Underweight prevalence among young adults from rural areas, Salin Towinship, Magwe Region

May Soe Aung*, Win Myint Oo•, Espen Bjertness■, Soe Htet Ko♦, Yar Zar Oo♦, Yin Win Tun♦, Win Toe♦, Kyaw Thet Oo♦, Mon Mon Kyaw♦, Theigi Myo♦, Tin Loyal Tun♦

Abstract

Maintaining a normal body mass index (BMI) throughout the life-span of a person may reduce occurrence as well as the burden of non-communicable diseases (NCDs), in terms of years lived with disability and premature death. Lifestyle and socioeconomic factors like physical activity and availability of healthy or unhealthy food may contribute to both extremes of BMI, namely underweight and overweight/obesity. The aim of the present cross-sectional study was to estimate the prevalence of underweight and overweight/obesity and selected lifestyle factors in a cluster randomized sample of 335 young adults aged 18-35 years from rural communities residing at Salin Township, Magwe Region. In addition, it also aims to investigate the association between selected socioeconomic and lifestyle factors with underweight. Data were collected by carrying out face to face interviews with the individuals selected in the sample in 2011 using semi-structured questionnaires and measuring of their weight and height. SPSS version 16 and STATA version 11 were used for data entry and analysis respectively. Based on WHO criteria, participants were classified according to their BMI into underweight (BMI < 18.5); normal weight (BMI 18.5 - 24.99); and overweight/obese (BMI > 25). Individuals with normal BMI was found in 72% (95% confidence interval (CI): 67.1 - 77.0) and the prevalence of underweight was found in 28% (23.0 - 32.9). The majorities of respondents were illiterates, of monastic and primary schooling, and working as farmers and manual workers. Nearly 84% of the respondents were able to have 3 meals per day, and the same proportion consumed vegetables daily. The prevalence of current smokers was 11% and all were found to be males. Seventy-two percent were physically active on a daily basis. Out of these respondents, three-fourths of them were physically active at least two hours per day. A total of 64% reported to sleep during the day and 71% reported less than 8 hours of sleeping during the night. Logistical regression analysis showed that underweight was significantly associated with lower age as compared to higher age (OR = 0.54: CI 0.32 - 0.92). There was no significant association between sex, education, occupation and lifestyle factors.

★ Lecturer, Department of Preventive and Social Medicine, University of Medicine 1, Yangon

• Formerly Professor / Head, Department of Preventive and Social Medicine, University of Medicine 1, Yangon

■ PhD, Professor / Head, Section for Preventive Medicine and Epidemiology, Department of Community Medicine, University of Oslo, Oslo, Norway

♦ Bachelor of Community Health (2011), University Of Community Health, Magwe

Introduction

Developing countries witnessed a health transition due to socio-economic development, with changes in disease patterns and in the demography of its population. Lifestyle and environmental factors modify the disease transition leading to inequalities in health, between and within countries. Most of the South East Asia countries are currently facing both communicable as well as non communicable disease problems (NCDs) as a double burden[1]. Poor nutrition is still an important factor associated with relatively high morbidity and mortality in developing countries[1], causing both under and overweight along with various deficiency diseases that ultimately affects the quality of healthy life[2].

Optimum health can be achieved by adopting healthy lifestyles such as adequate nutrition, enough sleep and sufficient physical activity[3]. Eating patterns during the day including frequency of meals, having breakfast, amount of snacks consumed, and the timing of the meal plays an important role in weight management[4]. Low fruit and vegetable consumption is one of the behavioral risk factors associated with chronic diseases. The worldwide estimated number of deaths attributed to insufficient fruit and vegetable intake was 2.7 million[5]. Poor sleep has also been linked to an increase in mortality and morbidity[6], and it has also been suggested to take enough and plenty of sleep for maintenance of normal body weight[7].

