

Repeated interventions towards weight reduction by adopting multidimensional approach through health education in urban slum area of Mysore city

MC Smitha, BM Srinivas, HV Rama, MR Narayana Murthy, Nayana Shahbadi, Renuka Manjunath

Department of Community Medicine, JSS Medical College and University, Mysore, Karnataka, India.

Correspondence to: BM Srinivas, E-mail: drsbm1983@gmail.com

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Abstract

Background: With the increased burden of non-communicable diseases (NCDs) in the world and with obesity being one of the most common risk factors of all the NCDs, our study was undertaken to curtail this risk factor by a simple, repeated intervention through health education.

Objective: (1) To achieve control/reduction in the weight among adult women by monthly educational intervention and (2) to determine the role of each monthly intervention on weight control/reduction among the same group.

Material and Methods: The study was carried out in an urban slum area of Mysore city with subjects being women of self-help group. Baseline body mass index (BMI) was calculated. Intervention on weight reduction was given in the form of repeated health education with multi-dimensional approach towards weight reduction for a period of 4 months and every month progress was assessed by measuring weight and calculating BMI.

Results: In total, 19 participants (51.3%) achieved weight reduction, 11 (29.7%) maintained their weight, and 7 participants (18.9%) gained weight. Intervention in the form of health education related to nutrition was found to have a significant impact on weight reduction (p -value < 0.001).

Conclusion: Community-based, near to house, and culturally acceptable health education has impact in controlling as well as reducing weight.

KEY WORDS: Non-communicable diseases, health education, weight reduction, intervention

Introduction

Non-communicable diseases (NCDs), such as heart disease, stroke, cancer, and diabetes, are the leading causes of mortality in the world today. According to the global status report on NCDs 2012 by World Health Organization (WHO), the age standardized NCD death rate in India was found to be 682/100,000.^[1] Diabetes is recognized as a major lifestyle disease and India has become the Diabetes Capital of the

world with 61 million patients with diabetes between 20 and 79 years suffering from this dreaded disease and this number continues to increase day by day. The International Diabetes Federation (IDF) estimates that by 2030, 8.4% of India's adult population will have diabetes and this figure is expected to go up to 101.1 million.^[2] Hence, addressing the major risk factors leading to such NCDs becomes a priority if we have to aim at reducing the incidence and further prevent the complications of NCDs. Research has proven repeatedly that weight reduction which requires major lifestyle changes in terms of healthy dietary intake, physical activity, etc. is one of the best parameter among all the risk factors to intervene on, which can provide us with maximum results. In recent times, there has been a startling increase in rates of obesity and overweight in both adults (28% increase) and children (up by 47%) in the past 33 years, with the number of overweight and obese people rising from 857 million in 1980 to 2.1 billion in 2013. With the maximum share taken by USA and other 10 nations, India and China share 13% of the total burden, which should be the matter of great concern to the health care system.^[3]

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The salient factor influencing overweight and obesity epidemic in the present scenario are the opportunities for excess dietary intake and minimal energy loss which demands a multidimensional approach. While weight reduction is one entity, focusing on maintaining the current weight and preventing further weight gain forms another facet to be worked on. Hence aiming towards curtailment of one of the most important risk factors of NCD, for this an interventional study was planned adopting a multidimensional approach through health education with the objective of achieving control/reduction in the weight among adult women by monthly educational intervention and to determine the role of each monthly intervention on weight control/reduction in the same group.

Material and Methods

This is an interventional study conducted for a period of 4 months from January to April 2014 in the urban health center area of JSS Medical College. The study subjects were women between the ages of 20 and 60 years who belonged to a self-help group. The SHG consisted of a total of 40 women and all were included in the study. Intervention was done in the form of health education every month for 4 months on prefixed days. The framework was based on the health belief model (HBM), which hypothesizes that a particular form of behavior depends on the individual's personal beliefs about the perceived threat posed by a health problem, together with the effectiveness of the proposed behavioral change in reducing the threat at an acceptable cost. In the first intervention, components of health belief model, i.e., concepts of perceived susceptibility towards the disease, perceived severity of the diseases and perceived benefits if such diseases were prevented were targeted. The participants were also enquired about perceived barriers that they face towards achieving weight reduction. In the subsequent interventions they were educated on the clues towards achieving weight reduction/control with special focus on perceived barriers.

Baseline Data

At the beginning of the first intervention, age was recorded in completed years and height and weight of every participant was recorded by standardized procedures and baseline BMI was calculated using the formula: weight in kilograms/height in square meters. The height was recorded with the help of wall mount tape. It was made sure that the participants removed their shoes and their heels, hips, back and head touched the wall before noting down the reading. The height was measured in centimeters. Weight was recorded using mechanical weighing scale. The participants were requested to remove their slippers and look forward after standing on the machine before recording the readings. Weight was also recorded in the subsequent monthly interventions and BMI was calculated every time. Information was shared with the study subjects about their progress towards weight reduction or control.

