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Research Paper :

An experiment on lemon juice supplementation and weight reduction

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ABSTRACT

The major objective was to see the impact of lemon juice supplementation on weight reduction of 100 females of MIG from Amroha city. They were assigned randomly into experimental (52) and control group (48). Anthropometric measurements for both groups were taken before and after supplementation period of two month. Mean, SD and t-test were applied as statistical techniques. Finally it was concluded that lemon juice supplementation has measurable effect on weight reduction. So it will be better to prevent and cure the problems of overweight and obesity with natural products such as lemon – the cheaper, easily available and the best source of vitamin C.

Key words : Lemon juice, Vitamin C, Obesity

Obesity is increasing at an alarming rate throughout the world and has become a global problem. WHO has declared overweight as one of the top 10 health risks in the world. Studies reveal that in cities, especially in north India, over 50 per cent women and 40 per cent men aged 35+ are overweight. But women are more prone to obesity because fat mass distribution is different in both genders.

Obesity is defined as a condition in which excess body fat is accumulated. The practical and clinical definition of obesity is based on the Body Mass Index (BMI; weight (kg)/height (m^2). It is generally agreed that a BMI of greater than 30 is indicative of obesity, while a BMI of 25.0-29.9 is suggestive of overweight in an individual. BMI between 18.5- 24.99 indicates normal BMI.

Obesity is also caused by excessive intake of food. Age, sex, physiological state, nutritional state, emotions, stress, peer groups, food trends, social pressures , as well as beliefs related to food safety are known to influence intake. Other external factors that affect intake include food availability, food cost, as well as environmental factors. Obesity is caused not only by excessive intake of food, it is caused by many interrelated factors such as heredity and environment factors. A person's weight is determined by a combination of genes, metabolism, behaviour, culture and environment.

Globalization is also playing an important role in modernization and sedentary lifestyle. Globalization has made cheap vegetable oils and fats widely available, greatly increasing fat consumption in all nations (Drewnowski and Popkin, 1997). It has been found from many studies that there is a significant increase in overweight and obesity among women in cities.

The WHO recently stated that "the growth in the number of severely overweight adults is expected to be double than under-weight during 1995-2025" (WHO, 1998). Also, numerous studies have corroborated the relationship between weight gain (BMI of at least 30) and increased risk of death.

Obesity has serious long-term consequences. Obesity is not an immediately lethal disease itself, but has a significant risk factor associated with a range of serious non-communicable diseases and conditions (Tanaka and Nakanishi, 1996).

Obesity is a first step, a gateway, to the chronic diseases. Hypertension, hyper cholesterolemia, heart disease, type 2 diabetes, gall bladder disease, asthma, mental health concerns (e.g., depression and low self esteem), and orthopedic disorders have all been linked to obesity (Mishra, 2004, Anonymous, Saw and Rajan,1997).

A study by Garrow (2000) showed that the mortality ratio increases drastically at higher BMI from the minimum 100 among those with a BMI 20-25 kg/m^2 to more than 150 crossing BMI of 35 kg/m^2 and further increases to more than 200 and 300 at the BMI of 40 kg/m2 and 45 kg/m^2, respectively. So, attention should be paid on overweight and obesity coexisting with under nutrition at the national level.

Obesity is recognized as having both multifarious causes and health-related consequences that are evident from early life and throughout the lifespan. There is an urgent need to recognize the gravity of the problem of obesity and therefore it has to be incorporated in the general health system. A healthy lifestyle should be promoted to tackle this emerging health threat. There are many new weight loss supplements available in the market

today but the natural is much better than artificial and herbal is much better than chemical. Therefore, natural and herbal supplements are preferred.

Some herbal supplements for effective weight loss are green tea, soy protein, chitosan, pure ascorbic acid etc. Ascorbic acid was selected among all the supplements due to its availability. Lemon is one of the major sources of vitamin C and easily approachable to middle income group as well as other income groups. It is also the cheapest source of vitamin C and available in each season. It may be comfortably purchased and stored in bulk. It is regarded by many scientists that lemon juice is very useful in acting as a tool to ward off disease like obesity.

A research revealed that the novel combination of glucimannam, chitoson, fenugreek, gymnema sylevestre and vitamin- C result in significant body weight and fat loss in obese adults aged 20- 50 years (Woodgate and Conquer, 2003). The regular ingestion of vitamin-C supplements, dietary protein, vinegar and/or nuts are helpful in stimulate energy expenditure and promote satiety (Johnston, 2005). Effect of ascorbic acid on prevention of hypercholesterolemia induced atherosclerosis and finally suggested that use of ascorbic acid may have great promise in the prevention of hypercholesterolemia induced atherosclerosis.

Nutrition scientists revealed that there is a direct correlation between the presence of vitamin C in the blood stream and the capability of the body to burn the fat resources as a form of energy. This is because the presence of vitamin C plays a role in the process of fat oxidation which has a considerable role to play in the process of attaining weight loss.

Furthermore, it is possible to facilitate weight loss considerably with increased consumption of lemon juice. Vitamin C is abundantly found in citrus fruits and the researchers have gathered data which goes to prove that individuals consuming sufficient amounts of vitamin C in their diet allow fatter oxidation by about 30% more than compared to those individuals who have inadequate proportions of vitamin C.

