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**Full Length Research Article**

**LIFESTYLE CHANGES THROUGH CHINESE MEDICINE EDUCATION ON HEALTH MAINTENANCE  
AND FOOD THERAPY AMONG COLLEGE STUDENTS**

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**ABSTRACT**

There is an increasing concern on promoting healthy lifestyle which is a quality, safe and affordable way to prevent many diseases. However, college students do not adopt healthy lifestyles and have poor knowledge of risk factors of lifestyle diseases. And there is lack of evidence to demonstrate that traditional Chinese medicine educational course could promote healthy lifestyle. This study was conducted to evaluate the effectiveness of implementing traditional Chinese medicine using a general education course in "Health Maintenance and Food Therapy in Chinese Medicine (HMFTCM)" class to promote the healthier lifestyles for college students. Items from Behavioral Risk Factor Surveillance System related to HMFTCM were selected to test students' lifestyle before and after the course. The experimental group of this study was HMFTCM students (n=120), and the students of another health-related course "Disease and Medicine (DM)" (n=98) was used as control group. Upon completion of HMFTCM, students became more physically active, changed their diet and spent more time on sleeping. In contrast, DM students did not change these habits in daily lives. The results demonstrate that a traditional Chinese medicine health education program, could be effective to improve the health-related behaviors.

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**INTRODUCTION**

Health professionals, who previously focused on treating diseases, are now concerned with diseases prevention through enhancing health lifestyle modification and eliminating the factors which negatively related human health in any way (Dans et al., 2011; Tol et al., 2013). Lifestyle, which is defined as normal daily activities, is accepted by people during their lives and can affect their health (Tol et al., 2013). A healthy lifestyle, which includes nutritious food, physical activity (Wadden et al., 2004), sufficient sleep, and limited alcohol use (Mozaffarian, 2011), plays an important role in maintaining health and preventing numerous diseases (Dans et al., 2011; Warburton et al., 2006; Matthews et al., 2011). One of the most important factors of healthy lifestyle is healthy dietary pattern (Tol et al., 2014). There is strong evidence that high diets in vegetables and fruits protect against the development of many diseases (Carter et al., 2005). With little preparation, fruits containing natural sources of vitamins,

minerals, and fibers are one of the main food resources that humans need to ingest daily (Biren et al., 2011). Maintaining health-enhancing level of physical fitness is good for maintaining health. Regular physical activities lead to both physical and psychological benefits (Rejali and Mostajeran, 2013). By selecting healthy lifestyles, people try to avoid diseases and promote health through nutritious diet, regular physical activities, controlling body weight, and less/not drinking alcohol. Conversely, unhealthy lifestyles have been linked to increased risk of cancer, heart disease, and other chronic conditions (Morris and Merrill, 2004). Lack of physical activity increases mortalities and doubles the risk of physical and psychological diseases (Rejali and Mostajeran, 2013). Sleep deprivation has been linked to an increased risk of many diseases (Kerkhofs and Boudjeltia, 2012). Despite the negative effects, it seems that people often do not adopt healthy lifestyles (Bacon-Shone, 2012), and the knowledge in causes and risk factors of lifestyle disease are poor (Sabu et al., 2009). The lifestyles of college students also seems unhealthy: college students typically consume few vegetables and fruits, and instead, prefer to consume low-nutrient-dense foods, which are high in fat, salt, and sugar (Ha and Caine-Bish, 2009); previous studies have shown that there is a lack of physical activities among college students, they engage in

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sedentary activities, (watching TV, surfing the Internet, and playing video games) which reduce the available time for health promoting behaviors and academic pursuits (Bellar *et al.*, 2014), most of the college students are unaware of the recommended amount of physical activity (Rejali and Mostajeran, 2013), and heavy alcohol use is prevalent among college students and associates with emotional problem such as depress (Pedrelli *et al.*, 2011). College students constitute a large part of young population and their social conditions and age as the educated group in the society can turn them into a symbol in the society. Their selection of healthy lifestyles not only exerts positive effects on their personal lives, but also their families and, consequently, the society (Pedrelli *et al.*, 2011). Therefore, promoting health lifestyles is of crucial importance for this group. Enhancing health-related knowledge is an effective way to promote healthy lifestyle. Previous studies have found that nutritional education programs can improve the healthy lifestyle and health-related behaviors of people (Tol *et al.*, 2013): dietary education programs were found to increase vegetable and fruit intakes and food safety behaviors in both adults and youth (Ha and Caine-Bish, 2009). Implementation of physical education programs are recommended to promote the amount of students' physical activities (Rejali and Mostajeran, 2013).

