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Knowledge and Practices Associated with Diabetes among Patients with Chronic Diabetes Mellitus in Rural Areas of Vhembe District, Limpopo Province, South Africa

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ABSTRACT Diabetes mellitus is a chronic progressive disease that can lead to debilitating complications and premature death if not effectively controlled. The purpose of this study was to establish the level of knowledgeofdiabetes among patients with diabetes mellitus in Vhembe district of Limpopo province, South Africa, and to determine how this impacts on their attitudes and practices towards diabetes mellitus.A quantitative descriptive design was used to collect data between February–October 2013 using pre-tested structured questionnaire among patients with diabetes mellitus at the randomly sampled threehealth care facilities within the Limpopo province. Respondents, aged 40-65 years were conveniently sampled from the randomly sampled healthcare centres in Limpopo province. Self-administered questionnaires were used to collect data from the respondents. A quantitative descriptive design was used to collect data. Findings of this study revealed that whilst only 32.4 percent of the respondents were aware of the diabetes mellitus, the majority (67.6%) of the respondents appeared to be unaware. Knowledge of the role of obesity and physical inactivity in producing diabetes was very low. About 3 in 4 (75.5%) respondents reported that they do not associate obesity with risk factors for diabetes mellitus. However, 62.0 percent of the respondents believed that diabetes mellitus could lead to complications such as blindness. Only the minority (18.3%) of the respondents report to have been able to control own blood sugar level by diet. While the majority (81.7%) of the respondents showed low level of knowledge on the control of the glucose level. The knowledge, attitude and practice scores were low in most areas ofdiabetes care emphasising the need for additional health education and national diabetes campaigns.

INTRODUCTION

Diabetes mellitus (DM) is a chronic progressive metabolic disorder characterized by hyperglycaemia mainly due to absolute (Type 1 DM) or relative (Type 2 DM deficiency of insulin hormone (Saleh et al. 2012; Abejew et al. 2015). Virtually, it affects every system of the body mainly due to metabolic disturbances caused by hyperglycaemia, especially if diabetes control over a period of time proves to be suboptimal. Until recently, it was believed to be a disease occurring mainly in developed countries among the affluent. Fortunately, recent findings reveal a rise in number of new cases of type 2 DM with an earlier onset and associated complications in developing countries (Rafique et al. 2006; Seid and Tsige 2015). Diabetes is mainly associated with complications such as cardiovascular diseases, nephropathy.It is a major and growing health problem affecting more than 171 million people worldwide and the number is expected to rise to 366 million by 2030 (Cramer and Pugh 2005). According to Omar and San (2014), diabetes mellitus is declared to be a progressive disease that can lead to debilitating complications and premature death if not effectively controlled.The prevalence of diabetes mellitus has been reported to be 76 percent and this condition accounts for up to 80 percent of deaths in those with type 2 diabetes mellitus. Appropriate management of diabetes mellitus is considered key to reducing the risk of complications and premature death (Cramer and Pugh 2005; Vimalavathini et al. 2008).

The International Diabetes Federation estimated the prevalence of diabetes in Kenya to be about 3.3 percent in 2010). South African study by Mashau (2011) showed that diabetes mellitus is an increasing health problem. However, local studies have showed prevalence of 5.3 percent in the general population with a prevalence rate of 4.2 percent in the rural areas and as high as 12.2 percent in urban areas. The prevalence of impaired glucose tolerance is equally high 9.7 percent in the rural population, and 13.2 percent in the urban population (Shrivastava et al. 2010). Diabetes mellitus is one of the most common non-communicable diseases globally and is a condition associated with significant

morbidity and mortality (Norris et al. 2002; Mathew et al. 2014). It is the fourth or fifth leading cause of death in most developed countries and there is evidence that it is epidemic in many developing countries and newly industrialized nations (Farmer et al. 2005). According to World Health Organization (WHO), an alarming increase in the population with type 2 diabetes mellitus both in developed and developing countries over the next two decades is expected (WHO 2007). Type 2 diabetes mellitus is considered a disease of poor lifestyle with physical inactivity, obesity and urbanization contributing to the increased prevalence of the disease (Levitt 2008).

