DIABETIC RISK IDENTIFICATION: A STUDY ON PRO-ACTIVE EDUCATION REMEDY FOR LIFE STYLE DISEASES

Dr. Roselit Michael
Assistant Professor CPAS College of Teacher Education, Erattupetta
Dr. T. C. Thankachan
Assistant Professor, St. Thomas College of Teacher Education, Pala, Kerala

Abstract

Diabetes, the leading non communicable disease has emerged as major health care problem in India. According to the Diabetes Atlas published by the International Diabetes Federation (IDF), every fifth diabetic subject in the world would be an Indian. Indians, particularly Keralites are more prone to develop diabetes and its complications at younger age. Diabetes education has been an essential component of diabetes management and is increasingly recognized as an integral part of chronic diseases management, The objective of educating people with diabetes are to optimize metabolic control; prevent acute and chronic complications; improve quality of life by influencing patient behaviour and produce changes in knowledge, attitude and behaviour that is necessary to maintain and improve our health.

This study is conducted among 60 teacher educators and 120 high school teachers of Kottayam district to find out the diabetic risk among teacher educators and teachers with respect to socio economic status, age and gender; to gather the opinion of among teacher educators with respect to evolving a diabetic care education course for secondary level teacher education; and to evolve a diabetic care education course for teacher education. The study revealed that majority of teacher educators and teachers are at high or moderate diabetic risk. It gives an urgent implementation of the scientific strategy and practice based pro-active pedagogy and education for controlling the lifestyle diseases. This research evolved a diabetic care education course with seven units and practicum. The seven units are; Introduction (10 hrs.), Conceptual Background of Life Style Diseases (15 hrs), Types of Diabetes (10 hrs), Problems of Diabetes (10 hrs), Coping with Diabetes and Diabetic Dieting (15 hrs), Exercise and Diabetic Care (20 hrs) and Evaluation of Diabetic Care Education (10 hrs). In addition to this the practicum includes; Assignment/Survey (1), Case study/ Project (1), Seminar/Panel discussion (1) and Exercises including 1 month yoga training (1 hour per day).

***Key Words**: Diabetes, Diabetic Care Education, Diabetic Risk, Non-communicable Diseases, etc.*

Introduction

The emerging epidemic of life-style diseases, Diabetes is the most important. Even though, a great deal of discussions occur about the emerging epidemic of life-style disorders, the fact still remains to be reflected in policy making and not translated in to action. Not only the genetic pre-disposition, but also various environmental factors play crucial role in the causation of the disease and this fact often gets ignored and the disease gets trivialized to the level of a genetically determined one. The role and influence of environmental factors are often riot highlighted with the result that many people realize that they could be afflicted with the condition only after the disease had set in, or even irreparable damage had been done to many organs or organ systems.

The multi-factorial causation, the presence of co-morbid conditions, development of complications and the ensuring morbidity and mortality are often not fully realized. Since the disease is not a rapid killer, as is the case with many infective disorders, the ‘silent damage and often the silent killing' fails to impress the lay person. Similarly a panicky public health response is often lacking in the case of such diseases. The economic implications of the morbidity are often beyond the perception of even the healthcare providers

and the challenge posed by the emerging epidemic to the resource strapped health system is often formidable.

Context and Background of Study

Diabetes is the most common metabolic disorder in the world. The World Health Organization estimates the total number of persons with diabetes to be 171 million as of 2000. The disorder is most prevalent in South Asia, especially in India, which with, 41 million individuals with diabetes, has earned the unwelcome sobriquet of the "Diabetes Capital" of the world. More worryingly, this number is set to increase to 70 million by 2025, 10 million more than China, which lies in second place.

The personal, social and economic costs of diabetes are huge and are likely to adversely affect India's economic development over the next couple of decades. Unless urgent steps are taken to thwart this burgeoning epidemic, more and more young and middle-aged Indians will fall prey to diabetes in the prime of their lives. The first step to combating any epidemic is to gather all available information about it. Till recently, efforts to tackle the diabetes epidemic in India were hamstrung by the lack of quality original data emanating from the country itself. It was also evident to researchers in this field that the data obtained from Western populations could not be directly extrapolated to Indians, since the natural history of diabetes in Indians is quite different from other ethnic groups.

