Effect of Web Based Health Education on Young Adults Weight Maintenance and Nutritional Knowledge

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Abstract **Background**: Lack of nutritional knowledge may lead to weight gain which led to several chronic disease as diabetes and hypertension. Therefore, the need to focus on the increasement of nutritional knowledge is essential. **Aim:** The aim of this study was to assess the effect of Web Based Health Education on Young Adults Weight and Nutritional Knowledge **Design**: A quasi-experimental research design was utilized to accomplish this study. **Sample** type: Purposive sampling technique was used to recruit Subjects and Setting: Total number of 132 young adults, who were invited through World Wide Web (WWW) for globalization. Anthropometric data were collected, and nutritional knowledge was evaluated. **Tools:** Three online self-administered questionnaires were used to assess nutritional health status of participants and their nutritional knowledge. **Results:** The present study revealed that the weight average decreased from 77.69(14.1) before the intervention to 68.84(13.3) 3 month after intervention and to 72.12(12.32) 6 months after intervention. There was statistically significant difference before and after 3 months of interventions (p=0.000) related to level of knowledge regarding nutrition. **Conclusion**: This study concluded that the majority of participants had higher score of knowledge after 3 and 6 months of intervention related to healthy nutrition which help in weight loss. **Recommendation:** This study was recommended to apply web-based health education for overweight and obese adults in different setting and worksite and integrate web-based education in all healthy promotion programs to enhanced healthy behavior.

Keywords: *overweight, obesity, weight management, web based, young adult*

Cite This Article: Eman R. El-Refaay, Amel I. Ahmed, and Nagwa M. Salem, "Effect of Web Based Health Education on Young Adults Weight Maintenance and Nutritional Knowledge." *American Journal of Nursing Research*, vol. 9, no. 5 (2021): 171-175. doi: 10.12691/ajnr-9-5-3.

1. Introduction

Young adults are 'vulnerable group' for overweight and obesity due to unhealthy lifestyles hence this is a critical stage in a person's life course Due to Young people generally give little attention to their future health. [1]

Worldwide, in 2016, more than 1.9 billion adults aged 18 years and older were overweight. Over 650 million adults of them were obese . [2] Adults aged 15 years and older from 16 countries in the Arab countries including Egypt showed the highest levels of overweight and obesity. The prevalence of overweight and obesity in these countries ranges from 74% to 86% among women and 69% to 77% among men. [3]

Obesity is associated with health-related behaviors which is contributing to increasing in rates of chronic diseases such as diabetics mellitus, coronary heart disease, and degenerative joint disease. [1,4] Overweight and obesity are a multifactorial disorder due to both non-modifiable and modifiable factors. Biological factors such as age, sex, ethnic group, and familial characteristics are nonmodifiable factors. While modifiable factors are level of physical activity, dietary patterns, and nutritional knowledge. [5]

The most common causes of weight gain during young adulthood are marked declined physical activity (PA), increases in sedentary behavior, and poor dietary habits. [6] The common barriers to healthy weight maintenance among young adult are time constraints, inadequate self-regulation skills, and a lack of environmental support for healthy eating and physical activity. Education and health awareness are enablers to healthy weight maintenance. [7]

Nutritional knowledge is important determinants of overweight and obesity Knowledge about proper dietary pattern and the importance of healthy food habits is necessary to change and improve eating behavior. [8,9]

Technology may offer a cost-effective means of engaging young adults in maintaining their body weight. The current generation of young adults are among the highest users of digital technologies such as social media, mobile phones, and wireless information sharing platforms. [6,10] Nurses can intervene for body weight maintenance by providing health education that promote knowledge about healthy dietary pattern for long-term weight management. [8] Because the internet has entered to daily life of these age groups the current study aims at investigating the effect of web-based health education on weight maintenance and nutritional knowledge among young adults.

2. Aim of Study

The aim of this study was to assess the effect of web based health eeducation on young adults weight maintenance and nutritional knowledge.

3. Material and Methods

3.1. Study Design and Participants

Quasi-experimental design was utilized in this study that was carried out at World Wide Web (WWW) for globalization. Young adults aged from 18- to 30 years old of both sexes who use internet access were invited to participate on this study. Invitations were sent through social media and e. mails. Young adults with health condition that interferes with dietary habits such as diabetes mullites, hypothyroidism, hyperthyroidism, and pregnancy were excluded.