Kiberenge et al. (2010) warn that the biggest challengesexperienced by health care providersis issues of addressing the continued needs and demands of individuals with chronic diabetes. The importance of regular follow-up of diabetic patients with the health care provider is of great significance in averting any long term complications. Studies have reported that strict metabolic control can delay or prevent the progression of complications associated with diabetes mellitus (Upadhyay et al. 2008). The needs of diabetic patients are not only limited to adequate glycaemic control but also correspond with preventing complications; disability limitation and rehabilitation. Indian study by Nadir et al. (2011) revealed very poor adherence to treatment regimens due to poor attitude towards the disease and poor health literacy among the general public.Previous studies have shown that knowledge on disease and medications were essential in effective diabetes self-care. It was also found that the diabetic patients who have low literacy and low knowledge might be facing troubles in learning self-care skill for glycaemic control.

Self-care in Diabetes

Omar and San (2014) emphasise that self-care in diabetes is seen as an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes on day to day practice. The reality is that the day-to-day care in diabetes is handled by patients and their families. Therefore, an important need for reliable and valid measures for self-management of diabetesshould be made available. According to Gul (2010), a number of essential practice modalities regarding self-care behaviours among patients with diabetes should be maintained. Such practice modalities would predict good outcomes. According to Rafique et al. (2006), a healthy eating, physically active, monitoring of blood sugar, compliant with medications, good problem-solving skills, healthy coping skills and risk-reduction behaviours are the most practice modalities to be adhered to by patients with diabetic mellitus. These proposed measures can be useful for both clinicians and educators treating individual patients and for researchers evaluating new approaches to care self-report (WHO 2007). Findings of various studies report that there is an increasing body of evidence to suggest that type 2 diabetes is a consequence of increasing levels of obesity, decreased levels of activity, and increased food availability – resulting from inactivity and modernization (Xu and Pan 2010). Type 2 diabetes on the other hand, is 'late onset' diabetes, and develops more commonly in people over 40 years of age. It is primarily managed through diet and exercise. Individuals with type 2 diabetes are not usually dependent on insulin injections. This is because impaired insulin secretion and cell resistance to insulin cause the condition – it is not caused by insulin shortage (Garber 2007).

Upadhyay et al. (2008) report that poor control of diabetes mellitus results in markedly increased risk for heart disease, stroke, blindness, kidney failure, leg amputation and early death. Consequently, scientific evidence has clearly demonstrated that most diabetes-related pathologies are potentially avoidable if optimum metabolic control is achieved. The management of diabetes is however; dependent to a great extent on the affected person's own abilities to carry out self-care in their daily lives, and patient education is considered an essential component of achieving the purpose. There is further evidence that people affected with the diabetes mellitus often have inadequate knowledge about the nature of diabetes, its risk factors and associated complications, and that this lack of awareness may be the underlying factor affecting beliefs and practices towards the diabetes care (Roglic et al. 2005). Poor management of the diabetes is often the result of an individual obesity and ill health (Mbanya et al. 2010). This leads to cells becoming insulin-resistant, as a result of increased levels of sugar being stored as fat and processed. Eventually, the function of the beta cells deteriorates, and this signals the progres-

sion of the diabetes mellitus from a state of insulin resistance to clinical diabetes. Prolonged and continued beta cell exhaustion can result in reliance on insulin injections. Complications are usually common in individuals with type 2 diabetes, largely because of the longer latent period of disease prior to diagnosis. Diabetes mellitus may go undetected for a number of years, during which time mild symptoms develop – these may become life-threatening (Idemyor 2010; IDF 2009).