Kerala's achievements in health have been universally recognized and praised. The dramatic decline in fertility and child mortality during the last four decades has given Kerala reputation as the healthiest state in India. During the last decade, crude death rate has shown a steady rise from an all time low of 5 per hundred to the current levels of composition alone; rather it suggests an increase in mortality in the middle age group. Kerala has experienced a health transition from that of a high child mortality-high morbidity picture to that of low child mortality-high adult morbidity situation in just over one generation time. In other words our health picture has taken a quantum leap from that of an under developed society to that of a developed, urbanized society. The paradox is that by western standards we are still a low consuming society both in terms of food consumption and economic consumption.

Need and Significance of the Study

Now diabetes is not a disease of rich people. It is a disease of sedentary people with unhealthy diet habits. 80% of diabetics in the world will be present in developing countries like India. Every 10 seconds, a person dies of diabetes complications. In the same 10 seconds, 2 people are diagnosed as diabetics. Number of diabetics in India is at 4 cores. Number of Diabetics in the world in 1995 was 124.7 million. Number of Diabetics in the world in 2000 is 153.9 million. Number of Diabetics in the world in 2025 will be 299.1 million. It is gradually becoming more dangerous than AIDS. India is the Diabetes capital of the world with Hyderabad is the Diabetes capital of India. Here are some of the facts about this silent disease. November 14 is observed as the World Diabetes Day. One in every five diabetics in the world is an Indian. India now has 35 million Diabetics.

As per WHO's The World health statistics 2012 report, one in six adults obese, one in 10 diabetic and one in three has raised blood pressure Diabetes needs to be identified as public health problem and needs to be addressed in that mode. Emphasis needs to be on risk reduction, prevention, detection, management, prevention of complications, and rehabilitation. It could be made possible only with full community involvement.

By a most conservative estimate, there are about 1.5 million diabetic subjects in Kerala. These people need lifetime management involving lifestyle modifications, drugs and diet. The economic cost of managing diabetes in Kerala is mind-boggling. When we learn from our studies that most of the diabetic subjects are getting irrational and unscientific management in our state, we can only shudder at the thought of future increase in numbers of people suffering from advanced renal failure, and blindness two dreaded complications of diabetes.

Kerala has to undertake a massive lifestyle education programme. Now we have started Lifestyle Education and Awareness Programme (LEAP). The thrust has to be on physical activity, prudent eating and exercise and life management. Early detection through screening for diabetes hypertension and overweight

has to be integrated into the culture of the Keralites. Time is not on our side. Only timely action can help defuse the bomb.

The Pro-active Education Remedy for Life Style Diseases should start from identification of diabetic risk and proper diagnosis and remediation. Diabetic risk in this study means the chance of becoming diabetic in future. In this study diabetic risk will be identified using the Indian Diabetes Risk Score (IDRS) developed by Madras Diabetes Research Foundation (MDRF), considering the criteria like age, waist circumference, physical activity and family history of diabetic. A scientifically prepared course for diabetic care education and its effective implementation is a must in the present context. The Diabetic Care Education Course should high lights diabetes and its causes, risk reduction, prevention, detection, management, prevention of complications and rehabilitation of the diabetic. In this study course means course evolved by teacher educators, and validated by medical experts, which can be included in B. Ed curriculum.

Need for Diabetes Care Education

It is known that many patients suffer from the diabetes and its complications due to lack of awareness among the common man on the occurrence of heart attacks, blindness, kidney damage, leg ulcers, loss of sexual ability etc. So we need to give a awareness about the silent killer after identifying it in the early stage. The education of the future providing poor man's total span must be oriented to his fulfillment as an individual person, as a creative worker and as a member of his society at local, national and global level. The educational programs and process should be related to the need of contemporary man looking towards a fast changing picture, the integrity, ability and wellness of man, achieved through an appropriate system education is the most precious asset of the individual and his society and it is this aim which needs now to be translated into curricular content. Such a curricular content of educational programs and experience need to him conceived and planned in to context of education.

