SUMMARY

The summary chapter in a research thesis demonstrates the depth and breadth of knowledge and contextualization of the research results. It encapsulates the aim of the research and the hypotheses that has been addressed. Summary therefore demonstrates by means of a reflective discussion that the learning outcomes set out by the researcher have been achieved.

Type 2 diabetes is one of the major public health challenges of the 21st century. Today there is a significant change in the lifestyle of people owing to the rapid industrialization, improved socio-economic status, enhanced health facilities and increased life expectancy. Economic affluence coupled with sedentary lifestyles and changing food patterns are contributing to several chronic degenerative diseases such as diabetes mellitus, cardiovascular diseases, cancer, etc. Diabetes mellitus is a silent disease and is now recognized as one of the fastest growing threats to public health in almost all countries of the world. Around 150 million people suffer from diabetes in the world, of which above 35 million are Indians, the highest number in any country.

The aim of the study was to study the influence of Minor millet along with education intervention in management of Type 2 Diabetes Mellitus. The main objectives is to evaluate the effect of minor millets in management of type 2 Diabetes by providing 4 exchanges of minor millets (Finger millet/Ragi, Sorghum /Jowar, Foxtail millet/navanae, Pearl millet/Sajjae) in any of the meal in a day’s menu, and to study the effect of Diabetes education in Management of type 2 Diabetes by providing diabetes intervention programme.

Hence, A purposive randomized sampling method was adopted with the study sample comprising of 250 Type 2 diabetics from both rural and urban areas of Bangalore, Karnataka. The age group of subjects was between 30-60
years with very minimal knowledge on diabetes and without any other associated complications like Heart Disease, Nephropathy, Neuropathy and Retinopathy and on only oral hypoglycemic agents.

Again these samples were sub-divided into control and experimental groups (50 subjects from each experimental group and 50 from control group) each experimental group was subjected to specific millets like Pearl millet, Foxtail Millet, Finger Millet and Sorghum, with regular observation and reviews for 4 months.

The respondents from both the group were subjected for ABCD method to analyse their nutritional status. And the millets were subjected for proximate analysis and Glycemic index was estimated using trapezoidal rule (WHO guideline)

Following the intervention period, the effect of the millet was assessed by measuring anthropometric measures and biochemical parameters. As per the objectives, the questionnaire was developed on demographic profile, lifestyle pattern, food and nutrient intake, medical history, physical activity. Education modules were also developed for the effective intervention regarding millets and diabetes. The collected data was analyzed using various statistical tests. The results of the study are summarized as follows:

- The basic information of the respondents represented the profile of subjects based on their personal and related characteristics. The results on education level of respondents depicted that a majority were illiterates (30%) from foxtail millet and control, followed by below SSLC (22%) and graduates (10%). It was also observed that 28 percent of the respondents were self employed followed by agriculturist (22%) and government jobs (8.1%). Majority of the respondents were males (56% - 70%) from both the groups.
• Hindus were in majority from both experimental and control group. Nuclear families was in trend which was observed in majority among both the groups. The data on family income of the respondents revealed that higher percentage of the respondents had a monthly income of Rs.5,000.

• All the respondents were found to be aware of incidence of Diabetes. Majority of the respondents were diabetic between 1-5 yrs followed by 5-10 yrs. higher percentage of the respondents were on oral hypoglycemic drug with multiple responses along with diet and exercise and less number of respondents were on oral hypoglycemic drugs along with homeopathy treatment. Majority of the respondents were treated by Diabetologists and General physicians.

• With regard to the family history of diabetes, hypertension and heart disease, the results revealed that the inheritance of diabetes among the parents was found to be twenty eight percent followed by Hyper tension (15%) and heart Disease (6%) from both the groups, however the incidence of diabetes, hypertension and heart disease between groups were found to non-significant

• BMI, Waist circumference, Visceral Fat percentage, Body Fat percentage and Metabolic age of the respondents from the experimental group was found to be higher in the pre test, However, there was a considerable decrease in all the parameters after the intervention in the post test, of all the experimental group irrespective of millets.

• Bone Mass, Body water percentage and Muscle mass of the respondents from the experimental group found to be less in the pre test. However, there was a considerable enhancement of all the parameters after the intervention in the post test, in the entire experimental group irrespective of millets, whereas the results of control group showed non significant.
• The FBS, PPBS and HbA1c results of all the respondents from the experimental group was found to be significantly lowered in the post test when compared to pre test. However, there was an enhancement in Fasting, Post Prandial Blood Sugar and HbA1c in control group in the post test. This indicates that the dietary intervention along with education had a great impact in glycemic control of the respondents irrespective of millets in the experimental group respondents.

