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EFFECT OF ELECTRONIC MODE OF PATIENT COUNSELING ON IMPROVING THE OUTCOME OF TREATMENT FOR DIABETES MELLITUS IN RURAL POPULATION OF KERALA

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ABSTRACT

Background: Diabetes mellitus has been specifically identified as having high blood glucose levels, mainly due to complete or partial lack of the hormone called insulin in the body. It can cause serious damage to vital organs from time to time. Control of diabetes includes education in peer care and self-care. In addition to traditional patient care treatments, self-care education helps the individual achieve a better quality of life in their critical state. In this modern era electronic media is gaining more importance and popularity. Hence this study aims to explore the possibility of electronic media in patient counseling. **Aim:** To study the effect of electronic mode of patient counseling on improving the outcome of treatment for type 2 Diabetes mellitus in rural population. **Material and Methods:** This study was conducted in rural areas of Thrissur district which is the central part of Kerala. This district is said to have mixed culture of southern and northern Kerala making it unique population for this study. Appropriate questionnaires were prepared and direct survey was conducted on the selected candidates. Candidates were selected based on pre-determined inclusion and exclusion criteria. A total of 252 candidates were shortlisted and divided into two groups, one was identified as the control group and the other as intervention group. Intervention group was made available with information only through electronic media which in this study is mobile phones. Well experienced pharmacist was engaged in preparing the material also with the help of an IT personal. Direct calling, forwarding of posters, reminder forwards, audios and videos were made use for patient counseling. Control group was just surveyed by non qualified person. Two standardized questionnaires called MDQOL -37 and KAP questionnaires were used for this purpose. The data was analyzed using ANOVA software.**Conclusion:** The results of the study was sufficient to understand that electronic based methods of patient counseling can be effective in treatment of diseases like diabetes mellitus. The overall quality of life of the patients improved commendably which ensures lot of scope for the newer counseling techniques. Moreover these techniques are considered safe and effective in pandemic situations were social distancing has be practiced.

KEYWORDS: Diabetes, Quality of life, Patient counseling by electronic mode.

INTRODUCTION

Diabetes is a condition in which a person has high blood glucose levels. It is an important lifestyle disease and is commonly referred to as 'sugar'. The energy required for the body to function comes from the starch in the food we eat every day. As food is digested, the starch is converted into glucose and mixed with the blood. The help of the hormone insulin is needed to get the glucose mixed in the blood into the tissues in a way that is suitable for the functioning of the body's tissues. Decreased levels or quality of the hormone insulin reduce the absorption of glucose into body tissues. This can cause the blood glucose level to rise. When the blood glucose level is above a certain level, glucose is found in the urine. This condition is called diabetes. Frequent urination, increased thirst and bloating are common symptoms of elevated blood glucose levels. The number of diabetics in the world today is increasing day by day. Lifestyle disorders are a major cause of diabetes. Therefore, this disease is one of the non-communicable diseases (NCD) Lifestyle Diseases. More than 200 million people worldwide have diabetes. Diabetes kills one person every eight seconds. Blood sugar levels rise and fall rapidly - often making diabetes dangerous. Diabetes can occur for a variety of reasons. It is not uncommon for multiple causes to occur.

1. Hereditary factors - People who carry the genes that cause diabetes are more likely to have it in their family.

2. Autoimmunity- In some cases, the body destroys the body's cells by pretending to be the enemy. When the body tries to destroy insulin-producing cells in this way, it can lead to diabetes.
3. Obesity.
4. Vascular problems.
5. Mental stress and fatigue.
6. Virus infection.
7. Accidents.

