



TITLE: A SYSTEMATIC REVIEW OF DIABETES MELLITUS IN FIJI

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ABSTRACT

Diabetes Mellitus leads to death if it is not prevented at the initial phase when seeing signs, symptoms, and pain.

Diabetes Mellitus is a health crisis in Fiji today. The aim of this paper is a systematic review of diabetes in Fiji.

The research gathered findings from available medical journals, articles, discussion papers, and reports from previous researchers on Diabetes Mellitus and its health effects within the period of 2007 to 2017. The research study uses 54 articles including databases, reports, journals, discussion and research paper, and media link relevant to the study topic.

Diabetes mellitus was the number one leading disease in 2007 & 2010. From 2012 to 2017 it was still ranked as the number one NCD disease in Fiji. It was identified that indigenous Fijians iTaukei had higher rates than on non-Fijian population. Males were identified as having higher rates of Diabetes mellitus than females. However females also reported higher rates of Gestational Diabetes mellitus. The review found that Diabetes mellitus was also the cause of poor sedentary lifestyle such as diet, a lack of physical activity and poor nutrition. There was poor management by diabetic patients in controlling there diabetes, an increase in weight, an increase in high Body Mass Index rates, high rates of eye disease, and high rates of amputations.

There are numbers of interventions, awareness, and services provisions in Fiji. The National Ministry of Health and its partners in the country are working together in partnerships to promote national wellness and well-being programmes, and reduce premature mortality and morbidity for diabetes mellitus. The partners consist of non-governmental organisations, faith based organisations, civil society organisations, the private sector, other government Ministries, and non-health organisations. The recommendations were made to upscale and improve the healthcare system in Fiji that benefits all Fijians.

Introduction

According to Bagley & Malabu (2014) the prevalence of diabetes in the Asian Pacific region has reached two-thirds of its population and China and India have recorded a total of 150 million people living with diabetes. In the Pacific region, Fiji, Tonga, French Polynesia, and Nauru have reported an epidemic of type 2 diabetes mellitus. In other Pacific Island countries, New Zealand and Australia, type 2 diabetes prevalence has more than doubled particularly for Aborigines and Torres Strait Islanders and Maori people. Diabetes mellitus in Fiji is reported to be the number one leading cause of death (Ministry of Health, 2016) and it is mostly among patients with Tuberculosis (Prasad et al, 2014).

The latest report by the Fiji Ministry of Health (2016) highlighted that the top five diseases in Fiji causing death are; diabetes mellitus, ischemic heart diseases, cerebrovascular diseases, hypertensive diseases, and other heart diseases, which are all NCDs (Ministry of Health and Medical Services, 2016). The Fiji National Health Advisor on NCDs stressed that Fiji is working towards eliminating the four key root causes of NCDs among Fijians and these are categorised in an acronym of 'SNAPS' standing for: smoking, nutrition (unhealthy), binge alcohol consumption, physical inactivity, and stresses, all of which are causes of the epidemic of NCDs in the country and need to be avoided (Ministry of Health and Medical Services, 2016).

Methods

The systematic literature search technique for each of the searched databases used; 'AND', 'OR', 'brackets', 'asterisks', 'open and closed inverted commas' for key words, in between two key words, and before and after the search sentences. The results of the search differ for each database. The Medline (ovid) database results showed huge numbers of findings compared to Scopus, Google Scholar, Cochrane, and PubMed databases. Words such as; "NCDs in Fiji and cardiovascular diseases"; NCDs in Fiji and diabetes; NCDs in Fiji and hypertension; non-communicable disease in Fiji and chronic kidney disease; and other medical terms were used to obtain the best results as well as searching for "Non-communicable Diseases in Fiji".

The research focused on published literature in English within a period of 2007 to 2017 looking at the author, its year of publication the article/journal title, its abstract, its reviewed articles, and its latest updates to assess the health shape of NCD's in Fiji. The review adopted the PRISMA model and meta analyses framework. PRISMA

is a systematic working tool for structuring systematic reviews, meta analyses results, and documents when conducting systematic research (Moher, D., et al, 2009).

