Original Article

IMPACT OF NUTRITIONAL COUNSELLING ON BODY MASS INDEX (BMI) AND NUTRIENT INTAKE OF THE NON - COMMUNICABLE DISEASE PATIENTS (NCD).

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ABSTRACT
Good health is an important discussion of the quality of life. Health problem is a major concern in all over the world but especially in developing countries. Non-communicable diseases (NCDs) contribute the ill health. Diabetes, coronary heart disease, various forms of cancer, gastro intestinal disorder and various diseases of bones and joints are diet related NCDs. Nutritional counselling is one of the effective tools of changing the food habits of people. The data for this study is taken from the out patients services of Department of Endocrinology & Metabolism and Cardiology of Sir Sunder Lal Hospital, Banaras Hindu University, Varanasi-5. Total 250 samples were included in the study. Age group 40 – 60 years were considered as study samples who attended the Endocrinology and Cardiology departments. Purposive sampling method was used in the study. Questionnaire cum interview method was adopted in the study. Anthropametric measurements were taken by using standard techniques. 24 hours diet recall method was also used in this study. Evaluation of councelling was done on basis of changes in BMI and nutrient intake. Result shows the positive impact of nutritional counselling in BMI and nutrient intake of NCD patients.

Introduction:
Non-communicable diseases (NCDs) are a serious threat to health in both developed and developing countries and deserve to be treated as global health priority. According to D. Yache [1] seven out of every 10 deaths in will be from chronic NCDs by 2020 and pose a serious challenge to the developing countries. According to W.H.O. report 2005, NCDs account for approximately 60% total mortality in the world.[2] Diet related non communicable diseases are diabetes, coronary heart disease, various forms of cancer, gastro intestinal disorders and various diseases of bones and joints. Nutritional status refers to the health of individual as it is affected by the intake and utilization of nutrients. Anthropometry deals with comparative measurement of the body. Nutritional counseling is one of effective tools of changing the food habits of people. Thus the present study was design with the objectives to assess the impact of nutritional counseling on BMI and nutrient intake of the NCD patients.

Materials and Methods:
The study was conducted at Sir Sunder Lal Hospital, Banaras Hindu University, Varanasi. Total period of the study was carried out from August 2005 – October 2009. Data was collected during the period of August 2007 to October 2009. Patients who attended the Endocrinology and Cardiology departments between age group of 40 – 60 years were considered as study samples. Prevalence rate of non communicable diseases was found to be 62.25%. and by using formula n = 4 pq/e[2] the required sample size is 25 was calculated. Purposive sampling method was used in the study. The primary tool used in present study was pre- designed and pre-tested interview schedule. . Proforma used was under four sections. Questionnaire cum interview technique was adopted in this study.
Anthropometric measurements were taken by using standard technique at the time of interview of each respondent. Height of the patients was measured by using measuring scale. A personal weighing Scale with zero standard error was used for measuring the weight of the respondents. BMI was calculated later on by using the formula :

$$BMI = weight\ (Kg)/\ Height\ (m^2)$$

The food consumed by each patients was recorded nearest to the actual intake and values of intake was calculated and recorded on schedule from the reference values [3]

Individual counseling was done for 30–35 minutes and it was carried up to two months with four visits (at 15 days interval). Evaluation of counseling was done on the basis of changes in BMI and nutrient intake. Statistical techniques were applied to analyse the data.

RESULTS AND DISCUSSION:
The present study has found that the average BMI was found to be higher during pre follow up in all patient of NCDs. It reduces to 1.13 to 2.15 in first follow up and 2.15 to 3.17 in second follow up respectively. The reduction in BMI level between pre, first and second follow up in found to be statistically highly significant. The average reduction in BMI between first & second follow up is highly significant.(Table I)

Table -1: BMI (mean ± SD) of respondents at initial, I & II follow up.