Sugar (glucose) is required for the function of cells in the human body. We get it from food. But because we cannot measure it accurately, we may get more or less sugar in our body. Therefore, different levels of glucose are found in the blood at different times. The body looks after the amount of glucose in the blood from food without increasing it excessively. It is carefully maintained in healthy people. Our cells use up a small portion of our blood glucose levels. It occurs in many people on many different levels. More in those who work more and less in those who do not; At the same time, some cells in the endocrine glands (Islets of langerhans) secrete glucose into the glycogen, which is used to convert glucose into glucose. But this happens when the level of glucose in the blood drops. Cells also need the help of insulin to use glucose. There are many other disorders that may arise due to diabetes. Diabetes is a leading cause of heart attack and stroke. Loss of vision (Diabetic retinopathy) is a problem to a big proportion of patients. Dialysis is required due to kidney failure. Erectile dysfunction in men and vaginal dryness in women cause pain and discomfort when associated with it. Difficulty in wounds that it do not dry out, loss of tactile ability, loss of athletic ability, feeling excessively tired, feels like urinating occasionally. As a precautionary measure, regular blood tests should be performed. The test should be performed without eating and eating at the right time. Diabetes is a disease that lasts for a lifetime. It can not be completely cured unless it is controlled. Effective treatment exists in modern medicine. The patient may need to continue the medication for the rest of his life. Thus (Quality of life) can be improved.

The basis of treatment is to keep blood sugar levels as close to normal ("euglycemia") as possible and to look for hypoglycemia (hypoglycemia). Sugar levels can be controlled with diet, exercise, and medication (insulin in the case of type 1 diabetes, and injectable pills for type 2 diabetes, and insulin if needed). It is essential that patients understand the information and participate in treatment. Complications of the disease are less common in people whose blood sugar levels are well controlled.[5][6] The goal of treatment is to keep the level of HbA1C at 6.5%. But a reduction in this rate should be avoided.[7] Avoiding smoking, high cholesterol, obesity, high blood pressure and lack of proper exercise can also help reduce the risk of complications.

Blood sugar levels can be adjusted in the short and long term by educating the patient, adjusting the diet, and prescribing possible exercise routines. People with diabetes are also more likely to have heart disease. Lifestyle changes also need to be implemented to control blood pressure.

The major challenge in the management of diabetes are:
1. Insufficiency and reluctance to take insulin injection in terms of position, time and dose.
2. Improper usage of glucometer.
3. Medications for management are discontinued for a few days only.
4. Exercise- Works incorrectly without understanding how much, when and how.
5. Insulin injection is started only late after the blood sugar has risen.
6. Unable to follow dietary restrictions.

MATERIALS AND METHODOLOGY

The study is an epidemiological study for the purpose of understanding the wide spread of type 2 diabetes in a particular community. It represents the total affected population in Thrissur district, Kerala. Selection criteria are fixed to be patients diagnosed with type II diabetics and aged between 18 and 65 years living in Thrissur. Elimination criteria are pregnancy and the patient's or caregiver's refusal to participate in the study. Data sources include direct information from the patient, various examination data and prescriptions. After preliminary coordination of the selected candidates, the study population was set at 253, of which 126 were in the control group and 127 in the intervention group. Sampling is done using a convenient sampling method. The two questionnaires used in this study are MDQoL-17 (Modified Diabetes Quality of Life) and KAP (Knowledge, Attitude and Practice). Preparing questions is an important step. Care should be taken to include the most appropriate question. The quality of life outcomes can be studied in many ways. For this, you can create and review different questionnaires. A separate questionnaire is required for each specific disease and problem.

MDQoL-17 is a pre-validated questionnaire developed as an updated diabetes standard for the Life Questionnaire. It consists of 17 targeted questions as indicated in the name. Each question is designed to test a specific training domain. MDQOL17 aims to study the limits of life in relation to physical exercise, roles due to physical health, mental health, energy fatigue, emotional state, social performance and public health. In this questionnaire, questions 1, 2 and 3 were used to analyze health status and questions 4, 5 and 6 were devoted to physical activity. Question 7 focuses on limiting roles due to physical health. Questions 8, 9 and 10 describe emotional well-being, questions 11 and 12 analyze the scope of emotional roles, and questions 13, 14, 15 and 16 describe social performance, and questions 17 identify energy fatigue. Education. All questions except exercise

are divided into 100, 75, 50, 25 and 0, and exercise questions are divided into 100, 50, and 0 for scoring purposes.

