Awareness of Weight and Situation of Body Mass Index and Hypertension in Nepalese Teachers

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Abstract

Teachers are the role models to their students in terms of health and wellbeing, in particularly the nutritional status and physical outlook. These present opportunities to students for observational learning. However, many teachers face health complications which are not even perceived as a threat by them to their career and life. This study was conducted to determine the awareness of weight and current status of body mass index and hypertension among the Nepalese school teachers. It also examined the association between the BMI and hypertension. Randomly selected secondary level teachers in the Bagamati province of Nepal were the respondents. A cross-sectional descriptive research was conducted. Self-administered questionnaires were used to collect data. Age-wise relationship was found with BMI and hypertension. More the age, higher was the BMI category and so was the blood pressure. Risky situation of BMI and hypertension among senior teachers could create a threat to the teachers' wellbeing and a setting for poor observational learning to the students. Teachers need to focus on improving their lifestyle and activities to better their conditions and present healthy role modeling.

Keywords: Body mass index, hypertension, Nepalese teacher, role model, weight.

Introduction

Reaching and maintaining a healthy weight is important for overall health and it can help a person prevent and control many diseases and conditions (National Heart, Lung, and Blood Institute, 2005). Every person need to know what weight they should bear to be healthy. Usually weight is calculated to be appropriate on the basis of height of people. A simple tool to measure fatness or leanness in adults is body mass index (BMI). BMI is a measure of body fat based on height and weight (weight in kg/ height in meters^2) that applies to both adult men and women. A study from the University of Bristol supports body mass index (BMI) as a useful tool for assessing obesity and health (University of Bristol, 2018). According to Centre for Disease Control and Prevention (CDC) (2020), BMI is a reliable indicator of body fatness for most people. BMI does not measure body fat directly, but BMI correlates to the direct measures of body fat, such as underwater weighing and dual-energy x-ray absorptiometry (DXA) tests. BMI can be considered an alternative for direct measures of body fat. Furthermore, BMI is an economical and easy-to-perform method of screening for weight categories that may lead to health problems.

Similarly, many of the people in Nepal today suffer from hypertension, a condition of raised blood pressure. It should be regularly monitored specially as per the rising age. According to Aryal et al. (2014), there is a serious problem of hypertension in Nepal as follows:

> Around 42.7% of the study population had never had their blood pressure measured. The prevalence of raised blood pressure or hypertension (SBP≥140 and/or DBP≥90), excluding those on medication, was 23.4% (men 28.7%, women 18.5%) and this figure rose to 25.7% (men 31.1%, women 20.6%) when those currently using medication were included.

It is also a concern of this study to identify the situation of the hypertension among the teachers because it is believed that teachers with normal blood pressure tend to be role models to their students. It is important for all subject teachers, indiscriminate of being health education teachers or members of the school health team, to present themselves physically fit to support and encourage healthy eating habits among students and maintain a proper weight. Even a small change in actions by the teachers can make a positive impact on students' wellness.

Nepalese education system purposes to produce healthy citizens because, in general, healthy citizens can only contribute to the national development. This is possible when healthy teachers teach. However, it is commonly perceived as a poorer nutritional status of teachers, presenting themselves as a plump or lean.

Students are always interested in getting deeper into teachers' deeds to know them. One of their areas of interest can be health-related aspects which may, later on, develop into healthy attitudes and the right change in behavior if they perceive their teacher as a healthy role model in terms of nutritional status. School teachers are the role models of those students who are in touch with them for around 6 to 8 hours every day. Students observe their teachers' health status every day and are directly influenced. The measure of body fat; fatness, leanness or normal body of a teacher is visible to the students which creates observational learning of body imaging. Unfortunately, many school teachers present poor role modeling in terms of nutritional health status and behaviors.

Objectives of the Study

The objective of this study was to determine the awareness of Nepalese school teachers regarding their own weight and current status of body mass index and hypertension among them. It also examined the association between the BMI and hypertension among the teachers. The researcher's perspective was to identify the nutritional status and physical outlook so that suggestions could be made in terms of creation of observational learning to the students for health promotion.