PRISMA Flow Diagram

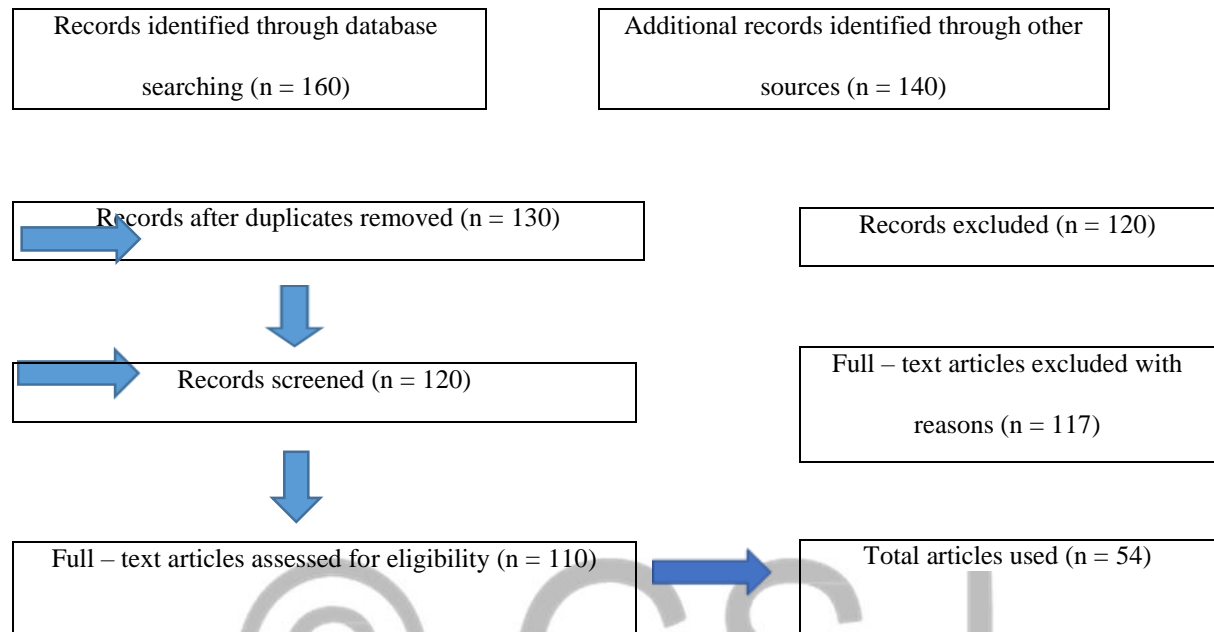


Figure 1: PRISMA Flow Diagram

Results

Diabetes mellitus situational analysis

In 2016, mortality rates for Diabetes Mellitus, Ischemic Heart Disease, Cerebrovascular Disease, Chronic Kidney Disease, and Lower Respiratory Infections are listed as the top causes of death in Fiji (Ministry of Health and Medical Services, 2016).

The patterns for diabetes in Fiji from 2007 to 2016 are tallied from the National Ministry of Health Annual Report and are shown in figure 1 below.

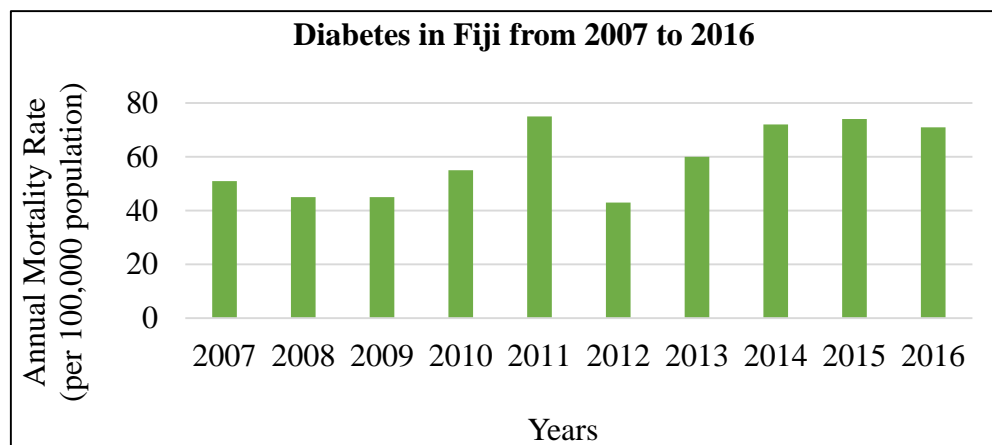


Figure 1: Diabetes in Fiji from 2007 to 2016

(Source: Ministry of Health and Medical Services Annual Report, 2007-2016)