KAP collects data pertaining to knowledge, attitude and practice. KAP is easy to read, expand and understand. This type of research helps to develop effective research methods. This survey will help you to get a general idea about the group. This can be done effectively by conducting a KAP survey that provides information about the emotions associated with a particular episode. It tells you what they think and how they react. KAP studies are ideal for assessing participants' knowledge, behavior, and clinical parameters in specific situations. The KAP questionnaire used in this study is in the mother tongue and contains objective questions. To confirm this, the English questionnaire was first translated into Malayalam and experts in both languages were invited to translate it. Its reliability was tested. The KAP questionnaire used in this study included 27 questions, including questions to assess knowledge, behavior, and training. The first nine of these 27 questions are based on knowledge and give the patient a 100, 50 or 0 level of knowledge. 10 to 19 Attitude-based questions. These questions are mostly lifestyle based and will earn you 100, 50 or 0 points. The last eight questions, questions 20 to 27, are practice-based questions that will help you understand the accuracy of your medication use and other diagnostic errors. There are two options for answering these eight questions, so they are considered 100 or 0. A detailed study of this questionnaire will teach patients the ability to correctly identify deficiencies in the patient's current management.

Along with the initial interview or intervention, demographics such as gender, age, weight, BMI, disease duration, family history, social habits, co-morbidities, education status, occupation, and the patient's annual income were recorded. Laboratory data such as FBS, PPBS and HbA1c were recorded on the patient information sheet.

The shortlisted candidates were randomly selected using a graphics card speed calculator. All applicants completed a patient consent form and a patient information form. Between the two groups, a pharmacist is considered the control group, who did not intervene but interviewed non-professionals. The other group is called the third group (Group I), which involves the professional involvement of an experienced pharmacist. During the consultation, patients were reminded of common diabetes problems, eating right, exercising that affects their daily life, and doing things appropriate for their daily routine. They were also told the importance of taking medications, eating right and exercising to treat diabetes. Both the interventions and the interviews were conducted twice over a period of 6 months after the preliminary baseline data collection. The data obtained were analyzed using ANOVA and SPSS software.

RESULTS

A. Socio-demographic data:

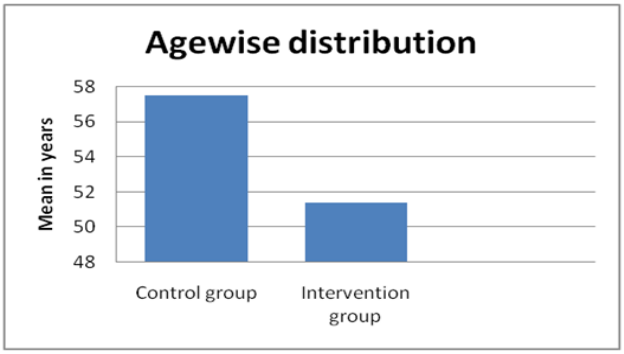

Figure 1: Age- wise distribution.

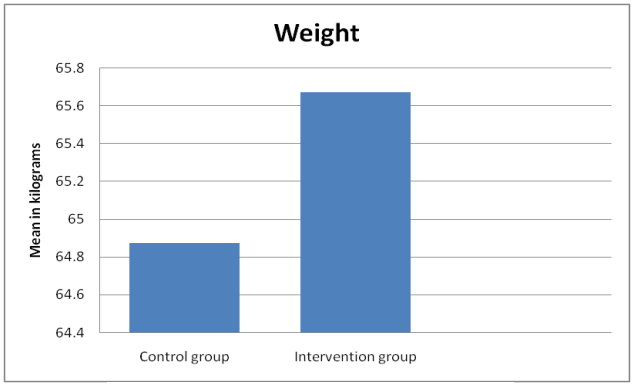

Figure 2: Weight- wise distribution.

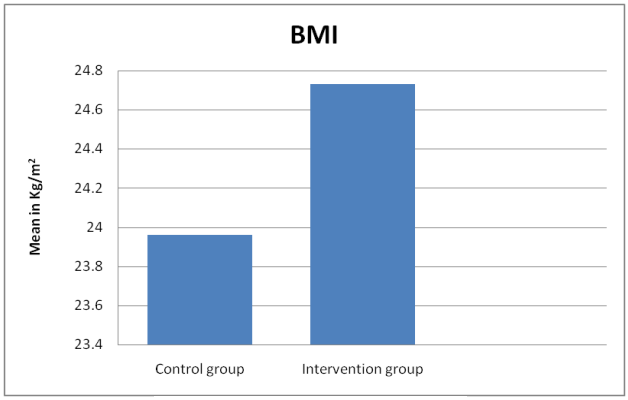

Figure 3: BMI distribution.

