึกษากลุ่มเสี่ยงต่อการเกิดโรคไม่ติดต่อเรื้อรังในอนาคตหมายถึงผู้ที่มีพฤติกรรมเสี่ยงต่อปัญหาสุขภาพอย่างน้อยหนึ่งอย่าง ร่วมกับมีภาวะสุขภาพที่ผิดปกติหรือมีประวัติโรคทางพันธุกรรม วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา **ผลการศึกษา:** นักศึกษาชั้นปีที่ 1 ทั้งสิ้นจำนวน 8,675 ราย พบว่าร้อยละ 35.7 มีระดับความดันโลหิตสูงกว่าปกติ ร้อยละ 16.7 มีผลการตรวจทางห้องปฏิบัติการเข้าได้กับภาวะโลหิตจาง และร้อยละ 42.2 มีครอบครัวที่มีประวัติโรคทางพันธุกรรม สำหรับพฤติกรรมสุขภาพพบว่าร้อยละ 10 สูบบุหรี่ ร้อยละ 21.5 ดื่มแอลกอฮอล์เป็นครั้งคราว และร้อยละ 85.0 ขาดการออกกำลังกายอย่างสม่ำเสมอ พบว่าในแต่ละปี มีนักศึกษาที่เป็นกลุ่มเสี่ยงต่อการเกิดโรคไม่ติดต่อเรื้อรังในอนาคตมากถึงร้อยละ 40 **สรุป:** มีนักศึกษาชั้นปีที่ 1 ถึงร้อยละ 40 ที่มีความเสี่ยงต่อการเกิดโรคไม่ติดต่อเรื้อรังในอนาคต ซึ่งควรได้รับการติดตามสุขภาพและสร้างแรงจูงใจเพื่อปรับเปลี่ยนพฤติกรรม

คำสำคัญ: การคัดกรองทางสุขภาพ ภาวะสุขภาพ พฤติกรรมสุขภาพ โรคไม่ติดต่อเรื้อรัง นักศึกษามหาวิทยาลัย

Abstract

Objective: To examine health problems and identify target groups for health promotion among first-year university students. **Methods:** The medical checkup reports of first-year students admitted to Rangsit University between 2016 and 2018 in 30 faculties/colleges/institutes were retrospectively reviewed. The students having at least one of poor health behaviors and one of poor health status or family history of hereditary diseases was classified as havinga high risk for non-communicable diseases (NCDs). Descriptive statistics were used for data analysis. **Results:** Among a total of 8,675 first-year students recruited, 35.7% of them had high blood pressure, 16.7% had anemia, and 42.2% had some hereditary diseases. Approximately 10% of them were current smokers, 21.5% consumed alcoholic beverages occasionally, and 85.0% did not exercise regularly. Furthermore, 40% of students in each year were considered to have a high risk for future NCDs. **Conclusion:** 40% of first-year students had a high risk for future NCDs. These students need regular monitoring and health motivation for health behaviors.

Keywords: health screening, health status, health behavior, NCDs, university students

Introduction

The data from public health service settings of the Ministry of Public Health of Thailand revealed that the most prevalent causes in nationwide out-patient were cardiovascular diseases followed by endocrine, nutritional and metabolic diseases.[1] Based on the data form the Bureau of Non-Communicable Diseases, the major non-communicable mortality rates were cardiovascular diseases, heart disease, stroke, hypertension and diabetes and the mortality rate continually increased in every disease from 2010 to 2014.[2] The significant risk factors of non-communicable disease (NCDs) are unhealthy eating behaviors, lack of exercise, sedentary lifestyle, smoking and drinking alcoholic beverages. As the National Statistical Office reported in 2017, 10.7 millions of Thai population (or 19.1%) aged 15 years or over smoked, and 20.7% and 9.7% of these 10.7 millions were in their 20 - 24 and 15 – 19 years of age,

respectively.[3] Furthermore, 11.5% (or 6.4 millions) of Thai people aged 15 years or over both smoked and drank alcohol which could lead to NCDs in the future.[3] These age groups are comparable to undergraduate university students. Health status and behaviors of this population group need understanding for maintenance and improvement, if any problems or defects.