While selecting the teacher educators and teachers under this study teacher educators are equipping teachers trained and this trained become teacher and they equip the society so it is need to be identified the diabetic risk of this group and make awareness about this silent killer and also evolve a course of diabetic care education.

Objectives

1. To find out the diabetic risk among teacher educators and teachers with respect to socio economic status, age and gender.
2. To gather the opinion of among teacher educators with respect to evolving a diabetic care education course for secondary level teacher education.

Methodology in Brief

In order to achieve the objective of the study investigator selected qualitative study with survey method. The major part of analysis was qualitative in nature. Documentary Analysis also was used. (Documents of Amrita Institute of Medical Sciences and Research, Indian Medical Association, Govt. Medical Colleges, Health Reports, Report of World Diabetes Federation, etc.). For evolving the course for diabetic care education, the investigators consulted expert Endocrinologists, Nursing Educators, Teacher Educators, Medical Experts, etc.

The investigators randomly selected 60 secondary level teacher educators form 8 colleges of education and 120 teachers from 9 high schools. As this study has some medical implications and background, 5 experts from two famous hospitals and colleges of nursing were selected. They were consulted in different phases of the study. Their expert opinion and participation in the evolving of the course for diabetic care education at secondary level teacher education was worthy and authentic.

The investigators used the following tool for collecting data. *Indian Diabetes Risk Score (IDRS)* - for identification of diabetes risk developed by Madras Diabetes Research Foundation (MDRF); *Socio Economic Status Scale* - Developed and standardized by A.S Nair (1978) and modified by Dr. T.C Thankachan (2012); *Questionnaire on life style diseases and diabetic care education* prepared by the

investigator; and the *Documents* of Government Medical College, Kottayam, Amritha Institute of Medical Science and Research, etc.

The investigators used the Descriptive statistical techniques for the analysis like; mean, percentage, average number of occurrences of responses and content analysis of the documents.

ANALYSIS AND FINDINGS

Identification of Diabetic Risk of Teacher Educators

The main objective of the study is to identify the diabetic risk of teacher educators and teachers in order to archive this objective the investigators used the Indian Diabetic Risk Score (IDRS) developed by Madras Diabetes Research Foundation (MDRF). The data is presented in table-1.

Table 1: The Diabetic Risk of Teacher Educators

Sl. No	Diabetic status	Teacher Educators		Teachers	
		No	%	No	%
1	Diabetic	5	9	11	9
2	High risk	23	38	39	33
3	Moderate risk	23	38	58	48
4	Low risk	9	15	12	10
Total		**60**	**100**	**120**	**100**

From the above Table - 1 shows that 9 % of the respondents are diabetic that means they are all ready diabetic patients, 38 % of the respondents have very high risk of having diabetic, 38% of the respondents are moderate risk of having diabetic and 15% of the respondents have low risk. This shows, in future 85% of teacher educators will either diabetic or at risk. Only a healthy educator can give education in the maximum excepted quality. With respect to the school teachers, the table shows that 9 % of the respondents (school teachers) are all ready diabetic patients, 33 % of the respondents have very high risk of having diabetic, 48% of the respondents are moderate risk of having diabetic and 10 % of the respondents have low risk. It means, we need more concentration on the health related practices in the education level.

Diabetic Risk of Teacher Educators and Teachers based on their SES

This analysis will help us to understand Diabetic Risk of teacher educators and teachers with respect to their Socio-Economic Status. The data is presented in table-2.