• With regard to blood pressure there was considerable decrease in post test with respect to diastolic and systolic pressure in all the millet group as compared to enhancement in control group in the post test.

• Majority of the respondents irrespective of millet group experienced clinical symptoms such as indigestion (87%), giddiness (85%) frequent urination (75%), fatigue (70%) followed by burning sensation (65%) in the pre test which are the common symptoms of hyperglycemia. Whereas in the posttest there was reduction in these signs and symptoms among the respondents, this may be attributed to good glycemic control after the intervention.

• The sensory evaluation of millet recipes revealed that except for taste (which may be due to bitter tasting of value added ingredients such as Fenugreek seeds, amaranths seeds and flax seeds) other parameters like flavour, appearance and colour were highly accepted with score ranging between 8-10, which was found to be significant at 5% levels

• Glycemic index of the millets revealed that foxtail millet was found to be the lowest (47.8) followed by pearl millet (51.9), sorghum (53.2) and finger millet (55.2).

• Glycemic load of pearl millet was found to be low with 9.7, followed by sorghum 14.3, foxtail millet- 23.2 and finger millet with 29.4
• The mean energy, protein and fat intake was found to be less in the post test and it was as per the recommendation when compared to the pre test with their actual consumption. However the fibre intake was found to be high after the intervention with counselling and this was as per the recommendation in the post test. Hence dietary intervention had an greater impact on anthropometry and biochemical parameters which also revealed that there was a reduction in weight and waist circumference along with good glycemic control among the respondents in the post test.

• Majority of the respondents (42-56 %) from both control and experimental group were following sedentary lifestyle. Higher percentage of the respondents adopted walking as their activity, for the duration of 30 minutes.

It was observed that irrespective of gender and age all the respondents obtained high knowledge levels, showed positive attitude and practices followed towards diabetes management after the intervention programme, which was found to be statistically highly significant. And higher significance was found among males with age group 35-45 years followed by females with age group 46-60 years.

• With regard to correlation coefficient relationship between Knowledge, Attitude and practice of experimental groups on age, education and income, revealed that there exists positive relationship between age, education and income with Knowledge, practice and attitude of the experimental groups irrespective of millets and statistically found to be significant at 5% level. Establishing that higher the age, education and income of the respondents better the knowledge, attitude and practices level of type 2 diabetics from experimental group.

• The correlation coefficient relationship between Anthropometric indices, ie., weight waist and BMI with Knowledge, Attitude and Practices of
experimental groups indicated that there exists negative relationship between knowledge, attitude and practices with anthropometric measurements which was found to be statistically significant. Further these results indicates that higher the level of knowledge, positive attitude towards diabetes management and practices followed to maintain the glycemic control with the reduction of all anthropometric parameters, which in turn as an great impact on Glycemic control.

- The correlation coefficients determined the nature of relationship existing among GI, Knowledge level, attitude and practices, with their Diabetes Management which was measured by HbA1c. The findings revealed that non nutritional factors like Knowledge, Attitude and practice are negatively associated with HbA1c level. This can be explained by the fact that higher education and better income levels lead to better socio economic status and better the knowledge and practices level of the respondents. This in turn improves accessibility to have a positive attitude towards management of Diabetes by regular follow up with the diabetologists and Nutritionists.

- The correlation coefficients among nutrient intake and body composition with HbA1c level of the respondents indicated that the lower the intake of macro nutrients (carbohydrate, protein, fat) results in the reduction of all the anthropometric parameters (Body Fat, visceral fat, BMI) which inturn has an impact on reduction of HbA1c values, with a better glycemic control.

- The findings also revealed that Fibre rich foods have an negative impact on HbA1c level, and at the same time metabolic age , water percentage, bone mass and muscle mass also show negative impact on HbA1c, as these variable increases there is an decrease in HbA1c level which indicates a better glycemic control and improves quality of life by postponing or preventing further associated complications.
Correlation coefficient between nutrients the such as Energy, protein, fat, carbohydrate and fibre with Glycemic index. The results indicate that there exists positive relationship between energy, protein and carbohydrate on Glycemic index. This indicates that as these nutrient content is low in the millet recipes there is an decrease in the GI of that specific millet recipe. Whereas there exists an negative correlation with Fat and Fibre on GI which is statistically significant at 5% level. It indicates that Fibre and fat rich foods have lower Glycemic Index. Hence Fibre rich foods are recommended in management of Diabetes, since Fat has an influence on Obesity and decreases Insulin sensitivity fats are restricted even though they reduce the Glycemic index of foods.

HYPOTHESIS

The hypothesis stated “Minor millets and education do not have any influence in the management of Type 2 Diabetes” is rejected. Since in the present study the results revealed that Dietary intervention with Minor Millets along with diabetes education has a positive impact in the Management of Type 2 Diabetes.