In Thailand, it was discovered that the student's risk behaviors were smoking (22.6%), drinking alcohol (61.3%) and substance abuse (1.6%).[4] Moreover, the study of Pongpipat et al also indicated that 60.9% of students drank alcohol, 11.6% had alcohol related traffic accidents, and 7.8% smoked.[5] Similarly, Noimontree and Piphatvanitcha revealed that 68.7% and 20.3% of Thai college students drank and smoked, respectively.[6] On the other hand, the prevalence of

drinking (91.6%) and smoking (40.4%) were higher in Lebanese University students.[7] The study in Iraq university students revealed that 28.5%[8] were overweight or obese which was comparable to that in Thai university students (27.4%).[6] These findings of behavior problems among university students from various countries including Thailand seemed to be different regarding the country's context. These behaviors are the risk factors of NCDs affecting their future morbidities. In addition, two-thirds of premature deaths in adults are associated with behaviors in younger age. Therefore, these adolescents should understand NCD consequences of the unhealthy behaviors.[9]

Health screening is not only necessary in adult and elderly, but adolescent also. Health screening is aimed to identify risks among a defined group of people with no awareness that they are at risk or those already affected by the disease or complication.[10] Health screening should be one of the crucial activities of primary health care services since not only treatment but prevention also is a major component of holistic approach of health care.

Rangsit University (RSU), the well-known private university in Thailand, has established the Office of Health Welfare to be responsible for primary health care of all academy's students and personnel. The mission of this department is to serve health care as well as implement the disease prevention and health promotion. Health examinations are routinely provided by the Office of Health Welfare for the first-year students. The data from student health report show the rising trend of abnormal health examination especially hypertension and overweight among the first-year students. Lifestyle and social values of current students are more likely to expose to addictive substances as a result of an easy access to tobacco and alcohol. Moreover, the dependence on technology and other facilities may lead to health risk behaviors such as lack of exercise. These problems not only affect their quality of life, but also impact the academic achievement as well as the study duration. Public health campaigns probably have limited effectiveness in solving health problems among university students. Therefore, all potential health problems for this population group need to be determined and handled by specific responsible bodies such as the health service office of each university. The finding could lead to the improvement in the health examination system specifically the routine annual health checkup with continuous monitoring. If such improvement is realized by the

university policy makers, proactive health promotion policy could be strengthened.

In addition to risky health behaviors, family history of hereditary diseases and metabolic abnormalities among university students had not been well studied. There is a need for more understanding on health status and health-related family history among these university students if the university aims to maintain and improve their health. The aims of this study were to examine health status, health-related family history and health risk behaviors of first- year students. The study findings would allow us to identify the high-risk group and the target group for health promotion. They could be beneficial for health promotion policy and programs for the first-year university students, not only specific for Rangsit University, but other private universities in Thailand with comparable demographic status.

Methods

In this retrospective study, electronic medical checkup reports of all first-year students admitted to RSU during the academic years of 2016 - 2018 were retrospectively reviewed. All records of students were used. As a consequence, analysis on each individual study variables could result in different number of students.

Health status can be considered in terms of a person's body structure and function and the presence or absence of disease.[11] Health status in this study was determined by medical checkup, such as physical examination, blood test results, urinary analysis as well as chronic medical problems and family history of hereditary diseases.

Regarding laboratory investigations, clinical status was defined as follows. White blood cell level was categorized as high (> 10,000 cells/μL), normal (4,000 – 10,000 cells/μL), and low (< 4,000 cells/μL). Anemia was gradiented as low MCV (< 80 g/dl), normal MCV (80 - 96 g/dl), and high MCV (> 96 g/dl). Urinary system abnormalities including renal dysfunction, urinary tract infection, and urine glucose presence were identified by researchers based on data of urinary analysis (UA) in the chart. Renal dysfunction was defined as 1) positive protein and WBC, 2) positive protein and RBC, and 3) positive RBC and WBC. Urinary tract infection was defined as positive WBC and bacteria. Finally, urine glucose was defined as positive result of glucose.

Health behavior is the activity undertaken by individuals for the purpose of maintaining or enhancing their health, preventing health problems, or achieving a positive body image, such as avoiding smoking, exercising regularly, and eating a balanced diet.[12] In this study, smoking, alcohol beverage consumption and exercise were also collected from the medical check-up records.