Type of Disease	Initial	I- Follow up	II- Follow up	Initial / I- Follow up	Initial / II- Follow up	Follow up - I/ Follow up-II
Diabetes	30.45 ±3.27	28.30 ±3.18	27.29 ±2.92	2.15±0.91, t=18.69***	3.17±1.30, t=19.14***	1.02±0.97, t=8.27***
Diabetes & Hypertension	29.16 ±3.33	27.97 ±3.16	27.01 ±3.01	1.19±0.48, t=9.66***	2.15±1.32, t=6.27***	0.96±1.04, t=4.71***
Coronary heart disease	29.30 ±2.97	28.04 ±2.97	26.93 ±2.91	1.25±0.64, t=5.86***	2.37±0.92, t=7.72***	1.11±0.71, t=4.71**
Hypertension	31.42 ±3.87	30.05 ±3.83	28.89 ±3.43	1.37±0.53, t=9.41***	2.53±0.90, t=10.19***	1.16±0.74, t=5.63***
Coronary heart disease & Hypertension	31.66 ±4.82	30.52 ±4.46	29.29 ±3.99	1.13±0.57, t=5.26**	2.36±0.95, t=6.62***	1.23±0.58, t=5.58**

**   Significant
***   Highly significant

The average calorie intake was maximum by the patients of CHD with hypertension (2764 .29) and 2364.62 ± 301.76) calorie (per diet) intake was observed by patients having hypertension whereas minimum (1981.33±70.08) calorie by the patients of diabetes with hypertension at initial stage.(Table II)

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Table-2 : Nutrient Intake (mean ± SD) of respondents at initial, I & II follow up.

Nutrient / Type of disease	Initial	I-Follow up	II-Follow up	Initial / I- Follow up	Initial / II-Follow up	Follow up-I / Follow up-II
Calorie						
Diabetes	2075.53 ±212.7	1795.48 ±208.16	1744.03 ±215.45	280.05 ±200.42, t=11***	331.5 ±203.7, t=12.8***	51.45 ±38.2, t=10.61***
Diabetes & Hypertension	1981.33 ±70.08	1588.00 ±145.37	1523.23 ±149.03	393.3 ±131.3, t=11.6***	458.0 ±136.4, t=13.0***	64.66 ±19.59, t=12.78***
Coronary heart disease	1995.56 ±199.51	1754.44 ±220.69	1715.56 ±237.35	241.1 ±131.6, t=5.5***	280.0 ±137.9, t=6.09***	38.8 ±28.4, t=4.10**
Hypertension	2364.62 ±301.76	1862.31 ±209.53	1802.31 ±218.56	502.3 ±190.8, t=9.49***	562.3 ±189.08, t=10.7***	60.0 ±37.19, t=5.82***
Coronary heart disease & Hypertension	2764.29 ±174.92	1945.71 ±199.40	1852.86 ±167.80	818.57 ±290.8, t=7.45***	911.4 ±285.5, t=8.45***	92.85 ±56.18, t=4.37***
Carbohydrate						
Diabetes	324.05 ±55.8	235.47 ±29.69	204.37 ±26.88	88.58 ±45.04, t=15.48***	119.67 ±50.0, t=18.8	31.09 ±14.01, t=17.47***
Diabetes & Hypertension	291.80 ±20.55	224.00 ±26.05	190.73 ±14.96	67.80 ±34.16, t=7.6***	101.06 ±28.13, t=13.9***	33.26 ±20.2, t=6.37***
Coronary heart disease	239.56 ±23.70	192.56 ±16.379	168.33 ±15.945	47.0 ±13.05, t=10.8***	71.22 ±13.08, t=16.3***	24.2 ±11.1, t=6.54***
Hypertension	275.92 ±36.53	222.92 ±25.05	186.15 ±13.80	53.0 ±21.3, t=8.96***	89.76 ±32.5, t=9.96***	36.76 ±18.51, t=7.16***
Coronary heart disease & Hypertension	263.43 ±46.76	204.43 ±23.78	176.14 ±13.84	59.0±30.3, t=5.14**-0987654321	87.28 ±35.09, t=6.58***	28.28 ±10.9, t=6.86***
Protein						
Diabetes	91.27 ±11.66	59.03 ±4.11	54.06 ±3.85	32.24 ±10.39, t=24.4***	37.20 ±11.24, t=26.1***	4.96 ±2.3, t=13.45***
Diabetes & Hypertension	85.40 ±4.940	58.07 ±3.41	53.33 ±3.20	27.33 ±5.71, t=18.5***	32.06 ±6.04, t=20.56***	4.73 ±2.15, t=8.51***
Coronary heart disease	77.22 ±8.61	59.56 ±4.04	54.11 ±4.755	17.66 ±6.06, t=8.74***	23.11 ±7.81, t=8.87***	5.44 ±2.87, t=5.68***
Hypertension	87.69 ±3.54	59.00 ±3.08	54.77 ±3.75	28.69 ±4.7, t=21.86***	32.92 ±4.6, t=25.7***	4.2 ±2.12, t=7.17***
Coronary heart disease & Hypertension	83.57 ±2.51	57.00 ±3.45	52.43 ±3.36	26.5±2.9, t=23.5***	31.40 ±3.6, t=22.4***	4.57 ±2.4, t=4.96***

