Efficacy of Health Education using Facebook to Promote Healthy Lifestyle among Medical Students in Puducherry, India: A Non-Randomized Controlled Trial

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ABSTRACT

Introduction: Increasing burden of overweight and obesity among young adults is mainly due to unhealthy lifestyle especially with respect to diet and physical activity. At the same time, younger generations are spending more time with social network sites. Therefore, this study was intended to explore the role of social networking sites in promoting healthy lifestyle.

Aim: To measure the efficacy of health education using social networking sites in promoting healthy lifestyle among medical students in Puducherry, India.

Materials and Methods: A non-randomized controlled trial was conducted in a private medical college located in Puducherry. The study participants were overweight/obese individuals with (intervention arm) and without Facebook account (control arm). Following a baseline survey, both the groups received health education from dietician and physical trainer using Audiovisual (AV) aids. Intervention group received health education through Facebook in the forms of messages, pictures and videos for six weeks. Then, follow up survey was done to assess the change in dietary pattern, physical activity and body weight. Data of those who attended baseline, intervention and follow up surveys (23- control and 22- intervention) were analysed. Means and proportions were calculated. Paired t-test and Chi-square test were used to calculate the p-value. The p-value<0.05 was considered as statistically significant.

Results: Mean number of days of junk food intake per week was reduced in both control and intervention groups from 2.91 days/week and 3.27 days/week at baseline to 2.65 days/week to two days/week at follow up respectively. A significant decrease in the Body Mass Index (BMI) (p<0.05) was found among the control group (baseline: 25.57, follow up: 25.15). No significant changes were found with respect to physical activity and intake of fruits and vegetables.

Conclusion: Except for the decrease in junk food intake, use of Facebook as an effective tool to promote healthy lifestyle could not be proved with confidence.

Keywords: Behaviour change, Healthy diet, Physical activity, Social network

INTRODUCTION

According to World Health Organisation (WHO) in 2008, 1.4 million adults, 20 years and older, were overweight. Of these overweight adults, over 200 million men and nearly 300 million women were obese. Over 30 million overweight children were living in developing countries and 10 million in developed countries [1]. Once considered a high- income country's problem, overweight and obesity are now in rise in low- and middle- income countries, particularly in the urban settings. The prevalence of obesity has increased significantly in the last few years in urban Asian Indian adolescents aged 14–17 years [2].

According to the Indian Journal of Endocrinology and Metabolism, the prevalence of overweight has risen from 2% to 17.1% [3]. The fundamental cause of obesity is an energy imbalance between calories consumed and calories expended. Excessive intake of junk food, lesser intake of fruits and vegetables and lack of regular physical exercise are the major causes for obesity and overweight.

The invention of the internet was one of the biggest highlights of the 21st century. Some studies had been done using web based interventions to promote healthy behaviour [4,5]. Among web based interventions, social networking sites could be used as a potential tool for health education. Facebook is the most popular social networking site with a user base of more than one billion throughout the world. Indians are major Facebook users and if we can tap this resource to provide health education it would prove to be a great breakthrough. In few randomized controlled trails, Facebook have been found to be effective in improving the levels of physical activity

and dietary intake [6,7].

Facebook being cost effective, having extensive reach, less time consuming and convenient for the user would prove to be the ideal intervention platform for increasing physical activity and prevent obesity.

Therefore, this study was conducted to measure the efficacy of health education using social networking sites to promote healthy lifestyle among medical students in Puducherry.

MATERIALS AND METHODS

A non-randomized controlled trial was conducted among the medical students of a Medical College in Puducherry, Southern India, between July 2014 and August 2014. Ethical clearance was obtained from Institutional Ethical Committee (IEC). Undergraduate medical students studying in the second clinical year (third year MBBS) were selected as the study participants for the control group. The criterion for selection in control group was that they should be overweight/obese (BMI ≥23) [8]. Out of the 85 students in the third year of MBBS, there were 36 eligible participants. Only 30 consented to participate in the study and they were included as study participants in the control group. First clinical year (second year MBBS) students with BMI ≥ 23 and those who have a Facebook account and login at least thrice a week were selected for the intervention group. There were 32 eligible participants out of the 96 students in the second year of MBBS. Consent was given by 31 students and they were included as study participants in the intervention group.

A baseline survey was conducted among both control and intervention groups using a pretested structured questionnaire adapted from WHO STEPS questionnaire which consists of variables on socio-demographic and lifestyle factors like physical activity and dietary habits (intake of fruits, vegetables and junk foods) [9]. Bathroom weighing scale and stadiometer were used to measure the weight and height of the students respectively. BMI was calculated. Both groups were educated by a team of dietician, physical education trainer and public health specialist for one hour duration using audio visual aids in a lecture hall.