The bar graph clearly shows that the highest number of recorded mortality cases of diabetes mellitus in Fiji was in 2011. This shows that diabetes mellitus has been a continuous leading cause of death between 2007 to 2010 and the second cause of mortality in 2011, however, a study conducted by Sharma (2012) highlighted that high rates of diabetes are due to non-compliance with diabetes medications by diabetic patients and in 2010 it appears that diabetes mellitus was leading the mortality rank. In 2008 to 2009, diabetes mellitus was the fourth and second leading cause of death. Sharma (2012) also shows that diabetes is caused by being overweight and sedentary lifestyles.

Diabetes is a disease that can lead to blindness; foot ulceration and maybe amputation; or kidney failure and it heightens the risk of heart diseases, strokes, cancers, and cerebrovascular diseases (Center for Disease Control and Prevention, 2015). Being a diabetic may also lead to complications from neuropathy, peripheral vascular diseases, and impaired wound healing which causes impairment of circulation, a delay in wound healing, skin infections, ulcerations, and may be amputations (Sharma, 2012). Recent research conducted by Suchanek et al (2016) stressed that for NCDs such as diabetes, the risk factors that contribute to them are the metabolic risk factors of obesity, impaired glucose tolerance, dyslipidaemia, hypertension, and nutrition related diseases. The researchers further highlighted the significance of providing primary and secondary prevention services that would abolish the metabolic risk factors towards having or developing diabetes.

In 2012, DeLorenzo (2017) noted that diabetes mellitus in Fiji caused 900 Fijian deaths which accounted for 16% of the nationwide mortality. By 2016, diabetes mellitus was the leading cause of mortality and morbidity in Fiji, a total of 34%, when compared to other diseases (Ministry of Health and Medical Services, 2016). Diabetes Mellitus in the country was shown to be affecting people of an at-risk age of 30 years and above, those with a family history of diabetes mellitus, with a previous history of gestational diabetes, with hypertension, obesity, macro-vascular diseases, and those who are physically inactive (Ministry of Health and Medical Services, 2012). Sharma (2012) highlighted that diabetes in Fiji is mostly affecting people in the ages of thirty to fifty years and the majority are indigenous Fijians. Kumar et al (2014) noted that of around 938 amputations conducted, many patients are iTaukei – indigenous or native Fijians at 71% with the non-iTaukei people being 26.2% and with more males than females at 54.1% and 45.9% respectively. These are due to being overweight and having sedentary lifestyles (Diabetes Fiji, 2017). Most diabetic patients failed to manage their sugar levels which later led to the development of diabetes complications, particularly diabetes foot sepsis, amputations, and diabetic keto-acidosis that contributes to kidney diseases (Sharma, 2012). It was also discussed that most of these amputee diabetic patients, were not previously diagnosed with diabetes and presented with foot sepsis at the period of diagnosis, most were smokers with uncontrolled glycaemia, and most were iTaukei males (Kumar et al, 2014).

The Fiji Diabetes Association recorded that for Fijians with diabetes two a day are now losing lower limbs. Fiji is now listed as the second nation in the world where diabetes is the main cause of death (Fiji Sun, 2017). Uncontrolled diabetes leads to complications like amputations, heart attack, stroke, kidney diseases, and early deaths (Cornelius et al, 2015). The Diabetes Fiji Organisation discussed that in 2015 alone, there were 74,000 cases of diabetes in Fiji of which 74% were adults (Diabetes Fiji, 2017).