Table 2: Diabetic Risk of Teachers Educators and Teachers based on their SES

Sl. No	Diabetic status	SES	Teacher Educators		Teachers	
			No	%	No	%
1	Diabetic	High	4	7	4	3
		Above average	1	2	7	6
		Average	-	-	-	-
		Below average	-	-	-	-
		Poor	-	-	-	-
2	High risk	High	9	15	17	14
		Above average	14	23	22	18
		Average	-	-	-	-
		Below average	-	-	-	-
		Poor	-	-	-	-
3	Moderate risk	High	7	12	14	12
		Above average	16	26	44	37
		Average	-	-	-	-
		Below average	-	-	-	-
		Poor	-	-	-	-
		High	5	8	2	2

4	Low risk	Above average	4	7	10	8
		Average	-	-	-	-
		Below average	-	-	-	-
		Poor	-	-	-	-
Total			**60**	**100**	**120**	**100**

Table 2 shows that, among teacher educators, 7% of the diabetic patients are in the category of high and 2% of them are at above average Socio-Economic Status. 15% of the high risk respondents are in the category of high and 23% of them are in above average SES, 12% of the moderate risk are in the category of high and 26%of them are in above average SES and in low risk 8% of them are in the category of high and remaining 7% are in above average SES.

With respect to the school teachers it is observed that 3% of the diabetic are in high SES, 6% of them in above average. 14% of the high risk respondents are in high SES and 18% of them at above average, 12% of the moderate risk respondents are in high SES, and 37% of them in above average. 2% of the low risk respondents are in high SES, 8%of them in above average and there are 0% of respondents in average, below average and poor SES category.

Diabetic Risk of Teacher Educators and Teachers based on their Age

The analysis of diabetic risk of teacher educators is done on the base of their age and the data is presented in table - 3.

Table 3: Diabetic Risk of Teacher Educators and Teachers based on their Age

Sl. No	Diabetic status	Age group	Teacher Educators		Teachers	
			No	%	No	%
1	Diabetic	Below 30	-	-	-	-
		30-40	1	2	1	1
		40-50	3	5	7	6
		50 above	1	2	3	3
2	High risk	Below 30	-	-	1	1
		30-40	13	20	13	11
		40-50	8	14	15	12
		50 above	2	3	10	8
3	Moderate risk	Below 30	1	2	6	5
		30-40	18	29	6	5
		40-50	4	7	-	-
		50 above	1	2	-	-
4	Low risk	Below 30	-	-	2	2
		30-40	8	14	34	27
		40-50	-	-	19	16
		50 above	-	-	3	3
Total			**60**	**100**	**120**	**100**

From the above table 5.2, it is clear that, among the teacher educators, 2% of diabetic patients are in the age 50 and above, 5% of them are in the age group of 40-50, 2% of them are in 30-40 and there is no diabetic patient in the age of below 30 years. 3% of high risk respondents are in the age group of 50 above, 14% of them in the age group of 40-50, 20% of them in the age group of 30-40 and 0% of the respondents are in the age group of below 30 years. 2% of moderate risk respondents are in the age group of 50 above, 7% of the respondents are in the age between 40-50, 29% of them are in the age group of 30-40 and 2% of them are in the age of below 30.14% of the low risk respondents are in the age group of 30-40.

Among the school teachers, 1% of them are in the age group of 30-40, 6% of them are in the age group of 40-50 and 3% of them are above 50 years. High risk respondents are 1% below 30 years, 11% of

them are in the age group of 30-40, 12% of them are of 40-50 and 8%of them in above 50 years. Moderate risk respondent are 5% in the age group of below 30 years, 5% of them are in the age group of 30-40, 0% of them are in the age group of 40-50. Low risk respondents are 2% in the age group of below 30 years, 27% of them are in the age group of 30-40, 16% of them are in the age group of 40-50 and 3% of them in above 50 years.

It can be conclude that the high and moderate diabetes risk group is between the age groups 30-40 and 40-50. So the teacher educators and teachers in these age groups should be given special health care facilities, awareness and training.

Diabetic Risk of Teacher Educators and Teachers based on their Gender

The following table - 4 present the diabetic risk of teacher educators and teachers with respect to their gender.