The students belonging to the intervention group were then invited to join a private Facebook group in which the health education messages were posted thrice a week for six weeks in the form of pictures, videos, quotes, etc. Content of health education was decided by a team of dietician, physical education trainer and public health specialist. No such intervention was done for the control group. After six weeks of Facebook intervention, follow up survey was done for both the groups to assess if there was a change in dietary pattern and physical activity using the WHO STEPS questionnaire and to determine if there was any reduction in weight.

STATISTICAL ANALYSIS

All the data was entered in Microsoft Excel 2007 and analysis was done in SPSS version 17.0. Means and proportions were calculated. Paired t-test was used to compare the means and Chi-square test was used to compare the proportions between the groups and p-value was calculated. A p-value<0.05 was considered as statistically significant.

RESULTS

Only 23 students out of 30 participants in the control were included for analysis as they went through all the phases (baseline survey, follow up survey and conventional health education intervention) of project. Only 22 out of 31 participants in the intervention arm participated in baseline survey, follow up survey, conventional health education and Facebook intervention. Therefore, analysis was done only for them [Table/Fig-1].

The proportion of study participants in the age group of 18-20 years was higher in the intervention group (90.9%) than the control group (60.8%). The distribution of sex was similar in both the control and intervention groups. The proportions of study participants
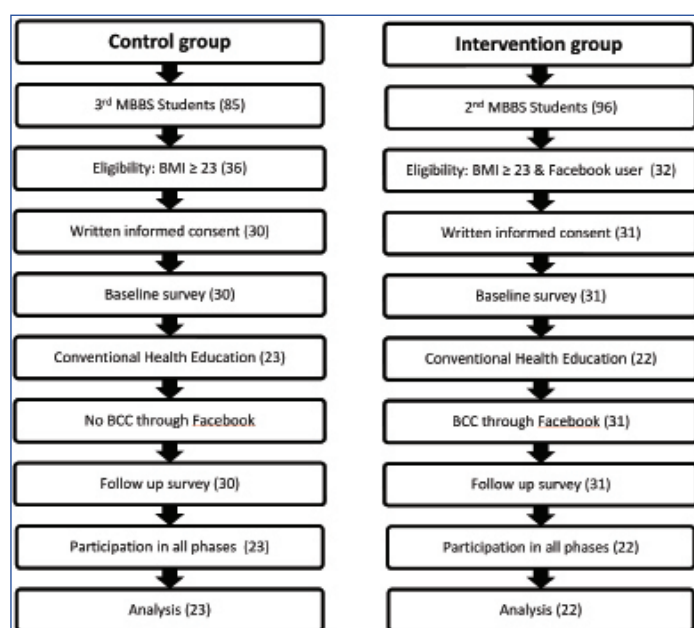
staying at hostel in control and intervention groups was 60.8% and 68.1% respectively. With respect to socio-economic status, the study participants were distributed uniformly in both the groups [Table/Fig-2].

The comparison of physical activity levels between baseline and follow up surveys in control and intervention groups is shown in [Table/Fig-3]. The mean minutes per week of moderate physical activity during training at baseline for the intervention group was found to be 9.32 minutes/week which increased to 12.27 minutes per week after intervention. However, there was no statistically significant difference. Mean minutes per week of physical activity during travel was found to be increased from 761.52 minutes/week and 298.18 minutes/week at baseline to 1036.52 minutes/week and 496.36 minutes/week at follow up in control and intervention groups respectively. But these differences were not found to be statistically significant. The mean minutes per week of recreational moderate physical activity for the control and intervention group increased from 71.52 minutes/week and 52.95 minutes/week at baseline to 96.96 minutes/week and 53.41 minutes/week at follow up respectively. However, these differences were not statistically significant.

The comparison of dietary pattern between baseline and follow up

Variables	Control n (%)	Intervention n (%)	p-value
Age groups			
18 – 20 years	14 (60.8%)	20 (90.9%)	<0.001
21 – 23 years	9 (39.1%)	2 (9.09%)	
Sex			
Male	12 (52.1%)	12 (54.5%)	0.873
Female	11 (47.8%)	10 (45.4%)	
Place of stay			
Hostel	14 (60.8%)	15 (68.1%)	0.608
Home	9 (39.1%)	7 (31.8%)	
Monthly family income (Rs.)			
≤ 50,000	6 (26.08%)	7(31.8%)	0.700
50,000- 1,00,000	8 (34.7%)	9 (40.9%)	
>1,00,000	9 (39.1%)	6 (27.2%)	

[Table/Fig-2]: Sociodemographic characteristics of study participants in control (n=23) and intervention (n=22) groups.