In this study, we identified students with high risk for NCD as those with at least one of poor health behaviors (smoking, drinking, overweight/obesity, and lack of exercise), and at least one of poor health status (chronic medical problems, high blood pressure and family history of hereditary disease).[13]

Each risk was defined as follows. Blood pressure was categorized as normal (< 120/80 mmHg), mildly elevated (SBP 120 – 129 / DBP < 80 mmHg), and moderately elevated (SBP $\geq$ 130 / DBP $\geq$ 80 mmHg).[14] In terms of smoking, the intensity was categorized as non-smokers, $\leq$ 10 cigarettes/day, and 11 – 20 cigarettes/day. E-cigarette users were counted as an independent category. For alcoholic beverage consumption, it was classified as none, occasional (< 4 times/month), and regular ($\geq$ 1 time/week). For exercise, the regularity was categorized as none, occasional (< 3 times/week), and regular ($\geq$ 3 times/week). Body mass index was classified as underweight (<18.5 kg/m^2), normal (18.5 – 22.9 kg/m^2), overweight (23.0 – 24.9 kg/ m^2), obesity level 1 (25.0 – 29.9 kg/m^2), and obesity level 2 ($\geq$ 30.0 kg/m^2).

This study was approved by the Ethic Committee of Rangsit University (approval number: RSUERB2 0 1 8 - 0 2 4). Data from student records were abstracted after the study protocol was approved.

Data analysis

Descriptive statistics were used to summarize the data with frequency and percentage.

Results

A total of 8,675 medical checkup reports of first-year undergraduate students admitted in 2016 - 2018 from 30 faculties, colleges and institutes were eligible for analysis. Specifically, the most recruited students (3,547 or 40.9%) were from 2016, followed by 2,628 (30.3%) from and 2,500 (28.8%) from 2018. The majority of the students was male (56.2%) and registered with the college of Tourism and Hospitality (9.8%).

Table 1 Number of first-year students receiving health examination (N = 8,675).

Variable	N	%
Gender		
Male	4879	56.2
Female	3796	43.8
Faculty / College / Institute		
Tourism and Hospitality	849	9.8
Communication Arts	805	9.3
Liberal Arts	708	8.2
Business Administration	647	7.5
Engineering	584	6.7
Pharmacy	579	6.7
Nursing	486	5.6
Design	430	5.0
Accounting	338	3.9
Digital Arts	333	3.8
Medical Technology	311	3.6
Political Science	259	3.0
Aviation	258	3.0
Architecture	241	2.8
Digital Innovation and Information	216	2.5
Optometry	209	2.4
Radiological Technology	185	2.1
International College	170	2.0
Physical Therapy and Sport Medicine	159	1.8
Science	135	1.6
Laws	126	1.5
Biomedical Engineering	109	1.3
Oriental Medicine	108	1.2
Music	104	1.2
Food Technology	88	1.0
Social Innovation	86	1.0
Agricultural Innovation, Food and Biotechnology	53	0.6
Economics	52	0.6
Undergraduate Programs	18	0.2
Public Administration	17	0.2
Biotechnology	4	0.1

According to health status and laboratory data, majority of the students were normal with 35.7% of them having high blood pressure and 7.9% and 27.8% had mild and moderate elevated blood pressure, respectively (Table 2). Most students had type O blood (38.4%) and were Rh positive (99.8%). Anemia was observed in 16.7% of the students with low mean corpuscular volume (MCV) as the most related cause. Most of them had no chronic medical problem (86.7%); however, 42.2% reported hereditary diseases in their families such as hypertension, cardiovascular diseases, and diabetes mellitus (Table 2).

Approximately 10% of the students were current smokers with less than or equal to 10 cigarettes/day (Table 3). Similarly, most of them (78.5%) were non-drinkers even though 20.7% of them consumed alcoholic beverage occasionally. The majority of students (85.0%) were lack of regular exercise. Most of them were not overweight or obese. The most prevalent poor behaviors namely current smokers,

current drinkers, overweight/obese and lack of exercise among first-year students from academic year of 2016, 2017 and 2018 remained (Figure 1). However, the number of current smokers and drinkers tended to decrease over time, whereas the proportion of students who lacked in exercise was higher than 80% and the percentage of overweight/obese students tended to increase.

It was found that approximately 40% of the students each year from 2016 to 2018 were classified as high risk for NCD. The top 3 target groups for establishing health intervention were in College of Engineering, College of Liberal Arts, and College of Tourism and Hospitality (Figure 2).

Table 2 Health status and laboratory data of first-year students (N = 8,675).