It is evident from the above that obesity is a fast growing public health problem of global significance. So there is a global need to pay attention on the solution of this problem. As India is not far away from this problem, focus should be made upon the weight reduction among Indian population. By taking these considerations in view, I had been started my research work with the two variables named as Lemon Juice and Weight Reduction among Indian women. The aim of present research was to identify the prevalence of obesity among women of middle income group in Amroha city and to spread awareness about the forth coming dangers of obesity and the natural way to prevent obesity among them. Therefore, the present study was undertaken with the objectives, to see the impact of lemon juice supplementation on weight reduction among the obese women of MIG., to observe the grade of obesity in subjects by BMI calculation method and to assess the nutritional status of subjects by anthropometric measurements.

METHODOLOGY

Quasi Experimental design of research methodology was applied to present research work. The sample was drawn randomly. 100 subjects were selected as sample from the women of middle income group (MIG) of Amroha city. The criteria for inclusion in the study were obese women between the age of 35 to 55 years with a BMI greater than or equal to 32.4 and assigned into 2 groups. Group A or controlled group (included 48 women) was not received any dietary supplement while the group B or experimental group (included 52 women) provided lemon juice supplement.

The study was conducted from the first weak of January 2009 to the first weak of March 2009. Anthropometric measurements were taken before and after the lemon juice supplementation to determine the nutritional status and impact of lemon juice supplementation. Standardized techniques were used in anthropometric measurements. After that mean, standard deviation and t-test were applied as statistical techniques to analyze the data.

FINDINGS AND DISCUSSION

On the basis of collected data analysis, it may be said that there is no statistically significant difference found in weight, BMI, BMI Prime, MUAC, WC, HC and WHR of experimental and control group before the supplementation of lemon juice (Table 1).

It is evident from the data of Table 1 that the calculated value of t for each anthropometric parameter is enough smaller than the table value of t to sustain null hypotheses at both levels of significance *i.e.* the two groups *viz.*, experimental group and control group and do not differ significantly before the experimental period of two months or before the lemon juice supplementation.

On the other hand, data in Table 2 reveal that the calculated value of t is enough larger than the table value of t for the prescribed df at both levels of significance to reject null hypotheses for each anthropometric parameter excluding BMI change. For BMI, the calculated critical value of t is significant at 0.05 level of significance but not significant at 0.01 level of significance.

Table 1: Comparison in mean anthropometrics of experimental and control group before lemon juice supplementation

Groups	Wt. change	BMI change	BMI prime change	MUAC change (mm)	WC change (cm)	HC change (cm)	WHR
Exp. group (n=52)	73.6± 7.9	31.8 ± 2.6	1.39 ± 0.1	340.8 ± 10.1	106.8 ± 8.4	115.72 ± 6.9	0.9 ± 0.04
Cont. group (n=48)	72.68 ± 9.2	32.7 ± 3.6	1.42 ±0.16	336 ± 11.1	107.1 ±10.1	112.56 ± 8.3	0.9 ± 0.04
Calculate 't' value	0.53	1.36	1.18	1.84	0.17	1.53	0
Hypotheses verification	Not significant at both levels	Not significant at both levels	Not significant at both levels	Not significant at both levels	Not significant at both levels	Not significant at both levels	Not significant at both levels

Table 2 : Comparison in mean anthropometrics of experimental and control group after lemon juice supplementation

Groups	Wt change	BMI change	BMI prime change	MUAC change (mm)	WC change (cm)	HC change (cm)	WHR
Exp. group (n=52)	69.8± 11.6	30.2± 2.7	1.31± 0.17	294.4± 12.12	93.2± 8.62	110.4± 7.91	0.84± 0.03
Cont. group (n=48)	72.98± 9.6	32.87± 3.5	1.43±0.17	338± 11.94	107.34±10.01	113.01± 8.96	0.95± 0.05
Calculated 't' value	2.85	2.11	3.79	18.16	7.56	2.73	14.34
Hypotheses verification	Significant at both levels	Significant at 0.05 level	Significant at both levels	Significant at both levels	Significant at both levels	Significant at both levels	Significant at both levels

Hence, it may be said that a significant difference was found in weight, BMI, BMI Prime, MUAC, WC, HC and WHR of experimental and control group after the supplementation of lemon juice. Finally it may be concluded that there is a significant impact of lemon juice supplementation on weight reduction among obese women of MIG.

Conclusion:

There is a need to sensitize the public and policy makers about the problem of obesity looking large in India in future, as prevention is better than cure. In the past, governments in many developing countries with high levels of under nutrition and high prevalence of communicable diseases have paid little attention to the problems of overweight and obesity.

The prevalence of obesity is a rising epidemic of global proportion**s.** No longer is it just a concern for rich countries but increasingly a problem for many developing countries. Obesity was recognized as having both multifarious causes and health-related consequences that are evident from early life and throughout the lifespan.

Health care providers and policy makers need to appreciate this important and emerging problem of obesity and pay more attention to develop effective policies and programmes to prevent obesity.

From this point of view, an intensive research on the dynamics of obesity is needed to understand this upcoming health issue and formulate effective programmes to enhance the quality of life of the people.

It has been found in our study that there was a significant effect of lemon juice supplementation on weight reduction among obese women of MIG. So, there is a need to prevent and cure the problems of overweight and obesity with natural products such as lemon – the cheaper, easily available and the best one source of vitamin C. Because this study was a successful effort in this direction, more researches should be promoted in this area to overcome the problem of obesity.

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