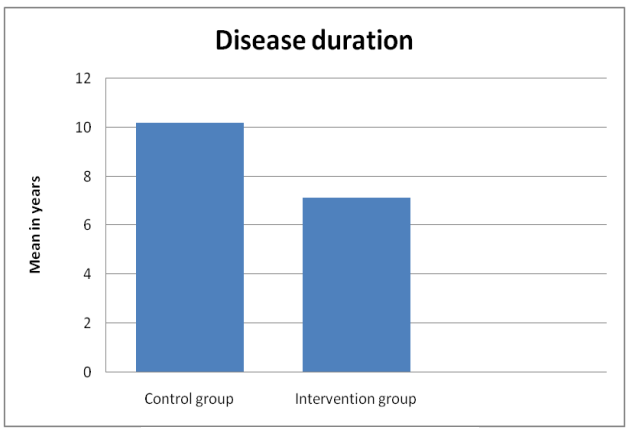

Figure 4: Duration of disease.

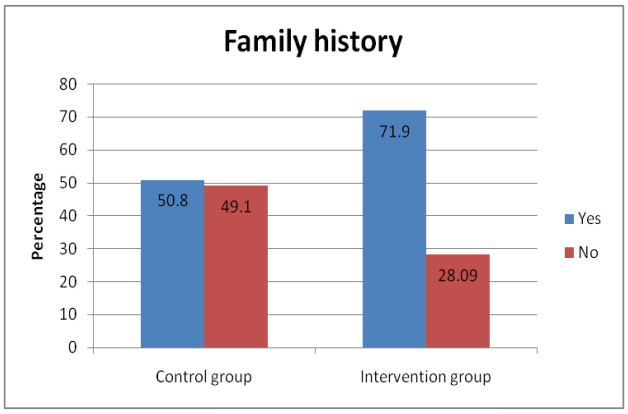

Figure 5: Family history.

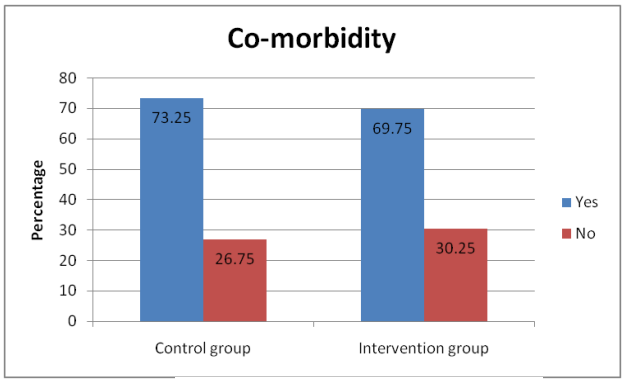

Figure 6: Co-morbid conditions.

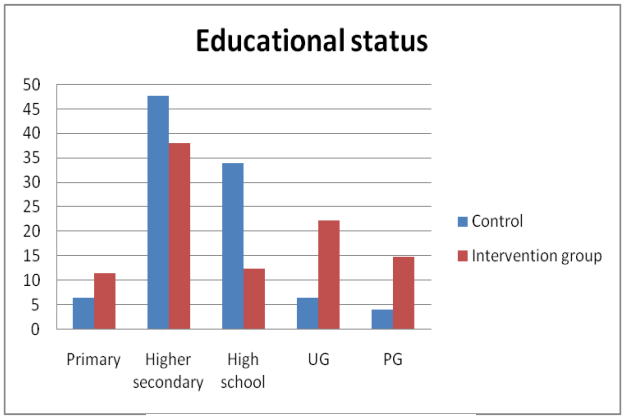

Figure 7: Educational status.