Many of previous studies used Western Medicine interventions to promote healthy-related behaviors and focused on specific aspects of a healthy lifestyle – such as diet and physical activities. Our current understanding of disease supports a more integrated and holistic view of a healthy lifestyle. Traditional Chinese medicine (TCM), which encompasses a holistic view of health and adopts integrated behavioral changes for health maintenance, has a long history of use in disease prevention and treatment, particularly for chronic disease. With proven quality, safety and efficacy, TCM provides health care that is close to homes, accessible and affordable, and it is culturally acceptable and trusted by large numbers of people in China, and are getting popular in worldwide (WHO, 2013). However, there is lack of evidence that prove TCM educational course could promote healthy lifestyle. To this end, this study is conducted to provide direct scientific evidence demonstrating that a TCM educational course focusing on holistic behavioral changes can improve the lifestyle of college students.

### Pedagogical framework

Amongst the 8 public universities in Hong Kong funded by the University Grants Committee (UGC)<sup>1</sup>, Hong Kong Baptist University (HKBU) is a pioneer in focusing its ethos on Whole Person Education (WPE) (Chong *et al.*, 2015) that fosters spiritual, intellectual, humane, social and physical development of students<sup>2</sup>. To further strengthen this education ethos and also to support the four-year undergraduate curriculum formally commencing from 2012, HKBU officially commenced its General Education (GE) Programme from the

Academic Year 2012-13, occupying 38 among a total of 128 credit units required for an undergraduate programme<sup>3</sup>. At undergraduate level, the Whole Person Education is embodied by the seven Graduate Attributes in which healthy life style is emphasized (Chong *et al.*, 2015). Moreover, HKBU also represents the first UGC-funded public university to provide higher education in traditional Chinese medicine (TCM) in Hong Kong since 1998; its School of Chinese Medicine (SCM) is committed to providing quality TCM teaching programmes, conducting cutting-edge research and offering TCM first-class services to meet the public health needs. Under such educational environment, a holistic healthy educational course entitled *Health Maintenance and Food Therapy in Chinese Medicine* (HMFTCM), has been developed and delivered, by utilizing the strength of traditional Chinese medicine to educate students about a holistic view of health and lifestyle. It is a General Education course for students who are from different disciplines and do not major in Chinese medicine.

Embracing the worldwide trend towards the model of Outcomes-based Education (OBE), HKBU adopted *the Outcomes-based Teaching and Learning* (OBTL) approach, a form of OBE framework building upon the concept of Constructive Alignment. Constructive Alignment (CA) is indeed a pedagogical approach that is embedded in the constructivist theory (Biggs and Tang, 2003; 2007; 2010), emphasizing the alignment between the intended learning outcomes (ILOs), teaching and learning activities (TLAs) and assessment methods (AMs). It is believed that courses designed upon CA will enhance student-centered learning by encouraging students to take an active and independent role in constructing their own knowledge and hence facilitate students' achievement of the ILOs at the course, programme and university level (Wang *et al.*, 2011; Thadani *et al.*, 2013).

## MATERIALS AND METHODS

### Participants

This study followed a quasi-experimental research methodology with a non-random selection of participants. Two groups were defined (an experimental and a control group). The aim of this study was to investigate if traditional Chinese Medicine educational course could promote healthy lifestyle. The sample integrated students of HMFTCM and DM courses, which was constituted by 218 students. All HMFTCM students (n=120) were invited as experimental group of this study. Students enrolled in another GE course entitled *Disease and Medicine* (DM) with 98 students were assigned as a control group. HMFTCM began with an introduction to traditional Chinese medicine and also integrated current scientific knowledge regarding the benefits of healthy behaviours. The course incorporated theories and practical activities such as a Tea Taste field trip and teaching students physical exercises often used in traditional Chinese medicine, such as *Tai chi* and *Qigong*. It taught students that a healthy lifestyle is an important component of avoiding illness and discussed appropriate diets, physical activities, and

<sup>1</sup>It is an independent funding agency for higher education established by the Government of Hong Kong Special Administrative Region (HKSAR).

<sup>2</sup> For details, please refer to the HKBU website (<http://cht1.hkbu.edu.hk/main/wpe/>).