3.2. Sampling

Purposive sampling technique utilized to recruited participants in this study. Sample size was calculated by assuming α level to equal 0.05, β level equal 0.20 and the desired power is 80%, when the assumed standard deviation of difference= 3.9, in body weight and the size effect= 1. [11] The minimum required subjects by considering non respondents by adding 10% are 131 participants). [12]

3.3. Methods

3.3.1. Preparatory Phase

1. Administrative process
Ethical Considerations:
Ethical approval was obtained from the Research Ethics Committee of Faculty of Nursing, Mansoura University for conducting the study. And verbal consent was obtained from the participants after clarifying the aim of the study and ensuring confidentiality of data. Participants were informed that they have the right to withdraw at any time from the study without giving any reason.

2. Developing the study tools:
Three online self-administered questionnaires were developed by the researcher based up on relevant literature. Data collection tools used to assess demographic characteristics such as age, gender, education, residence area, and occupation. Nutritional health statuses of participants include anthropometric measurement such as body weight, height, and waist circumference. Body mass index was calculated by using online calculator. According to the CDC, (2020) [13] overweight in adults is defined as BMI $\geq$ 25.0 to < 30.0 and obesity as BMI $\geq$30.0.

3. Pilot study:
Validity of the developed tools was tested by the following for their content validity by submitting the tools to a jury of 5 experts in the field of "community health nursing". A pilot study was included 10% of study sample study sample (n= 13) for testing the face validity of the developed data collection tools.

Reliability for the practice was done by using Cronbach's alpha and the result was 0.74. Based on the collected information. Accordingly, the required modifications were done.

3.3.2. Procedure

Data collection included participants' knowledge about healthy nutrition and the components of different food stuffs were assessed through answering total number of 21 questions. These questions tackled components of healthy diet and its benefits, as well as causes and management of obesity. The total scores of knowledges were 21 points with cut off point for the poor knowledge level less than 50% of total scores, fair level for 50% to less than 65% of total sores was and good level for more than 65% of total scores.

The online self-administered questionnaires were uploaded on the website "www.thehealthgardens.com". The health education module was developed and uploaded to the website "www.thehealthgardens.com". The content of health education module consisted of videos that supported with multimedia. The content included the component of healthy diet and its importance, healthy eating plate and plan for weight maintenance. The nutritional education intervention was supported by psychological massages to reinforce motivation, and goal setting through their email. Any questions raised by the participants were answered and they were provided with feedback through email or chatting on the website.

All participants who fulfilled the inclusion criteria were directed to the health education module link upon the completion of the pre-intervention assessment and were requested to enroll themselves for a brief web-based module. Self-reported height and weight were used to calculate body mass index. All participants were instructed to follow the uploaded advice on the website that helps them to manage their weight.

Participants' weight and BMI nutritional knowledge were evaluated through the online self-structured questionnaire on the website at three- and six-months post intervention.

3.3.3. Data Analysis

Statistical analyses were performed using the statistical software Stands for Statistical Product and Service Solutions (SPSS) v20, arithmetic mean ± standard deviation for continuous variables and percentages for categorical variable. Chi-square, fisher's exact and monte-Carlo test used to test association. They were tested for normality by Kolmogorov-Smirnov test. Paired T test was used for comparison between 2 paired within one group. ANOVA with repeated measure test was used for comparison between and within groups for normal data. All tests were performed at a level of significance (P-value) equal or less than 0.05 was considered statistically significant.

4. Results

Table 1 shows that the age of the studied young adults ranged from 18 to 30 years with a mean age 24.69(3.104). Most of participants were female (84.8%). As regards to

their education 59.8 % and 29.6% were graduated and post graduated university students, respectively. Regarding marital status 68.2% and 28.8% of them were married and single respectively.

Table 2 displays that the weight average decreased from 77.69(14.1) before the intervention to 68.84(13.3) 3 month after intervention and to 72.12(12.32) 6 months after intervention. There were highly statistically significant differences in body weight and BMI before and after intervention (P=.000).