Table 4: Diabetic Risk of Teacher Educators and Teachers based on their Gender

Sl.No	Diabetic status	Gender	Teacher Educators		Teachers	
			No	%	No	%
1	Diabetic	Male	2	3	5	4
		Female	3	5	6	5
2	High risk	Male	5	8	8	7
		Female	18	30	31	26
3	Moderate risk	Male	6	10	4	3
		Female	17	29	8	7
4	Low risk	Male	-	-	11	9
		Female	9	15	47	39
Total			**60**	**100**	**120**	**100**

From table 4, it is clear that out of 60 teacher educators 13 are male and 47 are female out of that 3% of diabetic respondent are male and 5% are female. Under high risk category 8% are male and 30% are female. 10% of the respondents are male and 29% are female in moderate risk. 0% male respondents and 15% female respondents are in the category of low risk. Out of 120 school teachers 28 are male and 92 are female out of that 4% of diabetic respondents are male and 5% are female. Under high risk category 7% are male and 26% are female. 3% of the respondents are male and 7% are female in moderate risk. 9% male respondents and 39% female respondents are in the category of low risk.

The above analysis shows that compared to male teacher educators and teachers, female teacher educators and teachers are at more diabetic risk. So, special care and attention should be given for them for more conscious about their health and health hazards.

The Diabetic Care Education Course – A Proposal

The course for Diabetes Care Education at secondary level teacher education is prepared with the help of medical experts, nursing educators, teacher educators and experts from different fields. The major units and areas of the course are;

Unit 1 Introduction (10 hrs.): Health – meaning and significance, dimensions and factors affecting good health, Health care education – aims and significance - National Goals of health care education and role of Diabetic Care Education, Health hazards – life style, smoking and alcoholism, Drawbacks of the present health education in the context of life style diseases;

Unit 2 Conceptual Background of Life Style Diseases (15 hrs): Life style changes – food habits, heredity, lack of exercises – causes and precautions, Blood fats – Very Low Density Lipoprotein (VDLP) - Low Density Lipoprotein (DLP) - High Density Lipoprotein (HD), Blood pressure – High and Low Causes, Symptoms and Treatment, Blood glucose – High and Low – Causes, Symptoms and Treatment, Diabetes – International, National and Kerala context – diabetes literacy, Need and significance of diabetes care education in schools and colleges;

Unit 3 Types of Diabetes (10 hrs): Type 1 Diabetes – Symptoms, causes, treatment and education, Type 2 Diabetes – Symptoms, causes, treatment and education, Insulin treatment – Insulin types, insulin action, insulin strength, insulin storage, insulin safety and insulin therapy – education and care for using insulin injection and pumps;

Unit 4 Problems of Diabetes (10 hrs): Eye Diseases – Retinopathy, Cataracts and Glaucoma, Foot Problems – Nerve damage, corns and calluses, foot ulcers, poor circulation, gangrene and amputation, Kidney Diseases, Stroke and Heart attack – Identification and care, Sex and Diabetes – Physical and Psychological challenges, Psychological problems of a diabetic;

Unit 5 Coping with Diabetes and Diabetic Dieting (15 hrs): Vegetarian diets – Vitamins and minerals – safe and adequate intake of protein, Preparation of the food source calendar of vitamins and minerals and time table, Healthy food habits for weight management – food tips, Coping with diabetes – denial, anger, depression, stress, fatigue and withdrawal - Need for special care and education;

Unit 6 Exercise and Diabetic Care (20 hrs): Flexible Exercises – Calf stretch, quadriceps stretch, hamstrings stretch, back and hips stretch, lower back stretch, shoulder and chest stretch, arms stretch, neck stretch, gymnastics, modern dance - Yoga and different Asanas for diabetes care, Aerobic Exercises - Aerobic classes or videotapes, bicycling, dancing, jogging, jumping rope, rowing, running, skating, skiing, stair climbing, walking and water exercise, Strength Exercises – Weight machines, free weights, calisthenics and circuit training, What to do before exercises – duration of exercise – Problems of hard exercises, Checking blood glucose before and after exercises for better diabetic care;

Unit 7 Evaluation of Diabetic Care Education (10 hrs): Diabetes care education - role of teacher educators and teachers, National and International Diabetes Associations, Constituting Health Care Teams in educational institutions, Evaluation of Health Care facilities in teacher education institutions, etc.