<sup>3</sup> For details, please refers to the HKBU website (<http://ge.hkbu.edu.hk/ge-programme/programme-structure/>)

Table 1.OBTL in HMFTCM &amp; DM

HMFTCM			DM	
Course Content	1. Basic theories and principles of health maintenance and food therapy in Chinese medicine; 2. Brief introduction and demonstration of Chinese traditional health exercises; 3. Applications and examples of Chinese medicinal therapy and their functions on real life of health maintenance.		1. Historical development of Chinese and world medicine; 2. The human diseases (e. g. skeleton and its associate disorders; digestive system and gastrointestinal diseases; diabetes, obesity, and cancer); 3. Perspective of orthodox drug actions in disease management.	
Course Intended Learning Outcomes (CILOs)	1. Describe basic principles of Chinese medicine health maintenance and food therapy; 2. Apply TCM knowledge to improve various aspects of health, quality of life and adjust lifestyle; 3. Use specific food or combination of food types for treatment of common ailments; 4. Demonstrate good understanding of principles in selecting healthy food, and an awareness of various traditional techniques in health promotion.		1. Provide student with knowledge of basic principles of Medicine on human diseases; 2. Reveal the practical aspects of Medicine in daily life and apply the knowledge of disease prevention in community health; 3. Using contemporary examples of diseases and body disorders to illustrate both conventional and state-of-the art therapeutic regimens in biomedical science	
Teaching & Learning Activities (TLAs)	lectures Group report & presentation Site-visit activities Tutorial	CILOs 1-4 CILOs 2-4 CILOs 2-4 CILOs 2-4	Lectures Group discussion Museum visit Term paper	CILOs 1-3 CILOs 1-3 CILOs 2,3 CILOs 1-3
Assessment Methods (AMs)	Group Report and Presentation Final examination	To assess students' writing and presentation skills To assess the major learning outcomes of the course	Group discussion Museum visit Term paper Final examination	To assess students' learning during each lesson. To assess students' learning during the visits. To assess students' learning on disease treatment or health-related problem. To assess the major learning outcomes of the course

Table 2. The lifestyle items and the internal consistency (cronbach alpha)

Items	Sub-items	Description of Items	Cronbach alpha
Physical Activity	Vigorous physical activity	During the past 7 days, on how many days did you do vigorous physical activities for at least 10 minutes at a time? Vigorous physical activities are those that make you breathe much harder than normal, e.g. football, swimming, heavy physical work, aerobics, jogging, etc.	.733
	Moderate physical activity	During the past 7 days, on how many days did you do moderate physical activities for at least 10 minutes at a time? Moderate physical activities are those that make you breathe somewhat harder than normal, e.g. fast walking, bicycling, car washing/waxing, cleaning windows, etc.	
	Walking	During the past 7 days, on how many days did you walk for at least 10 minutes at a time? This includes walking to office/school, walking to travel from place to place, and walking for leisure.	
Fruits and Vegetable Consumption	Fruit consumption	On average, how many fruit do you eat per day? One fruit equals to one medium-sized apple or orange, one medium sized banana, or two kiwi fruits or plums, or one bowl of small fruits like grapes or strawberries. The numbers can be recorded as half such as 0.5 or 1.5)	.731
	Vegetable consumption	On average, how many bowls of vegetables do you eat per day? One bowl refers to the size of a rice bowl.	
	Vegetable or fruit juice Consumption	On average, how many days do you drink at least one cup of fruit or vegetable juice each week? "Juice" refers to freshly squeezed juice or those are labeled 100% or pure fruit/vegetable juice. A cup means 250 ml in volume or a standard-sized tetra pack of juice drink.	
Drinking Pattern	Alcohol consumption	How many glasses of any type of alcohol on average did you drink per day?	.788
	Beverage consumption	How many standard units of beverage on average did you drink per day? Beverage includes lemon tea, chrysanthemum tea, Yakult, Vitasoy, soy drinks or cordials in tetra-packs, cans or bottles etc, but exclude pure milk.	
Time Spent Sleeping	On average, how many hours do you sleep per day? 1. Less than seven hours 2. Seven to eight hours 3. More than eight hours		

**Table 3. Details of Participating Responses Rates**

Group	No. of Valid Responses (% of Valid Responses)	No. of Male Responses (% of Male Responses)	No. of Female Responses (% of Female Responses)
Experimental Group (HMFTCM)	98 (81.67%)	22 (22.45%)	76 (77.55%)
Control Group (DM)	84 (85.71%)	20 (23.81%)	64 (76.19%)