Table 3 illustrates the distribution of participants according to their level of knowledge regarding healthy diet components and its benefits before 3 months and 6 months after intervention. It was observed 21.2 % of participants showed good score level of knowledge with mean 4.26 (1.76) related to healthy diet components before intervention. While their knowledge increased to 97.7% with mean 7.84(1.09) three months after intervention and to 84.1% with mean 7.33(1.56) after six months. The difference was significant between before, after 3 months and after 6 months regarding the previous item.

Table 1. Participant -demographic characteristics

Items	*N*= 132	%
Age:		
From 18 to less than 20	4	3.0
From 20 to less than 25	59	44.7
From 25 to 30	69	52.3
$\overline{X}$(SD)	24.69 (3.104)	
Gender:		
Male	20	15.2
Female	112	84.8
Education:		
Diploma	1	.8
Undergraduate	13	9.8
Bachelor's	79	59.8
Postgraduate	39	29.6
Marital status		
Single	38	28.8
Married	90	68.2
Divorced	2	1.5
Widow	2	1.5

Table 2. Participant's anthropometric indices before and after web-based health education

Items	N=132				
	Test time				
	Pre- test	After 3 months	After 6 months	Test of significance	p-value*
	$\overline{X}$(SD)	$\overline{X}$(SD)	$\overline{X}$(SD)		
Body weight/ Kg	77.69(14.1)	68.84(13.3)	72.12(12.32)	F	.000
BMI	28.49(4.6)	25.14(4.4)	26.37(4.2)	F	.000
Waist circumference / Cm	84.24(8.2)	81.24(8.2)	80.99(7.9)	F	.000

F: Repeated measure ANOVA
* Significant (p≤ 0.001).

Table 3. Participant's nutritional knowledge score level

Knowledge items	N=132							
	Test time							
	Pre- test		After 3 months		After 6 months		Test of significance	p-value*
	N	%	N	%	N	%		
Healthy diet and its components (9 marks)								
Good	28	21.2	129	97.7	111	84.1	MC	0.000
Fair	18	13.6	3	2.3	10	7.6		
Poor	86	65.2	0	0	11	8.3	F	0.000
$\overline{X}$(SD)	4.26 (1.76)		7.84(1.09)		7.33(1.56)			
Healthy diet benefits (3 marks)								
Good	89	67.4	132	100	132	100	MC	0.000
Fair	0	0	0	0	0	0		
Poor	43	32.6	0	0	0	0	F	0.000
$\overline{X}$(SD)	2.3 (.93)		3(0.0)		3(0.0)			
Cause of obesity (5 marks)								
Good	103	78	132	100	132	100	MC	0.000
Fair	19	14.4	0	0	0	0		
Poor	10	7.6	0	0	0	0	F	0.000
$\overline{X}$(SD)	4.17(1)		4.99(.09)		4.95(.21)			
Management of obesity (4 marks)								
Good	108	81.8	132	100	132	100	MC	0.000
Fair	11	8.3	0	0	0	0		
Poor	13	9.9	0	0	0	0	F	0.000
$\overline{X}$(SD)	2.94(.84)		4(0.0)		4(0.0)			
Total knowledge score (21 marks)								
Good	58	43.9	132	100	132	100	MC	0.000
Fair	64	48.5	0	0	0	0		
Poor	10	7.6	0	0	0	0	F	0.000
$\overline{X}$(SD)	13.67(2.56		19.83(1.11)		19.29(1.57)			

F: Repeated measure ANOVA, MC: Monte Carlo test.

Table 4. Mean difference between the knowledge categories and total knowledge score before and after six months of intervention

Knowledge categories	Pre-test $\overline{X}$(SD)	Post-test after 6 months $\overline{X}$(SD)	% of change	T test	p-value *
Healthy diet and its components (9 marks)	4.26 (1.76)	**7.33(1.56)**	72	17.3	0.000
Healthy diet benefits (3 marks)	2.3 (.93)	3(0.0)	30.4	8.6	0.000
Causes of obesity (5 marks)	4.17(1)	4.95(.21)	18.7	9.1	0.000
Management of obesity (4 marks)	2.94(.84)	4(0.0)	36.1	14.6	0.000
Total knowledge score (21)	13.67(2.56)	19.29(1.57)	41.1	23.6	0.000

T: Paired T test

* Significant (p≤ 0.001).