Smoking is one of the leading causes of increase in morbidity and mortality in most countries. There are wide ranging differences in the smoking status of an individual depending upon the socio-economic status (SES), with higher smoking prevalence among lower SES groups[8]. A study by Doll et al[9] showed that the life expectancy is reduced by 7 to 10 years and 6 to 8 years among men and women respectively due to smoking. According to Centre for Health Economics, Monash University, 32% of ex-smokers reported excellent or very good health as compared to 24% among current smokers[10]. In the study of adults from Northern Greece, negative relationship between BMI and smoking was noticed among females, but not among males[11].

Regarding physical activity, at least 60 minutes of moderate to vigorously intense physical activity can assist young people to develop healthy musculoskeletal tissues (i.e. bones, muscles and joints), and to maintain an optimal body weight[12]. Consistently performed manual activity or exercise for a pre-determined period can reduce weight, thus physical activity emerged as a powerful determinant of body mass index[13]. WHO has recommended for each individual performance of daily muscle-strengthening physical activities such as walking, cycling, and occupational work, household-chores, playing games, sports, or planned exercise on 2 or more days a week. Adults aged 18 - 64 years should do moderate-intensity aerobic physical activity for at least 150 minutes throughout the week and in bouts of at least 10 minutes[14]. Levels of physical activity are decreasing among young people in countries around the world. This decline is largely due to increasingly common sedentary way of life[12].

Lifestyle changes have led to obesity and NCDs, while too low food intake has contributed to various malnutrition diseases including anemia and poor body-defense against common infections[2]. Under-nutrition usually continues from one generation to another as a vicious cycle. Maternal malnutrition is responsible for 25 to 50% of intrauterine growth restriction (IUGR) leading childhood developmental delays, more vulnerable to diseases, late school entrance, inability to learn well and less productivity as adults[15]. Some permanent damage such as arteriosclerotic heart disease in childhood and adolescence is caused by nutritional deficiency[16]. Poor nutrition in early life increases susceptibility to the effects of an affluent diet in later life, and that predisposition to IHD is related to nutrition during prenatal period and early childhood[17]. However, lifestyle related health problems are potentially preventable and the introduction of health promotion have contributed to changes in life style. Several studies have demonstrated that Body Mass Index is influenced by individual lifestyles. In general, unhealthy lifestyles are usually linked to low social status, including low education and income. However, it is also known that in many different societies, the rich who can afford to eat westernized food and eating these foods in excess contributes to an unhealthy trend. In extreme cases, a large belly is even regarded as a sign of wealth. A longitudinal study from Australia suggested that promotion of a healthy lifestyle particularly in lower socio-economic groups should be a priority[18].

While underweight an overweight coexist in most countries around the world, the prevalence of underweight is going down in developed countries, while it still remains high in developing countries[19]. Many developing countries face the dual challenge of a continuing occurrence of underweight problem concomitantly existing with an increasing trend of over-weight[20]. Based on WHO STEPwise Approach to NCD Surveillance carried out in 2004 in the rural part of Yangon Region, Myanmar, the prevalence of underweight among 25-34 year olds was 30% in males and 25% among females while the prevalence of overweight was 14% and 25% in males and females, respectively[21]. A similar study in the urban part of Yangon Region carried out in 2005 showed similar prevalence of overweight in 15% of men and 28% in women, but a higher prevalence of underweight in males at 35%, and a lower prevalence among females at 16%[22]. Thus, lifestyle related health problems effects both urban and rural populations. In Myanmar where nearly 70% of the population is rural[23], lifestyle related health problems in rural areas contribute more significantly to the national health burden. Therefore, adoption of a healthy lifestyle and proper maintenance of body weight has become an urgent problem not only in urban areas but also in rural areas as well.

Objectives

The objectives of the present study are to estimate the prevalence of underweight, overweight (obesity) and the presence of selected lifestyle factors occurring among young adults aged 18 - 35 years in rural communities in Salin Township, Magwe Region. It also aims to investigate the association between selected socioeconomic and lifestyle factors with underweight. The result obtained from this study is expected to provide baseline information for future planning of interventions for health promotion and adoption of healthy lifestyles within the rural community.