Methods

This is a cross-sectional study conducted among the Nepalese teachers in Bagamati province in Nepal. Survey questionnaire was used to collect data. Bagamati Province was selected for its wide coverage of schools (29.68% of total schools of Nepal) and teachers (31.47% of total teachers and 41.67% of Secondary level teachers of Nepal) (Department of Education, 2009).

Moreover, there was also the highest rate of literacy in this region in Nepal. Likewise, there exist schools with different conditions in terms of their infrastructures, physical facilities, number of students and teachers. As for the selection of the districts, this region was further classified into the three geographical regions (clusters) namely Mountain, Hill and Terai. It is likely that the difference also lies by geographical region in context of teachers' health status. From each cluster, one sample district each was randomly selected. The total number of teachers in these districts were 1611 (Department of Education, 2009). So a sample size of 310 (adjusted to 344) was obtained appropriate keeping the the confidence interval (5), confidence level (95%), and the total population of teachers (1611) using the online sample size calculator of www.raosoft.com/samplesize.html. The formula used in calculation was as follows: $\eta = [z^2.p.q.N] / [e^2.(N - 1) + z^2.p.q]$. The sample size of the schools (46) was calculated on a proportionate basis being based on the sample size of teachers allocating 6-8 teachers per school.

Where,

η = size of sample

z = the value of the standard variate at a given confidence level and to be worked out from table showing area under Normal Curve (here, 1.96 at 95% confidence level)

p = sample proportion (here, its value is taken as 0.5 in case 'n' will be the maximum and the sample will yield at least the desired precision.

q = 1 – p (here, 0.5)

N = size of population (here 1611)

e = acceptable error (here, 0.05 at confidence interval 5, since the estimate should be within 5% of true value)

The self-administered survey questionnaire used for the teachers was the main tool of data collection. The tool was pre-tested for content validity and reliability in Kathmandu. Quantitative analyses were done including averages, chi-square test and cross-tabulations. Interpretations were made in an analytic and interpretative way.

Appropriate measures were used to inform the teachers about the aims of the research, the advantages expected from it, and any possible hazards or inconveniences. In addition, the tool was made inclusive and appropriate in terms of language, precision and dealing. Tribhuvan University professors in the related field assessed the tool for face validity. Respect was paid to the respondents of their rights to participate or not to participate in the research process. Males and females were paid equal respect. Verbal consent was taken before administration of the tools. Privacy of the respondents was maintained and they were assured of the confidentiality of the data and anonymity of the persons involved.

Results

Awareness on Weight

Bodyweight is the most common and simple anthropometric measure used for assessment of current nutritional status (Roy & Saha, 2013). Awareness on one's own weight is necessary to

keep the body weight in normal range. The teachers were asked about their weight condition. Teacher's understanding of their own weight was found as follows:

Table 1. *Teachers' perception towards condition of their own weight*

		Perception on the condition of weight							
		Underweight		Overweight (Obese)		About the right weight		Don't know	
		N	%	N	%	N	%	N	%
District	Rasuwa	1	6.3	1	6.3	13	81.3	1	6.3
	Chitwan	9	7.1	27	21.4	83	65.9	7	5.6
	Bhaktapur	17	8.6	38	19.2	134	67.7	9	4.5
Sex	Male	18	7.3	48	19.4	169	68.4	12	4.9
	Female	9	9.7	18	19.4	61	65.6	5	5.4
Age group	Less than 24	5	10.4	0	0.0	40	83.3	3	6.3
	25 to 29	12	13.2	8	8.8	71	78.0	0	0.0
	30 to 34	3	4.3	23	32.9	36	51.4	8	11.4
	35 to39	2	3.7	10	18.5	41	75.9	1	1.9
	40 to 44	2	5.7	15	42.9	14	40.0	4	11.4
	45 to 49	0	0.0	4	19.0	17	81.0	0	0.0
	50 and more	3	14.3	6	28.6	11	52.4	1	4.8
Teaching subject	Health Related	1	2.6	11	28.2	27	69.2	0	0.0
	Natural Science	8	7.3	17	15.6	79	72.5	5	4.6
	Social Science	4	8.0	12	24.0	29	58.0	5	10.0
	Language	10	10.0	14	14.0	70	70.0	6	6.0
	Other	4	9.5	12	28.6	25	59.5	1	2.4
Type of school	Community	7	11.7	13	21.7	35	58.3	5	8.3
	Institutional	20	7.1	53	18.9	195	69.6	12	4.3
	Total	27	7.9	66	19.4	230	67.6	17	5.0