South Africa is no exception. Hjelm et al. (2003) warn that diabetes mellitus in South Africais also common and has emerged as an epidemic of the 21st century. The prevalence of adult onset diabetes ranges from 5 percent among whites to 13.5 percent. Whilethe black population has 6-8 percent, coloured population of Western Cape has 8.0 percent prevalence. Data from South Africa also shows estimates of type 2 diabetes varying between 3 and 28.7 percent cases affected by the disease (Levitt 2008). Bradley and Puoane (2006) report similar findings that the highest prevalence of type 2 diabetes mellitus was found among the Indian communities in Durban to be13.0 percent – and the elderly coloured communities of Cape Town as28.7 percent. As in any other countries, type 2 diabetes mellitus is more common among the 30 year age group and above (Hjelm et al. 2003). According to Moodley and Rambiritch (2007), report that most of the South African population diagnosed with diabetes were predominantly from the affluent urban communities. Contrary, due to westernization of the rural communities, diabetes is fast becoming prevalent in the rural African population and threatens to overwhelm the health care system in the near future. With rapid westernisation and sedentary lifestyle in the past few years in South Africa, diabetes mellitus has become one of the greatest disease burdens in terms of mortality and morbidity and medical care costs. The prevalence of diabetes in South Africa is among the highest in the world (Mashau 2011). In 2005, South Africa experienced 14 percent prevalence of diabetes, of the total population (51.77 million people) but 10.2 million people remain undiagnosed as reported by Mashau (2011). Nurses and doctors are confronted with the burden of caring for poorly controlled patients and patients who are not adhering to diabetes medications. Some form of preventable diabetes mellitus complications are often present in such cases. Despite diverse efforts to prevent and control diabetes mellitus complications, adherence to management guidelines– including physical activity– remains low, as documented above. In South Africa, patients with diabetes mellitus receive free medications in all health facilities, including health care clinics that participated in this study. Nevertheless, adherence to medication remained ineffective in 80.0 percent of patients, in spite of free and available diabetes medication. Diabetes mellitus morbidity and mortality rates may not decrease unless knowledge, proper practices and adherence to diabetes medications of at least 95.0 percent are maintained, throughout these patients' lives. The researchers are health professionals working with patients diagnosed with diabetes mellitus, thought to establish the level of knowledge of diabetes among patients with diabetes mellitus and to determine how this impacts on their attitudes and practices towards diabetes mellitus in order to recommend that preventive health education be offered to the communities in Vhembe district and the South Africa as a whole.

METHODOLOGY

Research Design

A non-experimental, quantitative, descriptive study was used to collect information about the practices associated with diabetes among patients with chronic diabetes mellitus in rural areas of Vhembe District, Limpopo Province, South Africa.

Research Population and Sample

The target population comprised all patients with diabetes mellitus, aged 40-65 who consulted at the randomly sampled clinics in Vhembe district between February – October 2013 during data collection. Thus all the clinics in this area were included in the study; however, only three clinics were randomly selected based on the clinic monthly statistics of the diabetes patients consulted at those clinics. The sample consisted of hundred type 2 diabetic patients who consulted the three sampled health care clinics and who met the criteria for inclusion. For the purpose of this study, the researcher obtained the list of all patients diagnosed with diabetes mellitus at the sampled clinic under

Sibasa local area during the time of this research. Vhembe district as one of the five districts of Limpopo province was purposefully selected whilst convenience sampling was adopted to select the respondents.Approval for the study was obtained from the University of Venda Higher Degree Committee and the Provincial Department of Health in South Africa. The individual clinic Managers were also consulted for approval. The researchers sought ethical clearance to conduct the study from the University of Venda Higher Degree Committee and the letter to conduct the study was granted by the Provincial Department of Health in South Africa.

Data Collection

Data were collected during February to October 2013 using pre-tested structured interview schedules consisting of open-ended and closed-ended questions which were collated, coded, categorised and entered into the SPSS software version 19.0. Descriptive statistics were generated from univariate analysis. Although reports relevant to each clinic were supplied to the health care authorities, this report refers only to the combined results of the 100 questionnaires completed at the randomly sampled clinics, comprising the convenience sample of the patients with diabetes who voluntarily completed questionnaires. Convenience sampling refers to the selection of the most readily available persons (or units) as subjects in a study, also known as accidental sampling (Polit and Hungler 2014). After the questionnaires were returned, they were checked for completeness, coded and subsequently analysed using Statistical Package for Social Scientists (SPSS) Version 19.0. Basic descriptive analysis of the data was performed using frequency distribution and cross-tabulation.

Reliability and Validity

Reliability is a measure denoting the consistencyof measures obtained in the use of a particularinstrument and is an indication of the extent of randomerror in the measurement method. The validity of an instrument is a determination of the extent to which the instrument actually reflects the abstract construct being examined (Burns and Grove 2014). Validity and reliability were tested by the pretesting of the instrument; a number of questions were removed as they apparently impacted negatively on the face validity. The revised questionnaires were provided to the health care authorities of the Vhembe district for comments. Face validity was evaluated by nurses and doctorsworking at the clinics where questionnaires were distributed. The questionnaires were pre-tested by 10 patients with diabetes mellitus who completed questionnaires during 2013, and they were excluded from participation in the actual study.