Type 2 diabetes in Fiji affects many adults over 40 years, mainly people who are overweight or very fat (Khoo et al, 2017). People with Type 2 diabetes can control blood sugar through exercise, tablets, and diet. Adults with Type 2 diabetes do not experience the symptoms and is often unrecognised until too late (Diabetes Fiji, 2017). A study conducted by Lin et al (2016), stressed that the prevalence of type 2 diabetes within the years 1980 to 2011 mostly affected the Fijians of Indian descent rather than the iTaukei or native Fijian people.

Gestational Diabetes

According to the National Ministry of Health and Medical Services (2012), gestational diabetes is comparable to diabetes mellitus type 2, however, it appears to be affected by the pre-natal mother having diabetes related symptoms during their pregnancy. This is most likely to affect the mother and the baby later in life unless they are treated at the initial diagnosis. Gestational diabetes was discussed as disappearing from post-natal mothers after giving birth however, it plays a huge risk in mothers having diabetes later in life if it is not treated and managed appropriately (Ministry of Health and Medical Services, 2015; WHO, 2013).

The National Ministry of Health and Medical Services (2012) with partnering organisation, the Fiji Health Sector Support Program Organisation is a Monitoring Unit for the Ministry of Health for diabetes. The Fiji Health Support Program assisted the Ministry of Health in various ways via the provisions of medical screening tools and training for health professionals, and community health workers for preventing diabetes. Diabetes mellitus increased from 2012 to 2016 and remains the leading cause of mortality in these years as well.

Diagnosis and Treatment Programmes

Type 2 diabetes mellitus is treated via lifestyle management and behaviour and practices, for instance; diet control; increase in physical activity; having their own blood glucose testing; and oral medication and/or insulin injection treatment (Ministry of Health and Medical Services, 2015). It was also noted that type 2 diabetes is a disease burden risk factor from being obese and therefore it was recommended that increasing physical activity would help to curb type 2 diabetes.

Effective control of diabetes means keeping the blood sugar level normal. The Ministry of Health (2015) suggested preventing type 1 and type 2 diabetes mellitus by adopting a healthy Pacific way of lifestyle via having a healthy diet of local island food, regular physical activity, avoiding smoking, avoiding excessive alcohol intake, and maintaining a healthy body weight which would reduce the risks of diabetes.

There are medications provided to diabetic patients by nurses and doctors to eradicate the chances of diabetes affecting the entire body. The most common medications are insulin; glibenclamide; glipizide and metformin (Ministry of Health and Medical Services, 2012). The latest health report highlighted that most patients diagnosed with diabetes were provided with metformin or glipizide (Ministry of Health and Medical Services, 2016).

HbA1c is an effective treatment for the 6.5% of the people screened and diagnosed with diabetes during the initial medical screening assessment (Ministry of Health and Medical Services, 2014). The impaired fasting glucose represents a range of blood sugar that falls between 6.1 to 7mmol/l in the fasting blood sugar. Impaired glucose tolerance describes blood sugar that falls between a range of 6.5 to 11mmol/l in the random blood sugar both were encouraged to control and manage the sugar levels to prevent an individual from the risk of developing diabetes (Ministry of Health and Medical Services, 2016).

Hyperglycaemia is a condition where too much sugar is found in the blood (Khoo et al, 2017). This condition leads to abdominal pain, nausea, and vomiting which could later lead to diabetic coma if conditions worsen. Hyperglycaemia can be prevented via drinking extra water, avoiding any form physical activity, testing the urine and blood three times in a day, and taking medications as required (Cornelius et al, 2015). Hypoglycaemia is a condition that develops when low blood sugar levels occur in the body of a diabetic patient. These conditions mostly occur for T1 diabetes, and can be seen in symptoms of trembling, sweating, headaches, weakness, confusion, palpitations, and dizziness (Brian et al, 2011). The major causes of this condition include missing meals, over medication, excessive alcohol, and excessive physical activity (Morrell et al, 2016). Hypoglycaemia can be prevented via consuming sweetened orange juice or seven jelly beans, two spoons of sugar in a half glass of water, four small chocolates or even two lollies which cannot be administered when a patient is unconscious (Cornelius et al, 2015).