Population and methods

A cross-sectional study with multistage simple random sampling was carried out among young adults in Salin Township, Magwe Region during 2011. The sample included 127 males and 208 females. Following a convenient selection of a township in Magwe Region, one Rural Health Centre (RHC) level village was randomly selected. After that, three sub-center level villages from this RHC village were randomly selected. Then, two villages from each sub-center level village were randomly chosen. Thus, a total of six villages were included in the study. The first household in each village was selected using a random starting point. In each household, members of both sexes within the age of 18 to 35 years were all selected as subjects in the study. If there was no eligible respondent in the selected household, the next house on the right was randomly chosen. An average of 20 households in each village was selected. Consent was obtained from the respondents after explaining the objectives and purpose of the study. Complete confidentiality and anonymity of the information was ascertained. Data were collected through face to face interviews using semi-structured questionnaires, along with measurement of height and weight.

Weight and height were measured to the nearest 100 grams and nearest 0.5 cm respectively. To measure height, a metal measuring tape was used. Weight was measured using a standard bathroom weighing machine.

Body Mass Index (BMI) was calculated according to the formula: BMI = weight (in kg) / height in meter square (m^2). Underweight, normal weight, overweight/obesity were defined according to WHO criteria which is as follows: underweight (BMI < 18.5): normal weight (BMI 18.5 - 24.99): and overweight/obese (BMI ≥ 25)[24]. For subgroup analyses, underweight was further sub-divided into severe underweight (BMI < 16.0), moderate underweight (BMI 16.00 to 16.99) and mild underweight (BMI 17.00 to 18.49), according to WHO[24].

Smoking was reported as non-smoker, former smoker and current smoker. These categories were used in the descriptive analyses as well as in logistic regression analyses.

Education status was recorded according to the highest educational level achieved, and in the logistic regression analyses education was operationalized into categories such as: low (illiterate, monastic schooling and primary school level), medium (middle school levels from 6th grade to 9th grade and high school levels from 10th grade to 11th grade) and high (university level and graduates).

Occupation was reported as farmer, manual worker, government servant, merchant and dependent. However, the last three categories were grouped together and reported as 'others' because of the small numbers in each of these categories, when carrying out both descriptive analyses and logistic regression analyses.

Data was entered using SPSS version 16 and then transformed to STATA version 11 for statistical analysis. Odds ratios (OR) with 95% confidence intervals (CIs) and P-values were estimated in univariate and multivariate logistic regression analysis. A two-sided P value < 0.05 or 95%CI was set as level of statistical significance.

Results

The prevalence of underweight in the study population was 28% (95% CI : 27.2 - 36.7) while there were no overweight or obese cases. The prevalence of underweight was more than 5% higher in females compared to males. Proportions of severe and moderate underweight were also higher in females than in males (Table 1).

Over half of the respondents were found to have low education levels and majority of them are working as farmers and manual workers. Female respondents have had lower education levels compared to males (Table 2). All participants reported to have at least two meals per day and 16% had more than three meals. In addition, a total of 84% consumed vegetable on a daily basis. Only 11% (38 out of 335 respondents) were current smokers while there was no female current smoker, but nearly 30% of males were currently smoking. Daily regular physical activity was reported by 72% and nearly three quarter of the respondents performed this practice for more than two hours per day. The number of days and duration of physical activity pattern were similar in both males and females. Sixty-four percent had the habit of day-time sleeping. However, this practice was more common among females than in males. More than 70% of both males and females reported to have less than eight hours of night time sleep each day (Table 2).

In logistic regression analysis, increase in age was significantly negatively associated with underweight as compared to lower age (OR = 0.54, 95%CI : 0.32 - 0.92), both in bi-variate analysis and after adjustment for all variables (Table 3).