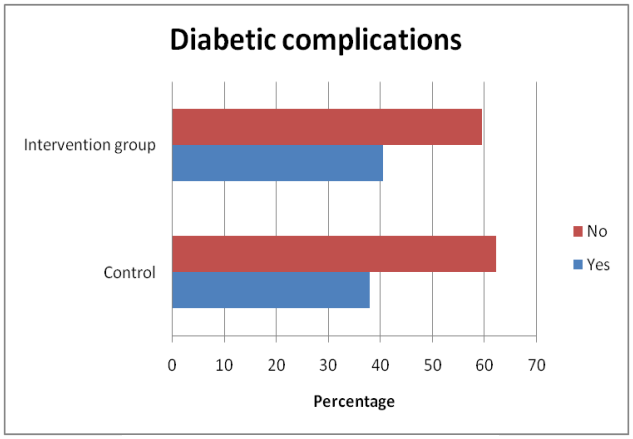

Figure 8: Diabetic complications.

B. Lab data:

Table 1: Fasting Blood Sugar.

FBS	Control group	Intervention group
Baseline	146.04	141.15
6 Month	144.19	136.41
12 month	142.47	132.23

Table 2: Postprandial Blood Sugar.

PPBS	Control group	Intervention group
Baseline	157.07	156.71
6 Month	154.14	151.61
12 month	149.21	145.13

Table 3: HbA1c.

PPBS	Control group	Intervention group
Baseline	157.07	156.71
6 Month	154.14	151.61
12 month	149.21	145.13

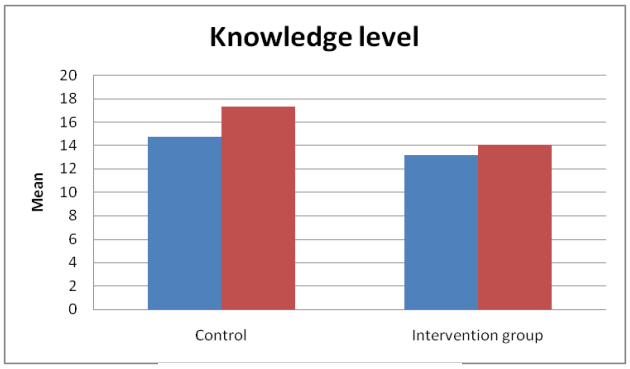

Figure 9: Knowledge level.

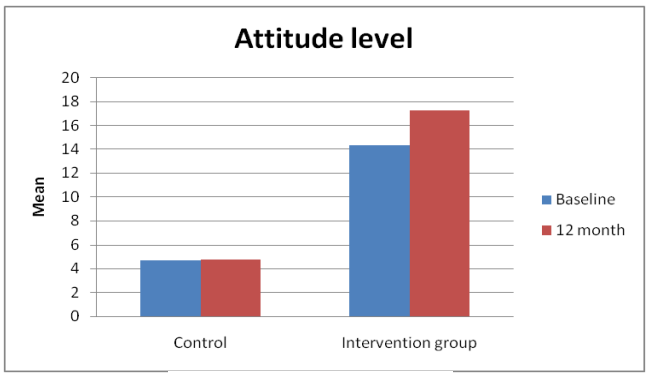

Figure 10: Attitude level.

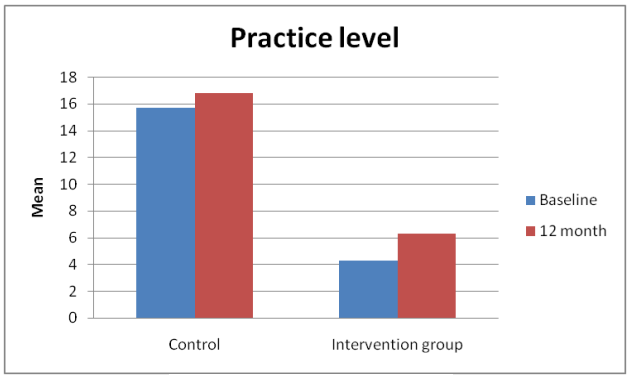

Figure 11: Practice level.