Physical Activity (Mean minutes/ week) SD	Control (n = 23)		p-value	Intervention (n = 22)		p-value
	Baseline	Follow up		Baseline	Follow up	
During academic training#						
Vigorous activity	0(0)	0(0)		0(0)	0(0)	
Moderate activity	32.4 (87.8)	0(0)	0.09	9.3 (25.3)	12.3 (57.6)	0.81
During traveling						
Walking/cycling	761.5 (887.9)	1036.5 (2428.0)	0.55	298.1 (474.5)	496.4 (923.5)	0.39
During recreation						
Vigorous activity	109.4 (238.1)	57.8 (162.9)	0.16	259.1 (287.9)	107.7 (206.1)*	<0.001*
Moderate activity	71.5 (137.1)	96.9 (158.9)	0.55	52.9 (83.4)	53.4 (96.7)	0.96
Sedentary behavior$						
Mean minutes/ day(SD)	641.7 (160.2)	600 (169.7)	0.29	624.6 (157.8)	670.9 (172.3)	0.16

[Table/Fig-3]: Comparison of physical activity between baseline and follow up surveys in control (n=23) and intervention (n=22) groups.
Note: Paired t-test was used to compare the mean duration of physical activity between baseline and follow up. *statistically significant (p-value < 0.05)
Physical activity within the college. e.g., walking from hostel to hospital/college, using staircase instead of lift etc.
$ Time spent sitting or reclining in the past one day (at work, at home, getting to and from places, or with friends including time spent sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television, but do not include time spent sleeping)

[Table/Fig-1]: Flow charts showing the recruitment of study participants and their participation at various stages of the study design in both control and intervention group.

Variables	Control (n=23)		p-value	Intervention (n=22)		p-value
	Baseline	Follow up		Baseline	Follow up	
Intake of fruits						
Mean days/week (SD)	3.3 (2.7)	4.4 (2.6)	0.12	4.3 (2.5)	4.2 (2.2)	0.89
Mean Servings/day (SD)	0.9 (.7)	1.0 (.6)	0.55	0.99(.7)	1.27 (.7)	0.67
Intake of vegetables						
Mean days/week (SD)	5.7 (2.5)	5.1 (2.6)	0.31	4.7 (2.7)	5.1 (2.6)	0.28
Mean Servings/day (SD)	1.1 (.6)	1.2 (.5)	0.54	1.1 (.9)	1.1 (.8)	1.00
Mean number of meals taken from outside (SD)	5.9 (8.3)	6.52 (7.9)	0.71	5.5 (4.5)	3.8 (3.5)	0.07
Intake of junk foods						
Mean days/week (SD)	2.9 (2.4)	2.7 (2.5)	0.57	3.3 (2.5)	2 (2.5)*	0.01
Mean times/day (SD)	0.9 (.5)	0.9 (.7)	1.00	0.9(.5)	0.6 (.6)	0.05

[Table/Fig-4]: Comparison of dietary pattern between baseline and follow up surveys in control (n=23) and intervention groups (n=22).
Paired t-test was used to compare the means of dietary intake between baseline and follow up.
*statistically significant (p-value < 0.05)

surveys in control and intervention groups is shown in [Table/Fig-4]. There was an increase in the mean servings per day of fruits in the control and intervention groups at follow up, but this increase was not found to be statistically significant. The mean days per week of vegetable intake at baseline and follow up, in the intervention group was 4.68 days/week and 5.14 days/week but this increase was not found to be statistically significant. Mean number of meals taken from outside places (hotels / restaurants etc) was reduced by -1.68 meals/week in the intervention group, but this difference was not statistically significant. Mean number of days of junk food intake in a week was reduced in both control and intervention groups from 2.91 days/week and 3.27 days/week at baseline to 2.65 days/week to 2 days/week at follow up respectively. Both these differences were found to be statistically significant for intervention group, but not for the control group. Mean number of times a day of junk food consumption was found to be decreased from 0.95 times/day to 0.64 times/day in the intervention group. This difference was not statistically significant.

A significant decrease in the BMI (p<0.05) was found only among the control group (baseline: 25.57, follow up: 25.15) whereas as in the intervention group there was a slight increase in the BMI (baseline: 26.66, follow up: 26.74).

DISCUSSION

In the present study, physical activity during travel was found to be increased in both groups but not statistically significant. Similarly, a randomised controlled trial conducted by Kelty TL et al., showed a statistically non-significant increase in the levels of physical activity among adolescent girls who had received health education through face to face sessions as well as Facebook [7]. However, in a study conducted African American women using Facebook, physical activity levels had increased significantly. They had used culturally relevant messages through Facebook for the intervention arm and non-culturally relevant messages in the form brochures for the control arm [10].