In totality, 67.6 percent teachers felt that they were about the right weight but 7.9 percent found themselves underweight and 19.4 percent overweight. A total of 5 percent were unaware of their weight condition. Moreover, 81.3 percent teachers in Rasuwa felt themselves being at the right weight, which was found to be less than 68 percent in the other two districts.

Similarly, 83.3 percent teachers of the age group less than 24 and 81 percent teachers of age group between 45 and 49 said they were at the right weight. Mostly, the teachers of age group between 40 and 44 said they were obese (42.9%) which was followed by the teachers of 30 to 34 (32.9%) and 50 above (28.6%).

While looking at this subjectwise, more than 70 percent of Natural Science and language teachers said they were at the right weight. However, 28.2 percent of health-related teachers and 28.6 percent other teachers were obese. This is a serious issue that a large number of health-related teachers themselves were obese.

Table 2. *Pearson chi-square tests*

		Condition of weight
Age group	Chi-square	68.032
	Df	18
	Sig.	0.000
Teaching subject	Chi-square	15.206
	Df	12
	Sig.	0.230
Type of school	Chi-square	4.018
	Df	3
	Sig.	0.260

Awareness on the condition of weight was found significantly related to the age group of the teachers. It was also found significant with teaching subject and the type of school. However, no significant relationship was found between this and sex and district of the teachers.

Body Mass Index

BMI of teachers was found through self-expressed measurements. The following table 3 shows the overall situation of the BMI calculation of the teachers.

Table 3. *Distribution of teachers on BMI categories*

BMI Categories	Frequency	Percent
Underweight	40	11.6
Normal weight	222	64.5
Overweight	82	23.8
Total	344	100.0

Table 3 reveals a clear picture of the overall situation of BMI categories among the secondary level teachers in Nepal. According to it, 64.5 percent teachers in total were at a normal weight, but 23.8 percent teachers were at obese situations and 11.6 at underweight. This mal-nutritional situation was found to be slightly more than the teachers' awareness on their own weight (as in table 1).

Furthermore, age-wise distribution of BMI categories was also calculated which is shown as follows:

Table 4. *Age-wise distribution of BMI categories*

		Categories of BMI		
		Under Weight	Normal Range	Overweight
		%	%	%
Age group of respondents	Less than 24	25.0	60.4	14.6
	25 to 29	13.8	73.4	12.8
	30 to 34	8.5	60.6	31.0
	35 to39	1.9	70.4	27.8
	40 to 44	2.9	62.9	34.3
	45 to 49	0.0	57.1	42.9
	50 and more	23.8	52.4	23.8

According to table 4, a total of 25 percent of teachers of less than 24 years and 23.8 percent of 50 years old or above were underweight. On the other hand, about 43 percent teachers of 45-49 years old were found to be obese. Obesity was found to be lower among lower age teachers, among less than 24 years and 25-29 years age groups.

Hypertension

The teachers were asked about their blood pressure. The findings revealed a similar result as in Aryal, et al. (2014).