Ethical Considerations

The researchers obtained written permission to conduct the study and to use the three sampled health care clinics for data collection from Vhembe district of Limpopo province. Each respondent was requestedto sign a consent form indicating that she participated voluntarily and without any coercion whatsoever. Confidentially was also ensured by not writing names of the respondents on the forms. Accidentally these forms were attached to the questionnaires prior to distribution. As the researchers telephone numbers were provided on the forms, some respondents raised concerns about anonymity. It wasdecided that the signed consent forms would be placedinto individual envelopes and sealed. The anonymously completed questionnaires were individually sealed into different envelopes and placed into a different container. The patients with diabetes were comfortable and accepted to this procedure. Each respondent could decide whether or not to answer any specific question, explaining why few responses were obtained to some questions, particularly the open-ended questions.

RESULTS

Demographic Characteristics

Of the targeted 110 respondents, only 100 voluntarily completed the questionnaires in this study. There were more females (61.5%) than males (38.5%) who completed the forms. Minority (16.4%) of the respondents had tertiary education, while 35.3 percent had secondary education, as many as 48.3 percent had no education. Only 22.0 percent of the respondents had thorough knowledge of signs and symptoms of diabetes, majority (78.0%) of the respondents had poor knowledge on what diabetes is. Only 23.3

percent could associate the probable causes of diabetes mellitus while 76.7 percent of the respondents were confusing diabetes with bewitchment and bad luck. About 20.5 percent of the respondents could mentioned clearly the complications of diabetes such as blindness and amputation of limbs, amazingly, 79.5 percent had very little or no idea about the complications brought about by the diabetes mellitus (Table 1).

Table 1: Knowledge of diabetes

	Signs and symptoms	*Causes*	*Complications*
Yes	(22.0%)	(23.3%)	(20.5%)
No	(78.0%)	(76.7%)	(79.5%)
Total	(100%)	(100%)	(100%)

The study sample was one hundred respondents, and included 38.5 percent male respondents and 61.5 percent female respondents. Majority (94.0%) of the respondents were from rural areas. Only 1.0 percent of the respondents reported the residence as semi-urban, about 5.0 percent of the respondents reported to be residing in a township. majority (56.0%) of the respondents were married and 18.0 percent of the respondents were single. A minority (9.0%) of the respondents were divorced while 17.0 percent of the respondents were widowed. As many as 54.0 percent of the respondents followed the Christian faith, while 42.0 percent of the respondents reported to be traditional believers, only 2.0 percent of the respondents reported that they were Muslim. Only 21.3 percent of the respondents indicated that they had received formal education, while the majority (79.7%) of the respondents indicated that they had not received formal education. Minority (16.0%) of the respondents were self-employed, while 9.0 percent of the respondents were unemployed, whereas 23.0 percent of the respondents reported that they were pensioners. Majority (95.0%) of the respondents were using oral hypoglycaemic treatments, only 5.0 percent of the respondents reported to had been diagnosed diabetic patients but not on medications. More than half (56.0%) of the respondents were married and 18.0 percent of the respondents were single. A minority (9.0%) of the respondents were divorced while 17 percent of the respondents were widowed. Marital status was considered important in terms of receptivity of the information regarding health education. Moodley and Rambiritch (2007) in their study reported that married female patients with diabetes mellitus were more cooperative with health professionals in terms of diabetics' medications adherence, spouse caring for one another, while Beverly et al. (2007) indicated that diabetes management in the context of marriage is greatly because of supporting each other.

Table 2: Distribution of respondents' responses to questions related to the knowledge of diabetic foot self-care

Feet care by respondents	*Yes*	*%*	*No*	*%*
Do you use shoes when walking	40	40.0	60	60.0
Always cutting nails check toes	30	30.0	70	70
Visiting chiropodist regularly?	0	0.0	100	100
Wearing closed shoes	90	90.0	10	10.0
Do you protect feet from pricking	5	5.0	95	95.0
If pricked on foot accidentally, do you consult doctors or nurses?	10	10.0	90	90.0

Out of 100 respondents, only 40.0 percent of the respondents were aware and they responded positively that they use shoes always when working. Surprisingly, services of the chiropodist is not a familiar practice among the respondents of this study (100.0%). Majority of the respondents (95.0%) as shown in Table 2, do not have special time allocated for their feet, whilst, just a minority (10.0%) would seek for the services of nurses and doctors if pricked on foot. Fürthauer et al. (2013) report similar findings on qualitative study on knowledge of fee care by clients with diabetes, clients displayed very low knowledge on the reason why reporting to doctors for a mere little prick on feet. Only 12.0 percent of the respondents report weekly visits to clinics, whilst the majority (77.0%) of the respondents report visits on monthly basis, findings also revealed patients who visit the clinics for their treatment (11.0%) on bi-monthly. It is not known whether these patients were always given the bi-monthly treatment. The reason for this practice was not established with this study.