In relation to benefits of healthy diet 67.4 % of participants showed good score level of knowledge with mean 2.3 (.93) related to healthy diet components before intervention. While their knowledge increased after intervention to 100% with mean 3(0.0) three months after and to 100% with mean 3(0.0) six months after. The difference was significant between before, after 3 months and after 6 months regarding the previous item.

Regarding causes of obesity, it was observed 78% of participants showed good score level of knowledge with mean 4.17(1) related to causes of obesity before. While their knowledge increased after intervention to 100% with mean 4.99(.09) three months after intervention and to 100% with mean 4.95(.21) after six months. The difference was significant between before, after 3 months and after 6 months regarding the previous item.

Regarding the managements of obesity 81.8 % showed good score level of knowledge related with mean 2.94 (.84) before intervention. While their knowledge increased to 100% with mean 4(0.0) three months after intervention and to 100% with mean 4(0.0) after six months after. The difference was significant between before, after 3 months and after 6 months regarding the previous item.

As regards to participants total score level of knowledge related to nutrition, 43.9% showed good score level of knowledge with mean 13.67(2.56) before intervention. While their knowledge increased after intervention to 100% with mean 19.83(1.11) three months after and to 100% with mean 19.29(1.57) six months after. The difference was significant between before, after 3 months and after 6 months regarding overall knowledge.

Table 4 Reveals that means differences of knowledge score level categories and total knowledge score before and after intervention. It was noticed that all means increased after intervention. The total knowledge score was increased by 41.1% after intervention. There were statistical significance differences in all knowledge categories before and 3 months after intervention.

5. Discussion

Young adults are gaining weight faster than any other age group due to unhealthy lifestyle changes such as excessive snacking, and unhealthy meal choices. [14] The aim of this study was to investigate effect of web-based health education on young adults' weight maintenance and nutritional knowledge.

The components of health education in this study consisted of basic nutrition knowledge and weight control through eating habits. This was in agreement with study conducted by Visiedo and Palao (2017). [15] Their

educational program goal was to provide knowledge about nutrition and weight control and its risks.

The present study showed that there were statistical differences in weight, BMI and waist circumference before and after intervention due to web-based intervention. This finding agrees with systematic review conducted in "Web-Based Digital Health Interventions" for weight loss which reported that web-based digital interventions led to greater short-term but not long-term weight loss. [16] Also, Thielemann, (2012) [17] indicated that enrollment in nutrition courses could be effective controlling weight gain among college students.

Management of overweight and obesity requires providing individuals with a base of information that allows them to make knowledgeable food choice. Providing knowledge is for the purpose of activating self-management of individuals and enables them to make informed decisions about their dietary pattern.

Concerning the nutritional knowledge, this study reported a low level of nutritional knowledge before intervention. There was a highly significant improvement in nutrition knowledge after exposing participants to the health education module. This agrees with the study conducted by Mohandas., (2020) [18] who reported that knowledge scores demonstrated significant changes between pre intervention score. Improvement in the nutrition knowledge plays an important role in body weight management. The finding of this study revealed that there was high significance reduction in body weight and BMI in relation to the improving of nutrition knowledge among participants. The current results are similar studies that indicated the positive effect of enriched nutrition knowledge on controlling body weight. [19,20] Moreover, the knowledge about healthy nutritional help in makes the right dietary choices for weight management. [21]

6. Conclusion

Based on the study findings, it is concluded that there were highly statistically significant differences in body weight and BMI before and after intervention. Most of participants had higher score of knowledge after3, and 6 months of intervention related to healthy nutrition which improves their dietary habits and help in managing their weight.

7. Recommendations

Based on the finding of the present study: it was recommended the following: applying web-based health education for overweight and obese adults in different

setting and worksite and integrating web-based education in all healthy promotion programs to enhanced healthy behavior.

References

[1]	Kingsland. J, "Weight loss in young adults with obesity may halve mortality risk." (2020). Available https://www.medicalnewstoday.com/articles/weight-loss-in-young-adults-with-obesity-may-halve-mortality-risk#Healthy-weight/.[Accessed July., 2020].

[2]	WHO. (2021). Obesity and overweight. Available https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight/.
[Accessed Jun. 2, 2021].