In our study, there was a decrease in the number of meals taken from outside in the intervention group but stastically not significant. The intake of junk food was significantly decreased in the intervention group. A significant decrease was found in BMI among the control group but not in the intervention group. However, in a study conducted by Shani D et al., in Western India which also used Facebook as a tool for health education, weight gain in control group was higher than the intervention group [6].

Although our study did not satisfactorily provide an improvement in the healthy lifestyle habits of the students, it does not suggest

that it cannot be used a useful tool to do so. Few other studies were done using Facebook as a means to improve healthy lifestyle. A study was done in the United States by Valle CG et al., for 12 weeks among young adult cancer survivors (n=86) where one group received Facebook based Self-Help Comparison (SC) and the other group received Facebook based intervention via FITNET. In this study, both groups had increased minutes of moderate to vigorous physical activity but no significant difference between the two groups. There was also a significant increase in the light physical activity in the FITNET group [11]. A similar study was conducted by Cavallo DN et al., among female undergraduates in a public university (n=134) for 12 weeks. One group of students received physical activity focused website whereas the other group had Facebook self-monitoring and e-mails were also sent to them. There was an increase in physical activity (p<0.001) found among the female undergraduates but there was no significant difference between the two groups [12]. These significant findings could be due to the fact that in both the above mentioned studies both the study groups received daily health intervention either by Facebook or through a website which could have improved their healthy habits. Also, in the above studies the sample sizes were larger and the duration of intervention was longer (12 weeks).

There are some limitations in our study. Firstly, the sample size included for the analysis was small. One of the reasons for small sample size was limited resources. Also, a few of the eligible students were not willing to participate in the study and some of those who consented did not attend the conventional health education intervention. Secondly, the duration of the intervention was short. Six weeks might not be enough time to show any difference in lifestyle habits. Also various other social factors led to the unsatisfactory results. A lot of cultural and academic programmes were held during the same period as a result of which many of the students could not continuously concentrate on their fitness and diet schedule.

CONCLUSION

Overall, it was found that the use of Facebook did not significantly improve the healthy diet intake and physical activity among the medical students except in reducing the consumption of junk food.

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REFERENCES

[1] World Health Organisation. Obesity and overweight. March 2013. Available at http://www.who.int/mediacentre/factsheets/fs311/en/. Accessed 7 January 2014.
[2] Gupta DK, Shah P, Misra A, Bharadwaj S, Gulati S, Gupta N, et al. Secular trends in prevalence of overweight and obesity from 2006 to 2009 in urban Asian Indian adolescents aged 14-17 years. PLoS One. 2011;6(2):e17221. Published online 2011 Feb 23.
[3] Unnikrishnan AG, Kalra S, Garg MK. Preventing obesity in India: Weighing the options. Indian Journal of Endocrinology and Metabolism. 2012;16(1):4-6.
[4] Ezendam NP, Brug J, Oenema A. Evaluation of the Web-based computer-tailored FATaintPHAT intervention to promote energy balance among adolescents: results from a school cluster randomized trial. Archives of paediatrics and Adolescent Medicine. 2012;166(3):248-55.
[5] Tate DF, Wing RR, Winett RA. Using Internet technology to deliver a behavioral weight loss program. JAMA Internal Medicine. 2001;285(9):1172-77.
[6] Shani D, Nimbalkar A, Phatak A, Nimbalkar S. Training in dietary practices and physical activity to improve health among South Asian medical students. Advances in Preventive Medicine. Published online 2014 Sep 30.
[7] Kelty T, Morgan P, Lubans D. Efficacy and feasibility of the "Girls Recreational Activity Support Program Using Information Technology": a pilot randomised controlled trial. Advances in Physical Education. 2012;2(1):10–16.
[8] Members of WHO expert consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. The Lancet. 2004;363:157-63.

[9]   WHO STEPS Instrument (Core and Expanded). The WHO STEP wise approach to noncommunicable disease risk factor surveillance. World Health Organization. Geneva. Available at http://www.who.int/chp/steps/instrument/STEPS_Instrument_V3.1.pdf?ua=1. Accessed 2 May 2017.

[10]   Joseph RP, Keller C, Adams MA, Ainsworth BE. Print versus a culturally-relevant Facebook and text message delivered intervention to promote physical activity in African American women: a randomized pilot trial. BMC Women's Health. 2015;15:30.

[11]   Valle CG, Tate DF, Mayer DK, Allicock M, Cai J. A randomized trial of a Facebook-based physical activity intervention for young adult cancer survivors. Journal of Cancer Survivorship. 2013;7(3):355-68.

[12]   Cavallo DN, Tate DF, Ries AV, Brown JD, DeVellis RF, Ammerman AS. A social media–based physical activity intervention. American Journal of Preventive Medicine. 2012;43(5):527-32.

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