High blood sugar levels over a long period of time lead to permanent damage to blood vessels and nerves (Cornelius et al, 2015). If large vessels in the heart, legs and brain are damaged it leads to having foot ulcers, Heart attacks and strokes. If small blood vessels are damaged in the eyes, kidney, or nerves this can lead to kidney disease, blindness, and pain and itchiness in the feet (Morrell et al, 2016). Diabetic complications can be prevented

through maintaining blood sugar levels within normal limits and taking the preventative measures of refraining from smoking, maintaining an ideal weight, having regular eye checks, regular blood tests and being treated. Other factors can be to treat infections promptly, take regular physical activity, and have regular visits to health care services to prevent long term complications (Ministry of Health and Medical Services, 2007 – 2016).

Diabetes Mellitus Management Programmes

The National Ministry of Health (2012) developed a guideline specifically for diabetic patients and care givers as well. The Diabetes Management Guidelines was contributed to by several health professionals, experts, and consultants for the management of diabetes in the country, for all ages. The national guidelines highlight the early recognition of diabetes via medical screening; diagnosing and management at the initial stages; delaying the onset of diabetes complications; management of complications, and the enforcement of accessibility for referrals at all health service levels.

The nation created a new initiative, with strategies, and a framework named “from womb to tomb with a double-edged sword – everyone’s business”. Together with the 3M’s (mouth, muscle, medicine) concept for the management of diabetes this had the aim of reducing the prevalence of diabetes by 5% by 2014 (Ministry of Health and Medical Services, 2012). The aim and the target of reducing the onset of diabetes was successfully implemented the Ministry of Health staff, partnering organisations, donors, local stakeholders, and international funding organisations. It was rolled out in the country to schools, villages, communities, faith based groups, settlements, institutions, government departments, and workplaces.

The Ministry of Health (2015) also suggested that in preventing diabetes mellitus, adopting a healthy Pacific way of lifestyle via; having a healthy diet of local island food; regular physical activity; avoiding smoking; avoiding excessive alcohol intake, and maintaining a healthy body weight would reduce the risk of having diabetes later in life.

The following are organisations implementing diabetes interventions in various parts of the country. Each organisation is working in partnership with the Fiji Ministry of Health to eradicate diabetes in the country.

- a) Medical Service Pacific, Fiji
- b) FRIENDS Fiji

- c) Viseisei Sai Health Centre, Fiji
- d) Fiji National University, College of Medicine, Nursing, and Health Sciences, Fiji
- e) Empower Pacific, Fiji
- f) Oxfam Fiji
- g) ACATA Trust Fiji
- h) World Health Organisation, Western Pacific Region Office, Fiji
- i) United Nations Development Programme, Fiji
- j) Private Clinics, Fiji
- k) Fiji Health Sector Improvement Program, Fiji
- l) Fiji Health Sector Support Program, Fiji
- m) The National Food and Nutrition Centre, Fiji
- n) Diabetes Fiji and
- o) The National Diabetic Hub Centre, Fiji.

The National Diabetic Centre (Ministry of Health and Medical Services, 2010), highlights various programmes and services provided to diabetic patients, and their caregivers as well. These services are provided at the main centre of Suva as the hub of the diabetic services in the country. These services provided to the public range from diabetes education and blood glucose monitoring to dietary assessment and advice. They also include postpartum management of women with Gestational Diabetes; diagnosis and treatment of diabetes; provision of anti-diabetes medications to diabetic patients; medical dressings for unhealed wounds, and referrals of major complications to hospitals for surgery.

The Diabetes Prevention and Management Guideline, National Clinical Service Network Guidelines, and National Toolkit Programme were endorsed by the Ministry of Health in 2012 due to the increasing morbidity and mortality cases of diabetes between 1980 to 2002 at 10% and 16% respectively. And a high peak in 2011 of 65%, 59% are females and 41% are males (Ministry of Health and Medical Services, 2012). The guideline was produced to help reduce or eradicate diabetes in Fiji. The content of the Diabetes Prevention and Management Guideline highlighted primary prevention via a combination of health promotion awareness activities; community health education; clinical screening; outreach medical programmes; diagnosis and treatment, and management by the Ministry of Health staff. The Diabetes Prevention and Management Guidelines were seen to be enforced for every

section of the National Health Annual Plan and in the National Non-Communicable Diseases Strategic Plan 2016 – 2020 (Ministry of Health and Medical Services, 2015).