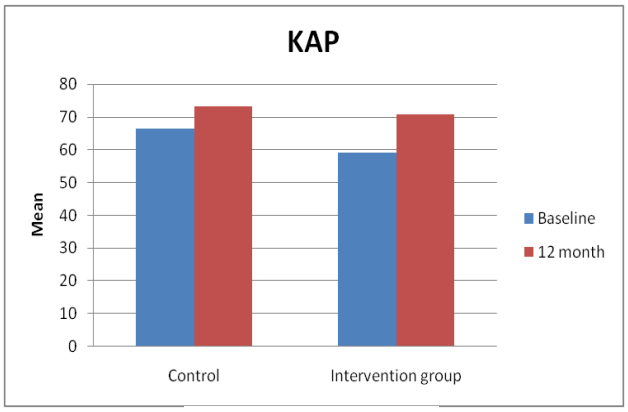

Figure 12: Total KAP.

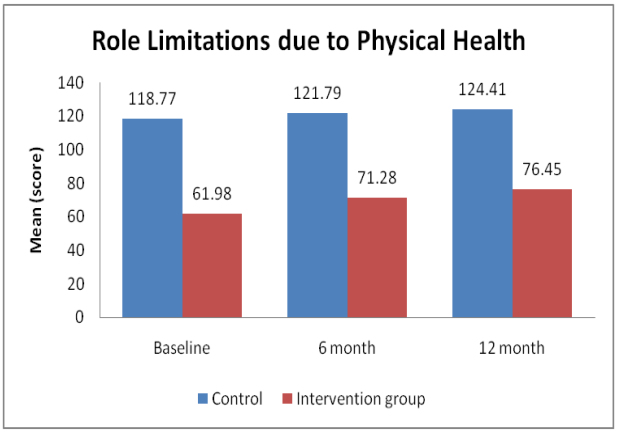

Figure 13: Role Limitations due to Physical Health.

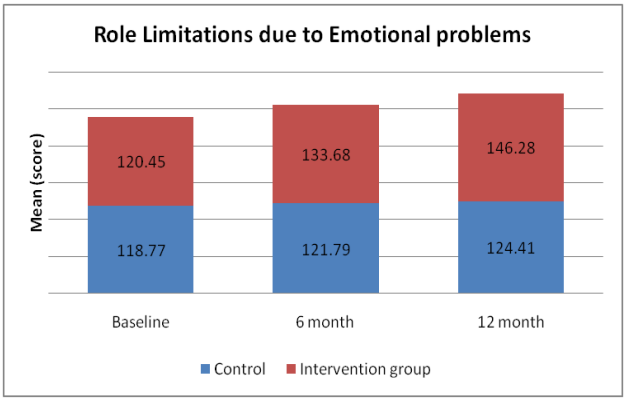

Figure 14: Role Limitations due to Emotional problems.

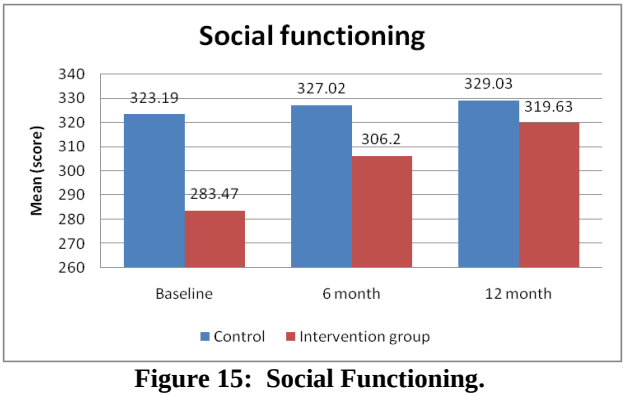

Figure 15: Social Functioning.

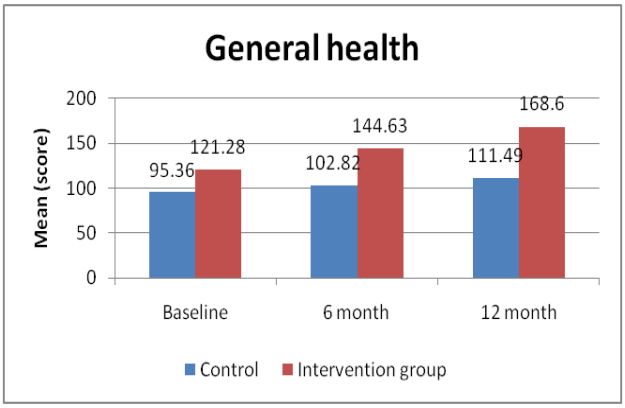

Figure 16: General Health.