DISCUSSION

The present study was conducted to establish the level of awareness of diabetes among

patients with diabetes mellitus, and to determine how this impacts on their attitudes and practices towards diabetes mellitus. Objectives of the study were to assess how knowledgeable the respondents were in terms of diabetes, its causes, signs and symptoms, complications and practices followed in the maintenance of the disease, as well as its prevention.The findings of this study reveal a marked deficiency in the level of knowledge on diabetes mellitus among the patients with diabetes mellitus in the rural Vhembe district, Limpopo province in South Africa. Indeed, over half of the respondents of this study were unaware of what diabetes mellitus was. Only 40.0 percent of the respondents who voluntarily completed the self-administered questionnaire were aware of the diabetes mellitus. Knowledge of the causes of diabetes was also low. A significant proportion of this study participants thought that diabetes can be caused by bewitchment 37.0 percent, while 29.0 percent believed diabetes is caused by high sugar intake. Findings of this study correlates with that of Muninarayana et al. (2010) who report that 50 percent of diabetic patients in India were found unaware of diabetes. Similar findings have also been reported from KwaZulu Natal, in South Africa by Moodley and Rambiritch (2007). Rafique et al. (2006), Gul (2010) and Allen et al. (2015) found a similar level of knowledge of diabetes mellitus 30.2 percent, among patients with diabetes Nigeria and in USA. In a South African study by Mash (2005) the findings revealed a gross lack of awareness of diabetes even in patients who were long diagnosed with diabetes and were long on treatment. Even in a developed country set up, Omar et al. (2014) also found that knowledge about diabetes amongst the communities in India was very low.

Ethiopian study by Seid and Tsige (2015) also report similar findings on the knowledge of principles of diabetic foot self-care indicate that the mean knowledge score was. This score is higher than that of a study done in Nigeria in which the score was 5.8 percent ± 3.3 but nearly comparable to the study done in Siri Lanka which was 8.3. Furthermore, it is showed that 42.2 percent had good knowledge and 43.8 percent had poor knowledge of diabetic foot self-care. This result is consistent with the study done in Nigeria that 57.8 percent were poorly knowledgeable about foot care principles but slightly lower than South Africa which is 75 percent.

Like other developing countries, the findings of this study underscore very important aspects of education to the patients with diabetes mellitus as far as diabetes is concerned. It is a known fact that there is reality in terms of deficiency in knowledge about diabetes and inequalities in the quality of education reaching each province within the country particularly in rural areas. A Kenyan study by Kiberenge et al. (2010) report similar findings that low level of community knowledge of diabetes reflects on the extent of health promotion for most chronic non-communicable diseases. The authors further indicate that at the moment, there are no comprehensive primary care programmes for diabetes in the country and diabetes health education is done within health facilities through microteaching and only targets those with diabetes. Saleh et al. (2012) warn that such practice could leave the rest of the public population ignorant of the diabetes mellitus. It is important that all diabetes health promotion efforts by different stakeholders be coordinated and the messages are to be standardized, and there should be a clear guidelines regarding diabetes education among all the people. Dinesh et al. (2008) warn that health workers themselves havelow knowledge of diabetes and this are the groups that are expected to deliver health education to the public.

Some questions in this study considered the knowledge of foot care among patients with diabetes, majority of the respondents 95.0 percent were not aware of the foot care. Almost three quarter of the aspects of foot care principles were not known by the majority of the respondents of this study. However the mean knowledge score was 2.22. The results showed that patients were not aware of the problems associated with the disease. Therefore, the health education campaigns should be scheduled and coordinated in order to promote its satisfaction. Since the self-care of diabetic foot care is based on simple medical facts it could be assumed that understanding of these principals are not difficult. Despite the simplicity of the information about diabetes, the level of practice of the foot care principles was found to be very poor in this study, as only 5.0 percent were aware of the foot care whilst 95.0 percent of the respondents neglected foot care principle. A statistically significant difference exists between the knowledge

score and practice score ($p < 0.001$). Furthermore, public knowledge, culture and beliefs about diabetes should be regarded as prerequisite for individuals and communities to take action to control the diabetes mellitus.