Discussion

The health pattern of diabetes diseases is decreasing even though the admission rate is still increasing and it is still a leading mortality disease in the country. It was clearly seen that the trend of diabetes in Fiji for the mortality rate is declining however the admission rate is still increasing. In 2008 to 2010 there was a slight increase in diabetes rates however 2007 to 2008 demonstrated a decrease in diabetes mortality. In 2012, rates of diabetes showed a huge decrease of mortality and that diabetes mellitus was a leading cause of death in Fiji in 2012. In 2012 to 2015, the rates of diabetes mortality increased for a period of four years and in 2011 it was recorded to be the highest cause of deaths when compared to other years.

This trend may also be due to poor coverage of data reporting, unreported diabetes mortality cases, inconsistent data reporting at the National Health Office, non-analysed data, poor reporting systems, poor recording systems, missing data, and wrong data entry. The decline of diabetes rates may also be due to the increased accessibility to healthcare services, patients adhering to advice from medical professionals on their diets and nutrition, an increase in their physical activity, patients avoiding smoking and alcohol binge drinking, and being compliant with their diabetes medications. The behaviour, attitude, and practices of diabetic patients may also be due to the increased numbers of interventions conducted by the National Ministry of Health and Medical Services and other partnering health organisations in the country in advocating the combating of diabetes mellitus for all Fijians in Fiji.

The Diabetes Fiji Organisation, Diabetes Association in Fiji, Ministry of Health and Medical Services, and other partnering health agencies have been encouraging citizens to have regular medical screening so that treatment could be provided at the period of detection of diseases to prevent diabetic patients from developing heart diseases and strokes later in life. Patient's diet and nutrition were also emphasised and poor health behaviours such as smoking, alcohol consumption, and physical inactivity were curtailed. Medications were provided to patients to lower the risks of diabetes and the development of heart diseases.

The rates, trends, and current health shape of Diabetes mellitus in Fiji could be improved if the National Ministry of Health and Medical Services provided a better healthcare system for the country. The use of voluntary village nurses as primary healthcare providers for the community should be looked at. Improving the allocation of funding

and providing funding for village nurses as a way of appreciating their effort at the community level should be considered since all of them are unpaid.

The strengthening public health awareness and free of costs medical services should be a high priority at a national level. The costs of quality medical treatment are expensive and cannot be afforded by many patients. This includes dialysis and transplant costs, overseas treatment costs, medication costs, and other necessary costs required by the hospital or clinics. These medical concerns faced by the public should be therefore be highlighted in the National Strategic Plan and Organisation Work plan to reduce the costs of treatment to satisfy the health needs of the public in trying to access quality treatment services. There needs to be an increase of public health awareness in communities, schools, faith-based organisations, settlements, and institutions by the Ministry of Health and Medical Services and partnering health organisations with ranges of medical services provided to support public health education awareness to prevent and control the high epidemic of cases of Diabetes Mellitus.

A key way forward to reduce diabetes mellitus would be to develop a Fijian healthcare model For instance a Fijian healthcare model or framework such as well - designed model concept that highlights several meanings using traditional/native versions and in an iTaukei traditional context highlighting health and cultural component ideas. The model or framework is called 'I SEMA'. The word 'i sema', in an iTaukei context it signifies relationship, networking, linking, blood ties, commitment, dedication, sacrifice own self, and united. The framework validates its own acronym into a health concepts of healthy living and wellness. The 'I SEMA' is defined as to; Increasing access to healthcare services, Stress-free individual, Exercise regularly, Maintain healthy diet and body weight, and Avoid smoking and alcohol consumption.

Conclusion

The idea of a bottom-up approach should be considered as an only way to achieve the desired goals set by the Ministry of Health and Medical Services. This should however be initiated first from the community-level, with ideas and thoughts endorsed to the National Health Office. If this bottom-up approach and framework to be used, it would require a lot of patience to achieve the best possible health outcomes and to improve the healthcare system sector.

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