After adjustment of socio-demographic characteristics and other lifestyle factors, less frequent vegetable intake as compared with daily consumption was negatively associated with underweight (OR = 0.39, 95% CI : 0.16, 0.98). No other factors were found to have an association that is statistically significant (Table 3).

Table1. Prevalence of underweight[a] by gender among young adults age 18 to 35 years in Salin Township, Magwe Region

Bodyweight	N	Total % (95% CI)	n	Male % (95% CI)	n	Female % (95% CI)
Severe Underweight	10	10.8 (5.3, 18.9)	3	9.4 (2.0, 25.0)	7	11.5 (4.7, 22.2)
Moderate Underweight	16	17.2 (10.2, 26.4)	4	12.5 (3.5, 29.0)	12	19.7 (10.6, 31.8)
Mild Underweight	67	72.0 (61.8, 80.9)	25	78.1 (60.0, 90.7)	42	68.8 (55.7, 80.1)
Total	93	100	32	100	61	100
Underweight	93	27.8 (23.0, 32.9)	32	25.2 (17.9, 33.7)	61	29.3 (23.2, 36.0)
Normal weight	242	72.2 (67.1, 77.0)	95	74.8 (66.3, 82.1)	147	70.7 (64.0, 76.8)
Total	335	100	127	100	208	100

[a]Based on BMI < 18.5[24]

Table 2. The distribution of socio-demographic characteristics and lifestyle factors among young adult population by gender in Salin Township, Magwe Region

Characteristics	N	Total % (95% CI)	n	Male % (95% CI)	n	Female % (95% CI)
Age (years)						
18 to 24	176	52.5 (47.0, 58.0)	76	59.8 (50.8, 68.4)	100	48.1 (41.1, 55.1)
25 to 35	159	47.5 (42.0, 53.0)	51	40.2 (31.6, 49.2)	108	51.9 (44.9, 58.9)
Education						
Low	178	53.1 (47.6, 58.6)	49	38.6 (30.1, 47.6)	129	62.0 (55.0, 68.6)
Medium	124	37.0 (31.8, 42.4)	62	48.8 (39.9, 57.8)	62	29.8 (23.7, 36.5)
High	33	9.9 (6.9, 13.6)	16	12.6 (7.4, 19.7)	17	8.2 (4.8, 12.8)
Occupation						
Farmer	155	46.2 (40.8, 51.8)	71	55.9 (46.8, 64.7)	84	40.4 (33.7, 47.4)
Manual worker	143	42.7 (37.3, 48.2)	42	33.1 (25.0, 42.0)	101	48.6 (41.6, 55.6)
Others	37	11.0 (7.9, 14.9)	14	11.0 (6.2, 17.8)	23	11.1 (7.1, 16.1)
Meals per day						
0 - 1 times	0	0	0	0	0	0
2 - 3 times	283	84.5 (80.1, 88.2)	105	82.7 (75.0, 88.8)	178	85.6 (80.1, 90.1)
> 3 times	52	15.5 (11.8, 19.9)	22	17.3 (11.2, 25.0)	30	14.4 (9.9, 19.9)
Vegetables consumed per week						
Everyday	281	83.9 (79.5, 87.7)	107	84.3 (76.7, 90.1)	174	83.7 (77.9, 88.4)
4 - 6 days	32	9.6 (6.6, 13.2)	14	11.0 (6.2, 17.8)	18	8.7 (5.2, 13.3)
≤ 3 days	22	6.6 (4.2, 9.8)	6	4.7 (1.8, 10.0)	16	7.7 (4.5, 12.2)
Smoking Status						
Never & Former smokers	297	88.7 (84.8, 91.8)	89	70.1 (61.3, 77.9)	208	100 (98.2, 100.0)
Current smokers	38	11.3 (8.2, 15.2)	38	29.9 (22.1, 38.7)	0	0
Physical Activity (days per week)						
Everyday	238	71.7 (66.5, 76.5)	87	68.5 (59.7, 76.5)	151	73.7 (67.1, 79.5)
4 - 6 days	68	20.5 (16.3, 25.2)	30	23.6 (16.5, 32.0)	38	18.5 (13.5, 24.5)
≤ 3 days	26	7.8 (5.2, 11.3)	10	7.9 (3.8, 14.0)	16	7.8 (4.5, 12.4)
Physical Activity (Duration / day)						
1 hour	50	15.1 (11.4, 19.4)	21	16.5 (10.5, 24.2)	29	14.2 (9.7, 19.7)
1 - 2 hour	28	8.4 (5.7, 12.0)	14	11.0 (6.2, 17.8)	14	6.8 (3.8, 11.2)
> 2 hour	254	76.5 (71.6, 81.0)	92	72.4 (63.8, 80.0)	162	79.0 (72.8, 84.4)
Day time sleep						
Yes	213	63.6 (58.2, 68.7)	74	58.3 (49.2, 67.0)	139	66.8 (60.0, 73.2)
No	122	36.4 (31.3, 41.8)	53	41.7 (33.0, 50.8)	69	33.2 (26.8, 40.0)
Length of sleep during the night						
≤ 8 hrs	239	71.3 (66.2, 76.1)	89	70.1 (61.3, 77.9)	150	72.1 (65.5, 78.1)
> 8 hrs	96	28.7 (23.9, 33.8)	38	29.9 (22.1, 38.7)	58	27.9 (21.9, 34.5)