Moodley and Rambiritch (2007) and Allen et al. (2015) emphasise the need for more resources for prevention and health promotion, with primary healthcare taking greater responsibility for chronic diabetes. It is expected that effective primary care should lower hospital admissions and complications brought about by diabetes. Health education focusing on prevention and management should be considered crucial to reducing the burden of diabetes. Current strategies for patient and healthcare staff need evaluation.

Significant useful information has been provided in this study on the state of awareness of diabetes mellitus among the patients with diabetes who consulted three randomly sampled clinicsin Vhembe district, some limitations should be acknowledged. It is also a back lock that the majority of the respondents of this study had no formal education, accurate administration of the questionnaires depended on the research assistants as professional nurses at the randomly sampled clinics, which could have in some way introduced a translation bias. This study did not seek to assess the differences in awareness among the respondents suffering from diabetes. Focus of this study was on patients with diabetes, only those who consulted the randomly sampled clinics during the time of data collection were recruited to participate on this study. This limitation implies that the findings of this study may not be generalized to the entire province and the whole South Africa. However, it is crucial that the findings of this formed the bases for further similar studies in other parts of South Africa.

In the whole country, diabetes mellitus is emerging as a major public health challenge and that the current patients practices and the follow-ups by healthcare workers is inadequate to address this challenge, effective control and prevention strategies based on sound educational programmes need to be put to place and be vigorously implemented. All patients with diabetes mellitus should be assisted and properly educated on lifestyle changes and diet modifications so as to prevent lifelong complications. Programmes should also focus on all stakeholders such as community members, religious leaders and schools since the impact of diabetes mellitus affects the entire population. Campaigns and other channels may be used as to disseminate the information; such channels include radio, television shows, newspapers, automated mobile phone messages, internet and formal group talks. Health professionals need to be thoroughly trained so that they can effectively educate their patients. Furthermore, diabetic or preferably education on chronic non-communicable diseases should also be introduced in school curriculum. Investing on health education might lead to a substantial benefit to the state as this would reduce the cost of healthcare (which is currently being subsidized by the state) or economic loss through job absenteeism following chronic morbidity associated with the disease. And finally, given that about 4 in 5 of this study population had a family member who was diabetic, targeted screening should be done on family members of all diabetic patients.

CONCLUSION

Diabetes mellitus poses a major health challenge both epidemiologically and economically in all the provinces of South Africa including Vhembe district. However, awareness of this pathological condition among diabetics is poor on the type of diabetes and its complications. Intensive diabetic patient education from diabetic care givers is therefore required to improve their eye care attitude to prevent visual impairment as well as in foot care. Knowledge of diabetes among the general population is important and it is known to be useful and effective in achieving diabetes control and preventing its serious complication, findings of this study confirm previous findings concerning the diabetes knowledge level. This study shows that the majority of patients attending consulted at the three randomly sampled clinics in Vhembe district have poor knowledge on several aspects of the diabetes including its causes, complications, management and prevention.

RECOMMENDATIONS

Health care providers should begin by taking time to evaluate their patients' perceptions and make realistic and specific recommendations for self-care activities. Some patients may expe-

rience difficulty in understanding and following the basics of diabetes self-care activities. When adhering to self-care activities patients are sometimes expected to make what would in many cases be a medical decision and many patients are not comfortable or able to make such complex assessments. Furthermore, these requirements or modifications should be specific for each patient and should be altered depending on the patient's response. It is critical that health care providers actively involve their patients in developing self-care regimens for each individual patient. This regimen should be the best possible combination for every individual patient plus it should sound realistic to the patient so that he or she can follow it. Simultaneously, health care providers should fully document the specific diabetes self-care regimen in the patients' medical record as it will facilitate provider-patient communication and help in assessment of compliance. Also, the need of regular follow-up can never be underestimated in a chronic illness like diabetes and therefore be looked upon as an integral component.

Health Care Providers Should Provide Proper Diabetes Health Education to Patients and the Entire Community.

- Patients need to be informed timely about the danger/complications of uncontrolled diabetes; and health care nurses must refer or make an appointment for diabetic patients to be seen by an ophthalmologist annually for eye screening and glaucoma evaluation.
- It is recommended that the directorate for chronic diseases and geriatricsshould encourage the supply of pamphlets with diabetes mellitus information to the health facilities as a method of information dissemination with the use of local language.
- The government should make use of media (radio and television) to convey diabetes messages to the entire society that could includes giving information on signs and symptoms of diabetes mellitus, its management and complications.

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