First Intervention

In the first intervention health education was provided regarding – what are NCDs?, its burden, the modifiable and non-modifiable risk factors influencing it with special focus on weight reduction, complications due to NCDs, economic burden faced as a consequence of health care expenses that may incur due to the disease, non-curability of the disease and how prevention always forms an important part of NCDs than the cure. After the intervention was over participants were asked to enumerate the socio-cultural and economic factors influencing their weight gain and the difficulties they were facing to reduce or control the same. The reasons enumerated were noted down and were specifically focused on in future interventions.

Second Intervention

In the second intervention, focus was on “Nutrition and weight reduction/control”, where the participants were educated on healthy dietary habits, the role of reduced intake of fat- and carbohydrate-rich foods, importance of reduced salt intake, hazards of junk food on health, preparation of healthy diet using grains and sprouts, importance of fruits, vegetables, and fiber in diet and how cultural practices in cooking influences weight gain. Information was also provided on suiting the diet according to the nature of work, avoiding excess food consumption and how important the balanced diet is.

Third Intervention

In the third intervention, the focus was on “Physical activity and weight reduction/control”. In this intervention the participants were educated on the importance of exercise – with special mention on walking and yoga (Surya Namaskara). For women who complained about not having sufficient time and not being comfortable doing exercise, practical solutions were provided in a way that they were asked to involve in household physical activities like brooming of the house, washing clothes, mopping the floors, etc. instead of using gadgets and they were also educated on how physical activity can be achieved in day to day circumstances like walking to a nearby shop or temple, or getting down one stop prior to the destination if travelling in bus and walking till the destination is reached, etc. After the third intervention in the next month on a fixed day the weight was measured and BMI was calculated. According to the BMI for the purpose of analysis, participants were classified as underweight, normal, and overweight as given in Table 1.

Ethical Consideration

Confidentiality and voluntariness were the guiding principles of the study. Informed consent was obtained from each of the study participant.

Statistics

Data obtained were entered into SPSS version. In total, 22 study subjects were analyzed using the same. Descriptive

Table 1: WHO recommended BMI classification for Asian adults

Category	BMI cut-offs
Underweight	≤ 18.5 kg/m ²
Normal	18.6–23 kg/m ²
Overweight	≥ 23.1 kg/m ²

statistics, viz., percentages and the inferential statistics – paired *t*-test was performed to know the effect of the repeated interventions of 3 months on weight reduction or control (between successive interventions).

Results

The mean age of the study subjects was 38.43 years ± 11.13. All the women were married and majority belonged to lower-middle socio-economic status according to modified Kuppaswamy classification. Among the 40 women to whom the intervention was performed, 3 were not followed-up and hence data from the rest 37 study subjects were considered for analysis and interpretation. There were equal numbers of participants in each group of nutritional status (Table 2).

There was shift in the median BMI from 19 to 18 from the beginning of intervention to the end. The box plots show that the weight of the study subjects almost remained the same throughout the intervention with some significant reduction in weight after the second intervention, i.e., nutrition and weight reduction (Table 3 and Figure 1).

In the present study, 19 participants (51.3%) achieved weight reduction, 11 (29.7%) maintained their weight, and 7 participants (18.9%) gained weight (Table 4).

Among those who reduced weight the average weight loss was 1.57 ± 0.769 kg. Among those who gained weight 3 participants were overweight and further gained weight, 1 was under-weight, and 3 had normal BMI and even after weight gain were in the normal BMI category. The mean increase in weight among the participants who gained weight was 1.71 ± 0.756 kg. Although there was no statistical significance seen when the overall interventions were compared to the end results, nutritional intervention was significant (*p* = 0.001) (Tables 5 and 6).

Table 3: Median BMI at each intervention

Intervention	Median	Inter-quartile range
1st intervention	19.01	15.1–22.8
2nd intervention	19	15.1–22.9
3rd intervention	18.4	14.9–22.7
4th intervention	18.43	14.9–23.1

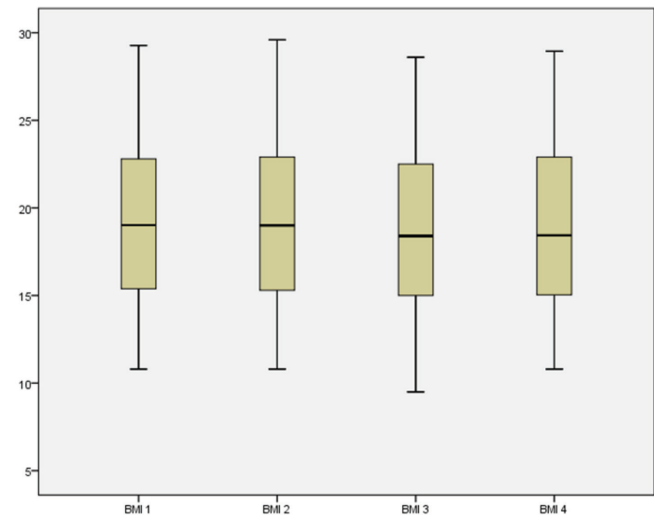


Figure 1: Box plot representing the difference in the median weight of study subjects throughout the interventions at monthly interval

Table 4: Proportion of participants outcome

	Frequency*
Achieved weight reduction	19 (51.3)
Achieved weight control	11 (29.7)
Increase in weight	07 (18.9)

*Percentages are mentioned in parenthesis.