In addition to this the practicum includes; Assignment/Survey (1), Case study/ Project (1), Seminar/Panel discussion (1), Exercises including 1 month yoga training (1 hour per day).

Major Findings of the Study

1. From the study it is found that 9% of the teacher educators are diabetic, 38%of them are at high risk, 38%of them are at moderate risk and 15% of them are at low risk and 9% of the teachers are diabetic, 33% of them are at high risk, 48% of them are at moderate risk and 10% of them are at low risk so from the study it is understood that majority of the teacher educators and teachers are at high risk. And portion of them are already diabetic.
2. Most of the diabetic and low risk teacher educators are in high SES, majority of the high risk and moderate risk teacher educators comes in above average SES.
3. It is found from the study that most of the diabetic are in the age group of 40-50, high risk respondent comes in the age group of 30-40and 40.50 and moderate risk and low risk respondents comes in the age group of 30-40.
4. From the study it is found that majority of the diabetic, high risk, moderate risk and low risk are female teacher educators and teachers.
5. The diabetic care education curriculum evolved details seven units and practicum. The seven units are; Unit 1 Introduction (10 hrs.), Unit 2 Conceptual Background of Life Style Diseases (15 hrs), Unit 3 Types of Diabetes (10 hrs), Unit 4 Problems of Diabetes (10 hrs), Unit 5 Coping with Diabetes and Diabetic Dieting (15 hrs), Unit 6 Exercise and Diabetic Care (20 hrs) and Unit 7 Evaluation of Diabetic Care Education (10 hrs). In addition to this the practicum includes; Assignment/Survey (1), Case study/ Project (1), Seminar/Panel discussion (1) and Exercises including 1 month yoga training (1 hour per day).

Conclusions and Implications of the Study

- From this study, it is evident that, majority of teacher educators and school teachers will either diabetic or at risk in future. It means, we need more concentration on the health related practices in the teacher education level. Only a healthy teacher can give education and training in its maximum excepted quality.
- The study revealed that, among the high and above average SES group, the Diabetic risk is comparatively higher. It may be because of the life style. Here comes the importance of life style education and diabetes care. The high and moderate diabetes risk groups are between the age groups 30-40 and 40-50. So the teacher educators and teachers in these age groups should be given special health care facilities and awareness. Compared to male teacher educators and teachers, female teacher educators are at more diabetic risk. So, special care and attention should be given for them for more conscious about their health and health hazards.
- From this study it is concluded that diabetes rate among the teachers and teacher educators are increasing day by day from their suggestions the investigator also find that diabetes is increasing among children and youth. Kerala is going to become diabetes capital of India. Most of the respondents suggested that diabetes risk can be reduced through giving awareness it can be given through evolving a diabetes care education course. The study shows the urgent need for implementing the diabetes care education course at the teacher education level and it should have implications at all the level of education.
- The study evolved a diabetic care education course at teacher education level so it helps to reduce the diabetic risk in future. Study helps to understand that education about various life style diseases will help to reduce the risk.

Conclusion

The present study helped to find out diabetes risk among the teachers and teacher educators and it is found that majority of them are at high risk. The study also revealed that diabetes is increasing among the children and youth. From the opinion of the teachers and teacher educators, diabetes risk can be reduced by giving awareness and they also suggested implementing the evolved diabetic care education course at teacher education level.

REFERENCES

American Diabetes Association. (2003). A study on randomized controlled trial on 169 adults by diabetes dose adjustment for normal eating (DAFNE) group Retrieved January on 27, 2013, from http:// *ncbi.nlm.nih.gov Diabetes Care* › v.34(Suppl 1); Jan 2011.

Anthony, J. R, & Rote, M. P. (2000). *Diabetes A to Z (4th ed.).* Alexandria: American Diabetes Association.