** Significant

*** Highly significant

The difference in average reduction of calorie intake between pre and first, pre and second as well as first and second follow up is statistically significant.

The average level of carbohydrate intake was maximum (324.05 + 55.8) gm in diabetic patients while it was minimum (239.58 + 23.70 gm) in patients of coronary heart disease. The difference in average intake of carbohydrate is found to be statistically highly significant between initial stage and first, 1st and 2nd follow up and between 1st and 2nd follow up respectively.

The average protein consumption was observed to be more (91.27 + 11.66) on subjects of diabetes and minimum (77.22 + 8.61) gm in respondents of coronary heart disease. The reduction in average protein consumption is highly significant. Also the average reduction in fat after counseling is found to be highly significant from initial stage to 1st and 2nd follow up and between 1st and 2nd follow up respectively.

During the intervention stage, the mean BMI of respondents of diabetes was 30.45 + 3.27 Kg/m^2 , for respondents of diabetes with hypertension was 29.16 + 2.97 whereas 31.42 ± 3.87 and 31.66 ± 4.82 was for patients of hypertension and CHD with hypertension respectively. The average BMI level gradually reduces to 1.13 to 2.15 in 1st follow up and 2.15 to

3.17 in 2nd follow up respectively in all NCD patients. The average reduction is found to be statistically significant After intervention of nutritional counseling, the average calories intake was reduced, reduction is found to be statistically highly significant. Carbohydrate intake was also reduced subsequently in all NCD subjects & reduction is found to be highly significant from initial position to 1st and 2nd follow up as well as between first and second follow up respectively.

In case of Protein and Fat intake was changed towards lower side during the time period and reduction is found to be statistically highly significant.

Peyrot et al [4] carried out a study which suggests that if we help patients to improve self care behavior, it can bring dramatic improvement in glycemic control. Similarly, Pederson et al [5] evaluated the effect of nutritional education programme of knowledge and self care behavior in a group of individuals with diabetes. Results indicated a statistically significant gain in knowledge but no change in early behavior.

Bagordia et al [6] studied the effect of nutritional counseling on blood glucose and nutritional knowledge of semi literate and found significant decrease in level of blood glucose after counseling.

According to Bhumenthal et al. [7] preventive life style changes such as dietary changes, physical exercise and weight loss shown to significantly reduced blood pressure in hypertensive patients.

CONCLUSION & RECOMMENDATION

The average reduction level in BMI between pre and 1st follow up, pre and 2nd follow up and between 1st & 2nd follow up is found to be statistically highly significant at 0.01 & 0.001 level of significance respectively.

The average of fat, protein, carbohydrate and calories was very high during pre intervention phase. During nutritional counseling , patients were informed about the effects of various nutrients on healthy and impact is very fruitful in this context in the present study. It can be concluded that Non - Communicable Diseases can be controlled successfully through obesity reduction intervention programme , by taking active participation at Govt. and non Govt. Organization, by nutritional councelling programme for control the non communicable diseases

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