Variable	N	%
Blood pressure categories[14] (n = 8,666)		
Normal (< 120/80 mmHg)	5,566	64.2
Mildly elevated (SBP 120 – 129 / DBP < 80 mmHg)	685	7.9
Moderately elevated (SBP ≥ 130 / DBP ≥ 80 mmHg)	2,415	27.8
Blood group: ABO system (n = 8,650)		
A	1,807	20.9
B	2,917	33.7
AB	602	6.9
O	3,324	38.4
Blood group; Rh system (n = 8,650)		
Rh positive	8,631	99.8
Rh negative	19	0.2
Abnormal platelet count (n = 8,652)	103	1.2
White blood cell count (n = 8,652)		
Low (< 4,000 cells/μL)	35	0.4
Normal (4,000 – 10,000 cells/μL)	7,772	89.6
High (> 10,000 cells/μL)	860	9.9
Anemia*[†](n = 8,652)	1,446	16.71
Low MCV (< 80 g/dl)	1,017	11.8
Normal MCV (80 - 96 g/dl)	427	4.9
High MCV (> 96 g/dl)	2	0.02
Renal dysfunction* (n = 8,348)		
Abnormal UA (protein + WBC/RBC or RBC+WBC)	76	0.9
Urinary tract infection* (n = 8,348)		
Abnormal UA (WBC+ bacteria)	132	1.6
Urine glucose (n = 8,348)	47	0.6
Chronic medical problems (n = 8,658)		
None	7,504	86.7
Yes	1,141	13.2
Symptomatic without diagnosis	13	0.1
Family history of hereditary diseases (n = 8,660)	3,657	42.2
History of drug allergy (n = 8,660)	374	4.3

* Identified by laboratory data.

† Anemia based on hemoglobin: <13 g/dl for male, < 12 g/dl for female.[15]

Note: MCV: mean corpuscular volume; WBC: white blood cell; RBC: red blood cell; UA: urinary analysis.

Table 3 Health behaviors of first-year students (N = 8,675).

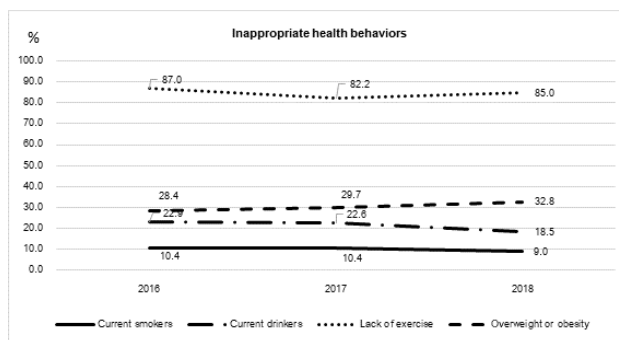| Health behaviors	N	%
Smoking (n = 8,644)		
Non-smokers	7,777	90.0
≤ 10 cigarettes/day	820	9.5
11 – 20 cigarettes/day	41	0.5
E-cigarette users	6	0.1
Alcoholic beverage consumption (n=8,635)		
None	6,778	78.5
Occasional (<4 times/month)	1,785	20.7
Regular (≥ 1 time/week)	72	0.8
Exercise (n = 8,635)		
None	2,338	27.1
Occasional (< 3 times/week)	5,001	57.9
Regular (≥ 3 times/week)	1,296	15.0
Body mass index class (n = 8,675)		
Underweight (< 18.5 kg/ m²)	1,951	22.5
Normal (18.5 – 22.9 kg/m²)	4,116	47.4
Overweight (23.0 – 24.9 kg/ m²)	1,002	11.6
Obesity level 1 (25.0 – 29.9 kg/ m²)	1,025	11.8
Obesity level 2 (≥ 30.0 kg/m²)	581	6.7

Figure 1 Proportions of students with inappropriate health behaviors by years.
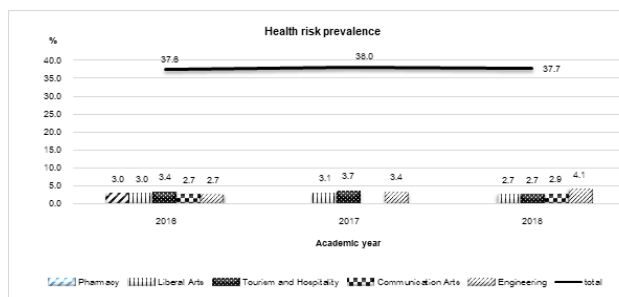

Figure 2 The prevalence of students with high risk for NCD by years.