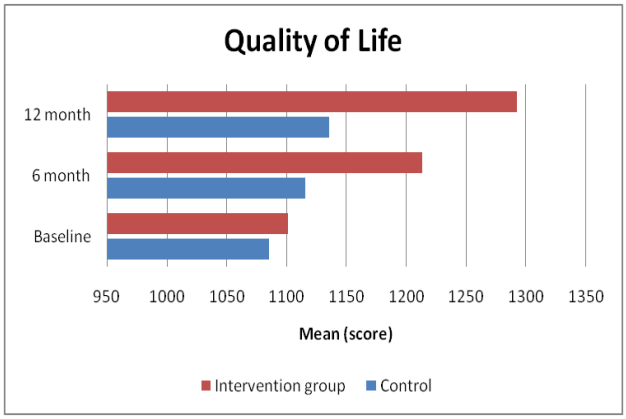

Figure 17: Quality of Life total value.

DISCUSSION

A. Demography.

1. **Age:** The selected candidates comprised mainly of males than females of age between 18 to 65 years. In the control group the average age of members were found to be 57.5 whereas in intervention group was 51.4. So the study populations were in a similar age group which will make the observations unbiased as far as age is concerned.

2. **Weight:** The mean body weight was calculated and found that both had only marginal difference. The mean body weight of control and study group was 64.87 kg and 65.67 kg.

3. **Body mass index:** As far as BMI of the candidates are concerned, there was no much of a variation among the groups and there was no huge deviation from then normal BMI levels. The control group had a mean BMI of 23.96 followed by 24.73for the intervention group. This may be due to the knowledge level and health outlook of the society.

4. **Disease duration:** The duration for which the candidates have carried diabetes with them was found to be depressing. The control group showed duration of 10.18 years whereas in the case of study group it was 7.14 years. So both groups have quite a long engagement with disease which may have increased their knowledge level.

5. **Family history:** The family history has a good co-relation with diabetes as per various studies. The intervention group comprised of 71.9% patients who had family history of diabetes, in comparison to 50.8% in the control group. The number of people with diabetic family history is minimum in control group. The positive side of having family history is that the knowledge level will be high and the family support in managing the disease will be good while the negative side will be that chance of getting the disease will be more. Here the chance of getting the disease is high but the level of precautions and preventive measures taken will also be higher.

6. **Co-morbidity:** Co-morbid conditions play a significant role in management of disease as well as the wellness of the patient. The chance for having various co morbidities is much higher as diabetes is a chronic disease and in this study the candidates have quite long disease duration. Hypertension and hyperlipidemia are the leading co morbidities found among the groups followed by anemia, hypothyroidism, COPD, Asthma, MI and stroke.

7. **Educational status:** The intervention group was found to be comparatively more educated than the control group. There was huge difference in the undergraduate and post graduates. The percentage was found to be 6.45 and 22.31 in case of undergraduates and 4.03 and 14.87 in case of post graduates. The level of education was found to improve the effectiveness of the new method of intervention.

8. **Diabetic complications:** The number of people with diabetic complications was lesser in both groups. It was understood that patients with complications and without complications thought that the new method will help them to manage diabetes. Once the method was used for a period of time the usage becomes easier and easier.

B. Lab Data.

1. **Fasting Blood Sugar:** The blood sugar level was found to decrease gradually which was more evident in the intervention group. There was more prominent improvement in case of data obtained after twelve months compared to sixth month and baseline which shows that the results will be more promising over more time.

2. **Postprandial Blood Sugar:** The results of PPBS were similar to that of FBS. The level reduced from 157.7 to 149.21 in control group and 156.71 to 145.13 in the study group. This showed that the new intervention method had significant effect.