Discussion

The biggest challenge in NCD prevention is modifying those risk factors which are modifiable. Weight is the important modifiable risk factor and reducing the weight comes only

Table 2: Proportion of participants according to BMI categories

Category	Frequency			
	1st intervention	2nd intervention	3rd intervention	4th intervention
Underweight	17	17	19	19
Normal weight	13	11	10	09
Overweight	07	09	08	09

Table 5: Level of statistical significance between levels of intervention

	<i>p</i> -Value*
1st intervention	0.569
2nd intervention	0.004
3rd intervention	0.158
All the interventions together	0.196

*Paired *t*-test between various interventions.

Table 6: Shows the association of various modes of interventions towards the outcome

Type of intervention	<i>p</i> -Value*
1st intervention (health education on NCD's)	0.113
2nd intervention (nutrition)	0.001
3rd intervention (physical activity)	0.158
All the interventions together	0.196

*Paired *t*-test.

after prolonged controlling or maintaining same weight without weight gain. Intervention in this study tried to achieve control of weight and reduction of weight as added advantage. Over all 81% (combined weight control and weight reduction) achieved the desired goal at the end of study period. And several studies have proven that lifestyle modifications bring about significant reduction in SBP, DBP, and blood sugar levels which are predominant NCD indicators.^[4-9] Linda Penn *et al.*'s study in Europe related to the importance of weight loss or maintenance in prevention of Type 2 diabetes showed that participants with $\geq 5\%$ weight loss at 1 year had 65% lower Type 2 diabetes incidence (HR 0.35; 95% CI 0.22–0.56, $p < 0.001$) and those maintaining $\geq 5\%$ weight loss for two and three years further reduced Type 2 diabetes incidence in a total duration of follow-up time of 3.1 years. Another study carried out by diabetes prevention program research group showed that lifestyle modification had highest effect on the prevention of diabetes.^[9]

Several studies have also proven that weight reduction increases life expectancy.^[10-12] Hence, it is understood that weight reduction has important health implications of an individual in the later stages. While our study makes genuine attempt to see, how a community-based intervention which is cost effective, which is socially, culturally, and economically acceptable and which adopts multidimensional approach, casts its influence on weight reduction/control. Repeated intervention in our study proved effective in controlling weight gain, although there was no statistical significance seen when the overall interventions were compared with the end results, but nutritional intervention was significant ($p = 0.001$).

It is noteworthy that major portion of study participants either reduced weight or maintained it (81%). With such a response it is not wrong to say that if we are able to achieve

such outcome by simple repeated motivation for a small duration of 4 months, then it is imperative that such community-based interventions for a longer duration would have better results. It is also noteworthy to see that intervention in the form of health education focusing on healthy dietary habits towards weight reduction was found to provide maximum results and was found to be statistically significant. This may be due to the fact that nutritional interventions compared to interventions related to physical activity for weight loss has a better compliance due to lesser efforts and lesser motivation required. Also it proves that simple measures to change in nutrition could bring lot of changes implying that basic information about quality nutrition is lacking in general public. Another aspect might be that most of the study participants were the people who cook for entire family in their houses and hence following instructions related to healthy dietary habits might be more effective not only for the individual, but also for the entire family. The reason for the participants not being able to gain much advantage of the intervention related to physical activity may be due to the reasons quoted by themselves that there was no time for exercise, problem of street dogs in the area, fear of robbery, and non-availability of parks nearby. There are several other studies also which prove that lifestyle modifications interventions bring positive results with respect to weight reduction/control,^[13-16] but our study is unique since it is just based on simple repeated motivation by health education and hence the method can be adopted in community-based intervention programs as a part of primary health care. Since weight is the single most indicators which is phenotypically visible, repeated intervention to control the same will be effective as primordial prevention. As it is observed in our study not only those who were obese but also non-obese individuals lost weight showing the strength of our intervention in short duration of 4 months. The strength also remains that there was close follow-up of the participants and voluntariness of study participants ensured that there was no selection bias and the study also tries to address NCDs at all the levels of prevention. Some limitations do exist in the form of short duration of follow-up of the participants, not being able to provide a control group and not measuring outcome measures like blood sugar level and blood pressure as indicators of change, which would add to the strength of evidence of intervention. It can be concluded that the intervention in the form of health education related to nutrition was found to have a significant impact on weight reduction (p -value < 0.001). Community-based, near to house, and culturally acceptable health education has impact in controlling as well as reducing weight. This method can be incorporated at community level with Medical officer as a health educator. The study was among non-homogeneous literate group (majority uneducated), but can be applicable to any literate group based on change in intervention content. Hence, this study would be of great help when it comes to prevention of NCDs at all the levels of prevention.

Conclusion

Community-based, near to house, and culturally acceptable health education has impact in controlling as well as reducing weight.

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