**Table 4. Comparison of mean scores of the students’ lifestyle in the two groups, pre-and post- courses**

Scales/Variables of lifestyle	Experimental Group N=98			Control Group N=84			ANOVA test P values	
	Pre-test mean (SD)	Post-test mean (SD)	Independent t-test <i>p</i> values	Pre-test mean (SD)	Post-test mean (SD)	Independent t-test <i>p</i> values	Pre-test <i>p</i> values	Post-test <i>p</i> values
Physical Activity	5.45 (2.13)	6.65 (2.06)	0.000	5.45, (2.09)	6.54 (2.08)	0.202	0.991	0.037
Fruits & Vegetable Consumption	3.62 (1.04)	3.92 (1.03)	0.000	3.48, (1.02)	3.54 (1.01)	0.057	0.342	0.016
Drinking Pattern	2.47 (0.98)	2.45 (0.97)	0.530	2.42 (1.13)	2.37 (0.99)	0.530	0.736	0.583
Time Spent Sleeping	1.56 (0.63)	1.68 (0.67)	0.010	1.45 (0.50)	1.49 (0.53)	0.320	0.202	0.031

maintaining a balance of work and rest is critical for maintaining good health in long term. DM was developed which aims to introduce the fundamental concepts of Medicine and biomedical sciences related to health and disease and serves to broaden the horizon of university students in the knowledge of medical technology. Upon completion of the course, students are expected to envisage the differential roles and approaches of medicine in the treatment of human diseases as well in the prevention of illnesses. Both HMFTCM and DM last 14 weeks, and have fully adhered to the OBTL model (Table 1).

**Measurement**

Questionnaire of this study was based on the Behavioral Risk Factor Survey (Bacon-Shone, 2012), which was conducted by the Department of Health of Hong Kong Government to collect information on the health related behavioral issues among the Hong Kong population. In order to collect information on students’ lifestyle related to the HMFTCM course contents, questions on Physical Activity, Fruits and Vegetable Consumption, and Drinking Pattern, were selected from the survey to gauge the changes of students’ lifestyle after attending HMFTCM and DM. As the content of course HMFTCM involves scope of sleeping, Time Spent Sleeping which asked how many time the respondents spend on sleeping per day was included in the questionnaire. Before performing the comparison tests, the reliability of the items measuring Physical Activity, Fruits and Vegetable Consumption, and Drinking Pattern were tested by looking at the Cronbach’s alpha. The items were found to have acceptable internal consistency and temporal stability, Cronbach’s alpha was .733 for the Physical Activity, .731 for the Fruits and Vegetable Consumption, and .788 for the Drinking Pattern. Details of the questionnaire are shown in Table 2.

**Data Collection Procedures**

Questionnaire adapted from the Behavioral Risk Factor Survey (Bacon-Shone, 2012) was administrated in class for undergraduate students of these two courses with overall response rate of 83.5%. Both groups were adults between 18 and 27 years of age, and came from various disciplines.

All students enrolled voluntarily, suggesting that both groups had a specific interest in health. Each group was given two surveys to assess the students’ lifestyle before and after the completion of the courses. For the HMFTCM students, the experimental group, 98 pre- and post-surveys were completed, while in the control group (DM students) 84 pre- and post-surveys were completed. In the experimental group, the gender breakdown of respondents was 22.45% male and 77.55% female, in the control group, there were 23.81% male and 76.19% female, and details of response rate are shown in Table 3.

**Statistical Analysis**

Descriptive statistics compared the differences on healthy lifestyle sectors. Independent t-test and one-way ANOVA examined whether these differences were significant or not. Significance was set a priori as  $p \leq 0.05$ . All data analysis was conducted via SPSS software (SPSS version 15.0, SPSS Inc., Chicago, IL, 2007).

**RESULTS**

The overall data provides support for the view that the HMFTCM course can cumulatively make a significant contribution to students’ healthy lifestyle. The means and standard deviations were computed on the participants’ responses to the items and are presented in Table 4. One way ANOVA comparing mean differences between experimental and control group before and after the courses indicated that there are insignificant differences between them before the courses ( $p \geq .005$ ) and significant changes (except Drinking Pattern) after the course ( $p \leq .005$ ). The mean days per week on the Physical Activity of experimental group pre-survey was 5.45, SD=2.13 and the post-survey was 6.65, SD=2.06, and independent t-test showed this improvement was significant ( $p = .000$ ). Mean days per week in total Physical Activity of control group increased from 5.45, SD=2.09 to 6.54, SD=2.08, however, the increasing is insignificant ( $p = .202$ ). The mean value of experimental group Fruits and Vegetable Consumption significantly increased from 3.62, SD=1.04 to 3.92, SD=1.03, While the pre- (3.48, SD=1.02) and post- (3.54, SD=1.01) survey of control group shared no significant