Table 5. *Agewise situation of blood pressure*

		Blood pressure							
		Normal		Lower than normal		Higher than normal		Do not know / have not checked	
		N	%	N	%	N	%	N	%
Age group	Less than 24	39	81.3	5	10.4	0	0.0	4	8.3
	25 to 29	73	77.7	15	16.0	3	3.2	3	3.2
	30 to 34	55	77.5	6	8.5	9	12.7	1	1.4
	35 to39	42	77.8	2	3.7	5	9.3	5	9.3
	40 to 44	24	70.6	2	5.9	6	17.6	2	5.9
	45 to 49	12	57.1	0	0.0	9	42.9	0	0.0
	50 and more	14	66.7	2	9.5	5	23.8	0	0.0
	Total	259	75.5	32	9.3	37	10.8	15	4.4

As per table 5, more than three fourth of the teachers in total had their blood pressure normal. However, 10.8 percent teachers' blood pressure was found to be higher than normal. Mostly the senior teachers had had high blood pressure (42.9% of 45-49 years old ones and 23.8% of 50 above teachers had high blood pressure).

Discussion

More than two third teachers perceived themselves at a right weight, and BMI of the teachers also actually shows that 64.5 percent teachers in total were at a normal weight and a total of 75 percent teachers had normal blood pressure. However, about a quarter or even more number of teachers were having issues of weight, BMI and hypertension in this study. National Heart, Lung, and Blood Institute (2005) explains that if a person is overweight or obese, they are at higher risk of developing serious health problems, including heart disease, high blood pressure, type 2 diabetes, gallstones, breathing problems, and certain cancers.

A study was conducted to find the association between BMI and health and health-related quality of life (HRQL) in Chinese adults. According to Zhu et al. (2015), the class I obese had better HRQL in both the physical and the mental domains than the normal weight, especially in the mental well-being, the class II obese mainly had an adverse association in the physical functioning activities, and the underweight had the lowest HRQL scores in both the physical and mental component summary. In this study too, a substantial number of both obese and underweight teachers was found which also indicates the possibility of Nepalese teachers with low HRQL.

Hypertension is a chronic disease where the level of pressure of blood is high, at which action is warranted. This is known as 'high blood pressure' which is a major risk factor for coronary heart disease, stroke, heart and kidney failure (Park, 2015). A systolic pressure around 120 mm of Hg and diastolic pressure around 80 mm of Hg is termed as normal blood pressure for a normal adult. Hypertension is said to be present if it is often at or above 140/90 mmHg. However, using any specific cut-off point is subjective.

Normally, when the aging starts among people, blood pressure will increase slightly. But the rate of occurring high blood pressure in senior teachers of Nepal was found to be in a critical condition. It seems to be related to BMI as per age too because BMI shows a tendency to increase as per age, so does the blood pressure.

As per the University of Bristol (2018), the effects of total fat, along with fat in the trunk, arms and legs, on 230 different traits relevant to metabolism and future heart disease risk, such as cholesterol and blood pressure were studied. These effects were compared with those seen when using BMI as a measure. Higher total fat at age 10 and 18 was found associated with damaging levels of cardio-metabolic traits such as higher blood pressure and adverse cholesterol and inflammatory profiles at age 18 (Bell et al. 2018). The results support abdominal fatness as a primary driver of cardio-metabolic dysfunction and BMI as a suitable tool for identifying its effects (Bell et al., ibid).

Maintaining a healthy weight as per height is important to reduce the chances of various health problems. However, it seems that a large number of Nepalese teachers are not aware of maintaining their weight as per height and hence susceptible to the increased risk for many diseases and health conditions, including the following: Hypertension, Dyslipidemia (for example, high LDL cholesterol, low HDL cholesterol, or high levels of triglycerides), Type 2 diabetes, Coronary heart disease, Stroke, Gallbladder disease, Osteoarthritis, Sleep apnea and respiratory problems, and some Cancers (endometrial, breast, and colon) (Centers for Disease Control and Prevention, 2011). It was found that a total of 35.5 percent teachers did not have normal BMI in this study. This study also revealed a possible problem of cardio-vascular disease like blood pressure among the teachers due to improper BMI measures. These teachers will not be presenting themselves right role modeling in front of their students.