Association of Diabetes Control and Complications. (2010). A study on relevance of intensive blood glucose among diabetes patients. Retrieved on January 26, 2013, from http:// *care.diabetesjournals.org/content/25/suppl_1/s25.full*.

Beryil Nithya, B. R, & Gunasekaran, M. (2011). Effect of Oat Bran Beverage on Subjects with Type 2 Diabetes Mellitus. *Journal of Extension and Research*, 13(1&2), 72-74.

Bhanti D.R et al. (2011). A study on prevalence and determinants of diabetes mellitus in Puducherry. Retrieved on January 27, 2013, from http://ncbi.nlm.nih.gov/pubmed/22219584.

Bihari, Saroj Kanta and Choudhury, Prasanna Kumar. (1996). *Text book on Health and Physical Education*. Ludhiana: Kalyani Publishers.

Butcher, C. A. and Evenly M (1971). *Physical Education and Health in the elementary school*. (2nd Edition), New York: Macmillan Publishing Co.

Chitra, K. B. (2012) Effect of an Instructional Package on Knowledge and Practice Regarding Foot care of Patients with Type 2 Diabetes Mellitus. Dissertation. Mahatma Gandhi University, Kottayam.

David B Kelley. (2002). *Complete Guide to Diabetes*, Alexandria: American Diabetic Association.

Diabetic Overview Report (2012). Retrieved on August 20, 2012, from http:/www.dise.in/cgi/content/abstract/9/4/301.

Haag, Jessic H. (1986) *School Health Programme*, Calcutta: Oxford and IBH Co.

Indian Council of Medical Research (2006) A study on Type 2 Diabetes Mellitus in urban areas in India. Retrieved on February 20, 2013, from http:// ncbi.nlm.nih.gov.

Koul, L. (2011). *Methodology of Educational Research*. New Delhi: Vikas Publishing House Pvt Ltd.

Latha, S. (2007) A Study on Effect of Planned Teaching Programme on Knowledge and Practice of Foot Care for Diabetic Patients of A Selected Hospitals at Mangalore. Dissertation. Mahatma Gandhi University, Kottayam.

Mc Dermtt J E (1993). A study on diabetes causes and its prevention strategy among diabetic patients. Retrieved on January 27, 2013, from http:// ncbi.nlm.nih.gov/pubmed/8463659.

Mohan et al. (2008). A study on the prevalence of diabetes in India, carried out in 108 centre's (49 urban and 59 rural) in different parts of India to look at the urban rural differences in type 2 diabetes and glucose intolerance. Retrieved on February 20, 2013, from http://*medind.nic.in/haa/t09/i1/haat09i1p1.pdf*.

Mohan,V et al. (2005). A study on simplified Indian Diabetes Risk Score for screening for undiagnosed diabetic subjects. Retrieved on January 27, 2013, from http:// *repository.ias.ac.in/80170/1/80170.pdf*.

Muller, J. P. (2000). *Health Exercise and Fitness*. New Delhi: Khel Sahitya Kendran.

Parimelazhangan, P, & Vijayalakshmi, G. (2010). Effect of Educational Intervention on Self-Care Management of Patients with Type 2 Diabetes. *Journal of Extension and Research*, 13(1&2), 69-71.

Rajanarayam, R.T. et al. (2008). A study on risk factors analysis in self reported diabetes in rural Kerala. Retrieved on January 27, 2013, from http:// *ncbi.nlm.nih.gov/pubmed/19902042*.

Rama et al. (1999). A study conducted state wide prevalence in Kerala on type 2 diabetes mellitus. Retrieved on February 20, 2013, from http://cdc.gov/ diabetes/projects/cda2.htm.

Singh, Ajmar and Singh, Jagtar (2001). *Modern text book or Physical Education*, Health and Sports Part-I Ludhiana : Kalyani Publishers.

Webb, Michael; Scott, Roy and Beale, Peter. (1997). *First Aid Manual*. London: Dorling Kindersley.