difference ( $p = .057$ ). However, participants of both experimental and control group did not make any significant change on drinking pattern ( $p > .05$ ), this could be because the college students in our sample did not have an unhealthy drinking pattern before the course (mean value of alcohol and soft beverage intake per day is approximately 2.45, nearly 70% of participants reported that they had never drank alcohol), the course had little impact on their drinking pattern. On "Time Spent Sleeping", the mean value of the experimental group was 1.56 (SD=0.63) per day before the course, and after the course is 1.68, (SD=0.67), and the increasing was significant ( $p = .010$ ). By comparison, before the DM course, the students in control group slept for 1.45 (SD=0.50) and this altered only slightly in the post-survey (1.49, SD=0.53), but this change is insignificant ( $p = .320$ ). Further data analysis was conducted to compare the differences of lifestyle between genders. Table 5 shows that except Fruits & Vegetable Consumption, there were no significant difference between male and female. On "Fruits & Vegetable Consumption", male's vegetable and fruit intake (4.48, SD=1.51) was higher than female's (4.04, SD= 1.28).

**Table 5. Comparison of mean scores of the students' lifestyle between Male and Female**

Scales/Variables of Lifestyle	Male Mean (SD)	Female Mean (SD)	ANOVA test $p$ values
Physical Activity	6.26 (2.32)	5.95 (2.11)	0.252
Fruits & Vegetable Consumption	4.48 (1.51)	4.04 (1.28)	0.009
Drinking Pattern	2.45 (0.83)	2.42 (1.06)	0.310
Sleeping Hours	1.58 (0.59)	1.54 (0.60)	0.584

## DISCUSSION

The course of HMFTCM has had a significantly positive effect on the students' lifestyle. After completing the course, students became more physically active, ate more fruits and vegetables and, on average slept more. In contrast, those students who took the DM course, showed no significant changes on their lifestyle. The positive results suggest that educating students about the importance of maintaining a healthy lifestyle, from a holistic perspective by Chinese medicine education program, can encourage significant behavioral modifications. This is demonstrated because HMFTCM adopted the framework of Chinese medicine and focused on maintaining healthy lifestyles while DM focused on disease itself, but not a holistic view of health. Several previous studies investigated the differences in healthy behaviors between genders. Gender differences were noted with respect to healthy lifestyle, including physical activity and diet (Wu *et al.*, 2009).

Male may have a greater sense of control than female for managing diabetes through diets (Brown, *et al.*, 2000); on the contrary, Wardle *et al.*, found that men cited taste preference for unhealthy foods, the convenience of "fast foods," and lack of self-control (Wardle *et al.*, 2004). This study supported the former one that male seems to have a more healthy eating habits, which they took more vegetables and fruits than female. It was indicated that physical activity also differs by gender that men may engage in more physical activity than women (Pauline, 2013). However, the results of this study shows there is no significant difference in physical activity between male

and female. The former studies suggest a continued need for healthy lifestyle promotion for college students. For any attempt to generate health lifestyle and healthy behavior, having related information and knowledge is the basic element (Rabiei *et al.*, 2013), therefore, it is essential to give knowledge to promote and correct lifestyle in order to maintain health and prevent nutritional diseases. In consistence with previous researches, this study indicated that improving the unfavorable nutrition behaviors and increasing health-related knowledge in students, nutrition education can be very effective. This study demonstrates that students respond to learning about a holistic view of health, and are prepared to modify their behaviors to keep in line with this integrative approach. The college years are a period of significant change in the lifestyles of young adults. Food preference and, more generally, healthy behaviors learned at college might have long-term implications for dietary intake, influencing student's lifestyle through adulthood and parenthood (Granner *et al.*, 2004; Haire-Joshu *et al.*, 2004). This is encouraging due to the emerging appreciation for the importance in maintaining a healthy lifestyle in order to prevent diseases.

## Conclusion

There is an increasing concern about lifestyle diseases which are different from other diseases as they are potentially preventable by promoting health habits. College years is considered as an underlying period for different stages of life, and many health habits forming in this stage are highly important in association in adulthood. Health education is the most important and basic step in preventing and removing problems of this stage. This study demonstrate that the HMFTCM, a traditional Chinese medicine health course, could be an effective course to improve the health-related behaviors in the sectors of Physical Activity, Fruits & Vegetable Consumption, and Time Spent Sleeping in a sample who were almost the Chinese students.

## Limitation

There are certain limitations to this study. The course was successful at improving the lifestyle of students in this sample. However, most of the students are native Chinese and may have been familiar with traditional Chinese Medicine philosophies prior to entering the course. Furthermore, students voluntarily enrolled in this course and may be more interested in a holistic view of health, and more likely to adopt behavioral modifications than the control group. The long term effectiveness of this intervention was not included in this study design. Future research should be directed towards examining whether the results of this study are generalizable to a wider population, and the long term effect of a Chinese medicine course on changes made to lifestyle.

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