A role model is a person whose behavior, example and success are or can be imitated by others, especially by younger people. Sociologist Robert K. Merton who coined the phrase 'role model' (Calhoun, 2010), hypothesizes that individuals compare themselves with reference groups of people who occupy the social role to which the individual aspires (Holton, 2004). Merton emphasizes that rather than a person assuming one role and one status, they have a status set in the social structure that has attached to it, a whole set of expected behaviors (Holton, 2004).

Generally, role models are understood to be other persons who, either by exerting some influences or simply by being admirable in one or more ways, have an impact on another (Nauta & Kokaly, 2001 as cited in Schroeter, 2002). A role model can give a person an idea of how they would like to be. School teachers have already been where their students are going,

undergone what they will go through and are in a position to pass along lessons, not only regarding the subject matter but lessons on life (2U, Inc., 2020).

The theoretical underpinning for role models is the social learning theory. According to this theory, people learn behavior by observing it in others and repeat it if it appears beneficial to them (Schroeter, 2002). Albert Bandura, a social cognitive theorist, propounds that people can learn by observing the behavior of others. Aronson, Wilson and Akert (1997) say that children have never been good at listening to their elders, but they have always been successful to imitate them. Individuals can also learn by observing what happens to other people and just by being told something, as well as by direct experience.

In Bandura's model of observational learning, Santrock (2006) considers four processes: attention, retention, production and motivation. The first specific process 'attention' indicates to the qualities in a teacher to attract the students to his/her doing or saying. Before students can imitate a model's actions, they must be there to see or hear what the model is doing or saying. Although attention to the model is influenced by a number of qualities, students are always more likely to be rapt to high-status models. Santrock (2006) concludes that in most cases, teachers are high-status models for students.

The second specific process 'retention' is the ability of a student to code the information and keep it in memory so that it can be retrieved in order to reproduce a model's actions. That the student's retention will be improved when teachers give vivid, logical, and clear demonstrations besides just telling the students to do this or that. This is the situation where a large number of Nepalese teachers, particularly senior teachers failed in presenting vivid examples and clear demonstrations of health status in terms of maintaining body weight, BMI and hypertension.

Conclusions

Age factor seems to play role in determining the awareness on the condition of weight. Higher BMI was linked to higher blood pressure. More the age, higher was the BMI category and so was the blood pressure. Mostly the senior teachers do not bear a good health situation in these indicators. The study indicated to a situation of poor observational learning to the students by the teachers who did not bear normal BMI. As regards Bandura's model of observational learning, it was perceived that a large number of senior Nepalese teachers were drawing less attention and creating less retention among the students through body imaging. Poor body weight, higer BMI and hypertension among the senior teachers are negative indicators to be a role model teacher. Hence, the initial steps or the processes of observational learning become weakly absorbed among the students which contribute to the creation of poor role modeling in terms of body measurements by the teachers in Nepalese schools.

The implications of this study are directed on continual lifestyle improvement activities among the teachers irrespective of their age. Senior teachers must focus more on their health. Since teaching is a profession to present healthy role modeling each and every moment, poor lifestyle never leads to the healthy role modeling. Health promotion goes beyond health care. So, they should, instead of seeking medical aid only, develop their personal skills through

information sharing, educating for health and enhancing life skills. It is necessary to change their lifestyle to improve condition of weight, BMI and hypertension before it reaches to a disastrous end. Schools should support them to follow healthy lifestyle by involving them in some school based health promotion interventions like weight reduction, yoga, meditation, sports, health clubs, aerobics, etc. In addition, teachers can prepare teacher quality circles within schools to identify their problems, prioritize them, and seek solutions. This combined action will empower and enable them to learn and prepare themselves for all stages of life to cope with health hazards, illnesses and poor lifestyle at work and home. This increases the options available to the teachers to exercise more control over their own health and over their environments, and to make choices conducive to health.

Limitations of the Study

This research was carried out with the perceived answers of teachers which showed there are several problems in their health status. Results of this study indicated that there is a need to carry on a national survey of teachers' health condition even through medical examinations. This will result in more accurate conditions of the health of Nepalese teachers.

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