[3]	WHO. (2021). EMRO |Obesity| Health topics Available http://www.emro.who.int/health-topics/obesity/Page-1.html [Accessed Jun. 2, 2021].

[4]	Sheha E., Hassan H., Gamel W. (2018) Association between pre-pregnant overweight and obesity and periodontal disease during pregnancy: a cross sectional study. *International Journal of Studies in Nursing.;* 3(1): 1-21.

[5]	Bezerra, L.; Lima, S.M.; Correia, L.; Costa, R. (2016). Nutrition knowledge assessment studies in adults: A systematic review. Cien. Saude Colet., 21, 449-462.

[6]	Willmott, T. J., Pang, B., Rundle-Thiele, S., & Badejo, A. (2019). Weight Management in Young Adults: Systematic Review of Electronic Health Intervention Components and Outcomes. *Journal of medical Internet research*, 21(2), e10265.

[7]	Sand A, Emaus N, Lian OS. Motivation and obstacles for weight management among young women-a qualitative study with a public health focus - the Tromsø study: Fit Futures. *BMC Public Health* 2017 Dec 08; 17(1): 417.

[8]	López-Hernández, L., Martínez-Arnau, F. M., Pérez-Ros, P., Drehmer, E., & Pablos, A. (2020). Improved nutritional knowledge in the obese adult population modifies eating habits and serum and anthropometric markers. Nutrients, 12(11), 1-14.

[9]	Balani, R., Herrington, H., Bryant, E., Lucas, C., & Kim, S. C. (2019). Nutrition knowledge, attitudes, and self-regulation as predictors of overweight and obesity. Journal of the American Association of Nurse Practitioners, 31(9), 502-510.

[10]	Hassan H., (2017). Terms and concepts of E-Learning. *of Distance Learning and Open Learning*, 5(8): 121-135.

[11]	Margaret, M., & Howarth, E. (2014). A Web-Based Weight Loss Programme Including Breakfast Cereals Results in Greater Loss of Body Mass than a Standardised Web-Based Programme in a Randomised Controlled Trial, 361-375.

[12]	Rosner B. (1995). F*undamentals of Biostatistics*. 4th ed. Duxbury Press; 1995. Page 221.

[13]	CDC, (2020). Healthy weight, nutrition, and physical activity. https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html.

[14]	Cheng, H. L., Medlow, S., & Steinbeck, K. (2016). The Health Consequences of Obesity in Young Adulthood. Current obesity reports, 5(1), 30-37.

[15]	Visiedo, A., & Palao, J. M. (2017). Effect of educational training on nutrition and weight control in under-18 Spanish wrestlers. Motriz. Revista de Educacao Fisica, 23(1), 76-80.

[16]	Beleigoli, A. M., Andrade, A. Q., Cançado, A. G., Paulo, M. N. L., Diniz, M. D. F. H., & Ribeiro, A. L. (2019). Web-based digital health interventions for weight loss and lifestyle habit changes in overweight and obese adults: Systematic review and meta-analysis. *Journal of Medical Internet Research*, 21(1).

[17]	Thielemann, B. (2012). Assessment of nutritional knowledge and eating behaviors on the weight and obesity of college students.. 114. Available http://scholarworks.uark.edu/ghesuht Recommended. [Accessed April. 8, 2021].

[18]	Mohandas, K., Lalitha, P., Krishna Kumar, S., & Haridas, K. (2021). The effect of nutrition intervention based on a Knowledge-Attitude-Practice questionnaire in the weight management of overweight and obese persons. *IP Journal of Nutrition, Metabolism and Health Science*, 3(4), 124-131.

[19]	Burch, H. (2018). Measuring the Nutrition Knowledge of Weight Management and diabetes risk in a low socioeconomic population May, p 1-111.

[20]	Gilardini L, Cancello R, Caffetto K, et al. Nutrition knowledge is associated with greater weight loss in obese patients following a multidisciplinary rehabilitaiton program. *Minerva Endocrinologica*. 2020 Jul.

[21]	Soini, S., Mustajoki, P., & Eriksson, J. G. (2016). Weight loss methods and changes in eating habits among successful weight losers. *Annals of Medicine*, 48(1–2), 76-82.