SPECIMEN FORMAT FOR THESES OF MONTH

Faculty	:	Home Science
Department	:	Food Science and Nutrition
Branch/ Area:	:	**Clinical Nutrition**
Sub Subject Heading:	:	Food Science
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Title of the thesis	:	Hypoglycemic effect of bitter gourd (*Momordica charantia L.*) on prediabetics and Type II diabetics
(i) In Roman Script		-
(ii) In roman Script		-
Nomenclature of Degree:	:	**Ph.D**
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Centre/department/school in which research was conducted : **Avianshilingam Institute for Home Science and Higher Education for Women**

University's Name & Address : **Avianashilingam University for Women**

Abstract within 300 words:

i) Major objectives :

- Collect baseline data on the consumption pattern of bitter gourd
- Develop bitter gourd recipes and analyze the antioxidants
- Elicit details on the prevalence of prediabetics
- Supplement bitter gourd juice to pre diabetics and evaluate its efficacy
- Evaluate the impact of bitter gourd intervention on Type II diabetics.

ii) Hypothesis:

Bitter gourd reduce high blood sugar in prediabetics and Type II diabetics

iii) Methodology :

In phase I, a group of 332 Type II diabetics were selected and socio-economic, dietary profile family and personal diabetic history was collected by administering a pre-tested interview schedule

In Phase II, th e cooking methods like boiling, pan-frying, stir-frying, braising and microwave cooking were selected and fifteen different bitter gourd recipes were standardized. Antioxidant capacity was analysed The sensory evaluation of the recipes was carried out with 10 each of non diabetic and diabetic adults as taste panel members using nine point hedonic rating scale.

In Ph**ase III , a** total of 948 pediabetics were screened in Government and private industries in Coimbatore District, TamilNadu, India using IDRS (Indian Diabetic Risk Score.

In **Phase IV, a** single blinded, placebo-controlled, randomized, cross-over designed intervention study was planned to find out hypoglycemic effect of bitter gourd with cucumber for placebo treatment. Prediabetics aged >25 and having FBG between 100 – 125 mg/dl or HbA1c >5.7-6.4 per cent were included in the study. Clinical trial was carried out as AB-BA sequence. Group 1 (AB) started the intervention with sample bitter gourd 2.5 g freeze dried bitter gourd powder (50 g

fresh equivalent) (A) followed by placebo (B), while the Group 2 (BA) started the supplementation with placebo(B) followed by bitter gourd A). The intervention continued for a period of eight weeks. Between the two arms, 4 weeks was left as wash-out period to minimize the carry-over effect of one phase to the other. Cross over was done after this wash out period. The trial was successfully completed with 65 pre diabetics after a drop out of 25 participants during the study period.

In **phase V, a**mong the 332 Type II diabetics, 40 Type II diabetics were selected and divided into two groups namely an intervention group (N=20) and a nutrition education group (N=20). For the intervention group 15 g of bitter gourd dhal powder was supplemented for a period of eight weeks along with nutrition education. For the nutrition education group nutrition and health education on dietary management of diabetes was given once in 15 days.

Impact of intervention is evaluated through anthrpometric measurements and biochemical parameters before and after the 60 days of bitter gourd intervention as per the standard procedures.

Findings:

Baseline survey

- Among the 332 Type II diabetics surveyed, 173 participants were male and 159 participants were female and 34.3 per cent were in the age group ranged between 41-50 years.Almost 45.8 per cent of the selected diabetics were in the middle income group earning Rs.7500-14500 per month. About 60 female and 52 male diabetics were consuming 100 g of bitter gourd once in a week, Around 84 male and 60 female diabetics consumed bitter gourd in the form of gravy or curry.

Development and evaluation of bitter gourd recipes

- The antioxidant values of bitter gourd ranged from 2.91 in raw samples to 6.69 in pan fried samples.
- Acceptability scores for raw preparations given by the diabetic taste panel was significantly greater when compared to that of non diabetics ($P<0.05$). The mean scores revealed that the pan fried recipes are well accepted by the diabetic participants when compared to non diabetics though the difference was not significant.

Identification and screening of prediabetics by IDRS

- Among the 948 participants screened, a total of 337 participants were in the high risk category with the IDRS score ≥ 60.

Impact of intervention on prediabetics

- Anthropometric measures of both AB and BA group (N=65) enlightens that bitter gourd intervention had a positive impact with significant ($p<0.01$) reduction in body weight, BMI, waist circumference, waist to height ratio and conicity index. It was also observed that there was an affirmative cutback in body fat which was significant at five per cent level ($p<0.05$).
- No trend in the reduction or increase in blood pressure was noted among the subjects in both AB and BA groups.
- The mean initial fasting blood glucose level of prediabetics in AB group was 110.66 mg/dl which got reduced significantly ($p<0.01$) to 99.86 mg/dl at the end of bitter gourd intervention. In the case of BA group the placebo treatment did not bring forth any appreciable change in FBG where as the bitter gourd treatment was found to have a significant ($p<0.01$) impact.With respect to the glycosylated hemoglobin level of the AB group, initial value (6.37 per cent) significantly ($p<0.01$) trimmed down to 5.53 per cent after eight weeks of bitter gourd treatment and in placebo treatment the glycosylated hemoglobin reduced from 6.42 to 5.93 per cent which was also significant at 1 per cent level. In case of BA group, no significant difference was observed both during placebo and bitter gourd treatment.
- It is evident that AB group showed an increase in insulin level from 9.55 to 10.57 μU/dl during bitter gourd treatment and a reduction of 0.33 μU/dl during the placebo treatment.
- With regard to the lipid profile, the total cholesterol and LDL cholesterol had reduced significantly ($p<0.05$) in AB group whereas in BA group there was a significant reduction only in total cholesterol.
- The body weight had a positive correlation with fasting blood glucose and total cholesterol whereas the glycosylated heamoglobin was negatively correlated. In case of BMI a high degree of positive association was found with fasting blood glucose and negative association was observed with glycosylated heamoglobin and total cholesterol.

Effect of dietary intervention on Type II diabetics

- The mean body weight of the experimental group was reduced recorded to be significant at ($p<0.01$) level. It is evident from the result that the same trend of difference was observed

with waist circumference, waist to height ratio and conicity index before and after the bitter gourd supplementation in the experimental group.

- Diabetic subjects were found to exhibit significant ($p<0.01$) hypoglycemia compared to control groups. The mean fasting blood glucose level of the experimental group was 159.85 mg/dl which had reduced to 150.9 mg/dl after a period of two months of bitter gourd intervention. The initial and final values was analyzed statistically and found to be significant at ($p<0.01$) level.
- The mean post prandial blood glucose level of experimental group before supplementation was 231 mg/dl and had reduced to 221.05 mg/dl after supplementation for 60 days and the difference was statistically significant at ($p<0.01$) level. The difference in glycosylated hemoglobin level after the bitter gourd supplementation was found to be statistically significant ($p<0.01$) level. In case of control group glycosylated hemoglobin was reduced but without any statistical significance.

- Lipid profile of the experimental group was found to be decreased after the intervention with a statistical significant difference at ($p<0.01$) level. In case of control group no significant difference was observed between the initial and final levels after the intervention period.

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