Table 3. Logistic regression analysis for underweight respondents with socio-demographic characteristics and lifestyle factors for young adults in Salin Township, Magwe Region

Variable	Total	Underweight		Crude OR	95%CI	P Value	OR_{Adj}	95%CI	P Value
		N	%						
Age									
18 to 24	176	58	32.9	Ref.			Ref.		
24 to 35	159	35	22.0	0.57	0.35-0.94	**0.026**	0.54	0.32-0.92	**0.023**
Sex									
Male	127	32	25.2	Ref.			Ref.		
Female	208	61	29.3	1.23	0.75-2.03	0.413	1.23	0.68-2.23	0.492
Education									
Low	178	46	25.8	Ref.			Ref.		
Medium	124	36	29.0	1.17	0.70-1.96	0.540	1.15	0.63-2.11	0.639
High	33	11	33.3	1.43	0.65-3.19	0.375	1.50	0.51-4.36	0.461
Occupation									
Farmer	155	42	27.1	Ref.			Ref.		
Manual worker	143	39	27.3	1.00	0.61-1.68	0.973	1.09	0.61-1.97	0.75
Others	37	12	32.4	1.29	0.59-2.8	0.517	0.99	0.37-2.63	0.99
Meals per day									
2 - 3 times	283	79	27.9	Ref.			Ref.		
> 3 times	52	14	26.9	0.95	0.49-1.85	0.883	1.17	0.58-2.36	0.66
Vegetables consumed per week									
Everyday	281	73	25.9	Ref.			Ref.		
4 - 6 days	32	10	31.3	0.55	0.18-1.68	0.290	0.60	0.19-1.94	0.392
≤ 3 days	22	10	45.5	0.42	0.17-1.02	**0.054**	0.39	0.16-0.98	**0.046**
Smoking Status									
Never & former smokers	297	84	28.3	Ref.			Ref.		
Current smokers	38	9	23.7	0.79	0.36-1.73	0.552	0.88	0.35-2.22	0.796
Physical Activity (days per week)									
Everyday	238	68	28.6	Ref.			Ref.		
4 - 6 days	68	16	23.5	1.11	0.46-2.68	0.814	1.01	0.40-2.52	0.98
≤ 3 days	26	8	30.8	0.77	0.41-1.44	0.412	0.72	0.37-1.39	0.33
Physical Activity (duration / day)									
1 hour	50	14	28.0	Ref.			Ref.		
1 - 2 hour	28	7	25.0	0.86	0.29-2.46	0.775	0.85	0.27-2.58	0.77
> 2 hours	254	71	27.9	0.99	0.51-1.96	0.995	1.08	0.49-2.35	0.85
Day Time Sleep									
Yes	213	62	29.1	Ref.			Ref.		
No	122	31	25.4	0.83	0.51-1.37	0.467	0.85	0.50-1.44	0.55
Lenght of sleep during the night									
≤ 8 hrs	239	69	28.9	Ref.			Ref.		
> 8 hrs	96	24	25	0.82	0.48-1.41	0.475	0.85	0.50-1.44	0.552