Discussions and Conclusion

In this retrospective study among first year university students, most of the students were male which was proportional with the general population aged 6 - 21 years old.[16]

One-third of students had high blood pressure 35.7% (7.9% with mildly elevated BP or SBP 120 – 129 / DBP < 80 mmHg and 27.8% with moderately elevated BP or SBP ≥ 130 / DBP ≥ 80 mmHg). This proportion was relatively consistent with the proportions of students who were overweight (30.1%) and lacked in exercise (27.1%). Moreover, these problems were found to be in the same persons in a relatively large proportion of the sample (data not shown). It has been reported that overweight status might increase the risk of emotional distress and cause a low social quotient, such as low self-esteem, socially isolation, and depression.[17] As a result, active health promotion program should focus on training and/or guidance on diet and exercise by incorporating into the actual academic learning, and delivering as special activities or projects.

Laboratory blood tests that found a small proportion of the students was Rh negative (0.2%). Despite a small number of students with Rh negative blood, it should prompt counseling and education for these students and their families for an awareness of conditions requiring blood transfusion.

Anemia was found in 16.7% of the students. It has been found that iron deficiency is the major cause of anemia in Thai female university students.[18] Thai female adolescents were reported to take the daily iron less than the recommended 15 mg per day.[19] Mousa et al. discovered that this condition could decrease scholastic achievement and impair cognitive function in female adolescent.[20] Students having renal dysfunction, urinary tract infection, urine glucose, as well as chronic medical problems should be further investigated and regularly monitored.

In terms of health behavior, approximately 10% of students smoked regularly. The proportion of regular smokers was lower than other studies[4-8], probably because all participants were the first-year student. Smoking might cause several problems due to nicotine, such as inappropriate behaviors and cognitive impairment with respect to sustained attention, working memory, executive planning.[21] In addition, smoking can cause DNA methylation at 410,746 CpGs and identified 58 CpGs, which can affect educational attainment.[22] Moreover, Stiby et al. found that daily smoking at age 15 was associated with subsequent poor educational outcomes, especially in English and Mathematics.[23]

About one-fifth of students drank alcohol occasionally, and 0.8% of them drank once a week. Even though our finding was smaller than the results from other studies,[4-7] it was still worth mentioning. For occasional drinkers, memory impairment can occur after a few drinks, and worse with more consumption. Alcohol consumption on an empty stomach could result in a blackout.[24-26] For regular drinking, the damage on hippocampus could result in class absence, memory deficit, and poor grades.[24-26] Regular alcohol consumption could also cause many social problems, such as automobile accidents, unplanned sexual activity, quarrelling and fighting as well as drug/substance abuse. The prefrontal cortex could also be damaged by alcohol abuse, leading to poor judgement. Finally, alcohol can cause mental health problems and suicidal behaviors.[24-26] Persons with alcohol abuse could benefit from brief intervention, consisting of 5-minute sessions of simple advice, brief counseling, or motivation interviews, to create an individual quit plan.[27]

About 40.0% of students in each academic year were classified as individuals with high risk. These students could benefit from health intervention with holistic approach. For students, facilities such as fitness centers offering adequate sports equipments with no charge should be provided.[28,29] Aannual health checkups should be supported. In addition, study sessions could be minimized to increase leisure time for activity hours. Finally, direct health information via personal contact, and individual health counselors for those interested in intensive programs should be established.

This study had certain limitations. Since some data such as health behaviors was gathered by nurses interviewing the students at the medical check-up. Such method can cause the errors including deliberate lying, unintended mistakes by misunderstanding the questions and recall error.[30] Furthermore, since data quality depended on the ability of various interviewers at the usual check-up, lack of interviewing skills could decrease data quality. Therefore, it was recommended for further studies that the training and guidelines for interview regarding health behavior should be provided.

In concusion, moree than one-third of the first-year students had poor health status. Most of them had high blood pressure. As high as 42.2% of them had some hereditary diseases. Poor health behavior was found in the majority of these students. Most of them did not exercise regularly. Moreover, approximately 40% of students were considered high risk for NCD. This finding would be of benefit for establishing policy and projects that are suitable for this

organization, such as regular monitoring and health behavior motivation.

Acknowledgments

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