3. **HbA1c:** This test is the most reliable test in case of understanding the level to which the patient is affected by diabetes. The values of HbA1c were found to be improving which is very hopeful for the care giver and the patient. The intervention group gave a 25% better result (0.25% reduction) than the control group (0.2% reduction). This is great achievement as the value was approaching the normal value, which fixed as 7.

C. KAP data.

1. **Knowledge:** The level of information about the various aspects of the disease that the society or the patient has is very important especially in case of life style diseases. This will improve patient compliance to a higher level. But if the knowledge is not complete then it may lead to problems like those due to self medication. Here both the group showed betterment in knowledge level. This will definitely help in understanding the influence of the pharmacist intervention in the disease management.

2. **Attitude:** Attitude is more important because without attitude knowledge does not help much. So unlike increasing the knowledge level, increasing the attitude level is more challenging. This requires a real talent of the care giver. He should be able to convince the patient about the importance of the treatment and so on. The change was only marginal even though it was towards improvement in case of control group.

3. **Practice:** Once knowledge and attitude is achieved, practicing becomes easier. Right practices improves the success rate if the treatment. Practicing of various aspects of treatment is usually time bound and tends to diminish over time. This needs to be.

4. **Total KAP:** To certain extent knowledge, experience and training (KAP) is an important feature which gives an excellent and quality insight. KAP reviews identify errors or omissions that may interfere with the activities we want to perform and change the service. Note that a KAP measurement measures an "idea" and is based on "conversation" or words. In other words, looking at KAP shows what it says, but there can be many differences between what it says and what it does. Thus it is important for a community pharmacist to get these data for better management of disease. The total KAP value increased from 66.36 to 73.25 in non-intervention group whereas, it showed a big leap from 59.18 to 70.84 in intervention group.

D. QoL data.

1. **Role limitations due to physical health:** The primary concern of the patient is his physical health especially in the starting stage of the disease. Slowly decline of physical health leads to decline of the mental health. The patients will have varying physical activities in their daily routine due to their occupation, place of stay and family set ups. Thus physical health is an important area to concentrate while deciding the management methods

of the disease. Among the two groups, control group showed an baseline value of 118.77 which rose to 121.79 and then to 124.41 in the six month and twelve month surveys. While, in the case of other group the baseline value 61.98 increased to 71.28 and then to 76.45 after the subsequent interventions. This shows a good proportional increase in the study group.

2. **Role limitations due to emotional problems:** Various factors including decline in physical health can contribute to decreased mental health. Also inability to perform in the work place, not able to eat favorite food may also lead to emotional problems. This can also lead to depression in later stages. So it the duty of the care giving pharmacist to study these aspects and include remedy for these issues during the management of problem. In the study the control group scored values of 118.77, 121.79 and 124.41 in the beginning and two subsequent interviews while the intervention group scored 12.45 in the beginning, 133.68 and 146.28 after the interventions.

3. **Social functioning:** Inability to maintain the social activities that a person had in the society is as depressing as the previous parameter. This will adversely affect the mental and physical health of the patient. Here the values from the questionnaire pertaining to social functioning gave mean score increase of 6 points in control group while in the second group it was around 36 points which is a big achievement.

4. **General health:** The general health was also studied which includes the physical, emotional and social health. The results were positive, as control group improved to 111.49 from 95.36 and study group showed increase from 121.28 to 168.6.

5. **Quality of Life:** QOL is an important endpoint in clinical and health research, and QOL research involves different patient groups and different research models. Based on the current evaluation of QOL research methodology and conceptual determination, we conclude that most QOL studies in health and medicine have conceptual and methodological challenges. In this study various aspects of health was studied and the final quality of improvements were compared. A steady line increase was recorded in control group (1085.5 – 1115.94 – 1135.5) and in case of the intervention group (1101.45 – 1213.22 – 1292.56) the increase was very steep. This proved the effectiveness of electronic methods in the management of diabetes. This method may be used effectively by a community pharmacist to monitor and provide care to many patients in a community at all times consistently. Also it is a great opportunity to give uninterrupted pharmaceutical care in times pandemics like the one we have faced now.

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