Discussion

The main findings observed in the present study that was carried out among the 18 - 35 years population (males and females) of Salin Township are: high prevalence of underweight (28%), the low prevalence of smoking in women (0%), the high level of daily vegetable intake (84%) and high level of daily physical activity (72%). Factors significantly associated with underweight were low age (18 - 24 years) and daily intake of vegetables as compared with intake < 3 days a week.

The underweight prevalence reported in this study was similar to that seen in the 2004 study conducted among 24-35 years old participants in rural area of Yangon district[21]. However, it is higher than what was reported in a recent study 11% that was part of a national study conducted among urban residences of Yangon district[25]. The prevalence estimate was also higher than that found among students from an Indian Medical School where underweight was found in 20%, of Malay 18.8%, and of Indian participants[2]. Moreover, the prevalence of underweight was higher than reported in other countries in the South East Asia Region: 19.2% in Thailand in 2003[26]; 9.6% in Malaysia in 2003[26]; and 20.1% in Vietnam in 2011[19]. One study carried out in India concluded that thinness observed in a rural woman is associated with being married into a farming family[26]. This association could be due to the married women having to join in the farming activities and as the nature of farming occupation involves a lot of physical activity and needs a lot of muscle strength to perform the various tasks related to farming. However, in the present study, no association between farming occupation and underweight was demonstrated. This could be due to not much difference in the daily physical activities between farmers and the comparison group of manual workers in our study.

An inverse relationship between eating occasion frequency (EOF) and body weight status has been reported in several studies[28,29,30]. A recent study from the United States found that eating frequency of ≥ 4 per day shows a significant 45% lower risk of obesity as compared to those consuming ≤ 3 meals per day[30]. The present study does not support the finding of a protective effect of frequent food intake. In the STEPS study from rural Yangon district in 2004[21], it was reported that almost all the subjects consumed vegetables 6 days per week, which is in contrast to the findings in this study that found only around 84% showed daily consumption of vegetables. The finding of a negative association between underweight and low frequency of vegetable consumption supports the findings from a study carried out in India where the prevalence of underweight was higher in non-vegetarian than vegetarian participants[2]. A negative association between smoking and body weight was revealed in a study from Greece[11] but this finding was not observed in the present study. The present study is hampered by lack of detailed history regarding smoking such as its duration, amount and frequency which should be addressed in future studies in Myanmar. The issue of smokeless tobacco use (including betel nut chewing) needs to be looked into. The level of physical activity noted in this study has been in accordance with the WHO recommendations[14], and revealed higher proportion of physical activity than among that of urban citizens from Yangon district[25].

The present study also showed high frequency of day time sleep and short hours of sleep during the night time. This could be also related to the nature of agriculture work where respondents have to go to their fields before sun rise and work in the early hours of the morning to avoid the mid-day heat. No association of sleep pattern was found with BMI in the present study, but it has been shown in the study from Australia where these habits may contribute to high BMI[31].

Conclusion

Nearly one-third of the respondents in the study are underweight. It may be suggested that for maintenance of good health status, promotive and preventive programmes for young people aimed to reduce underweight and increase healthy life style should be implemented especially in rural areas. However, further studies with a much larger sample size, covering wide geographical areas and collecting data on additional socioeconomic variables should be conducted to determine the factors influencing BMI status of young adults in rural areas of Myanmar.

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