

**Perceptions of the contribution of the workplace to the risk of  
type II diabetes in Kiribati**

By

Mrs Tiroia Teikake

Submitted in accordance with the requirements for the degree of Master  
of Public Health

School of Public Health and Psychosocial Studies, Auckland University  
of Technology

May 2015

# TABLE OF CONTENTS

<b>TABLE OF CONTENTS</b> .....	<b>I</b>
<b>TABLE OF TABLES</b> .....	<b>III</b>
<b>TABLE OF FIGURES</b> .....	<b>III</b>
<b>ATTENSTATION OF AUTHORSHIP</b> .....	<b>IV</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>V</b>
<b>ABSTRACT</b> .....	<b>VI</b>
<b>CHAPTER 1. INTRODUCTION</b> .....	<b>1</b>
1.2 CAUSES OF TYPE II DIABETES .....	1
1.2.1 <i>Genetic factors</i> .....	2
1.2.2 <i>Gestational diabetes and type II diabetes</i> .....	2
1.2.3 <i>Age and type II diabetes</i> .....	3
1.2.4 <i>Body weight</i> .....	3
1.3 NUTRITION AND TYPE II DIABETES .....	4
1.3.1 <i>Beverages</i> .....	4
1.3.2 <i>Carbohydrates</i> .....	5
1.3.3 <i>Absorption mechanism and nutrients conversion</i> .....	5
1.4 PHYSICAL ACTIVITY .....	5
1.5. PREVENTION AND CONTROL OF TYPE II DIABETES .....	6
1.6 SYMPTOMS, DIAGNOSIS AND TREATMENT .....	7
1.7. ADHERENCE OF PRESCRIBED MEDICATION .....	8
1.8 BELIEFS AND CULTURAL DIFFERENCES .....	9
1.9 GLOBAL INCIDENCE AND MORTALITY RATE .....	9
1.10 TYPE II DIABETES IN KIRIBATI .....	10
1.11 SOCIAL DETERMINANTS OF TYPE II DIABETES .....	10
<b>CHAPTER TWO: LITERATURE REVIEW</b> .....	<b>14</b>
2.1 BRIEF DEFINITION .....	14
2.1.1 <i>A healthy workplace</i> .....	14
2.1.2 <i>Worker</i> .....	14
2.2 LITERATURE REVIEW .....	14
2.3 WORKPLACES .....	15
<i>Table 1: Articles identified in literature search</i> .....	16
2.4 SOCIAL AND ECONOMIC BENEFIT OF WORKPLACE HEALTH PROGRAMMES .....	17
2.5 RISK FACTORS IN THE WORKPLACE .....	18
2.6 INCREASED DEPENDENCY ON PROCESSED FOODS .....	19
2.7 HEALTHY BEHAVIOURS .....	19
2.7.1 <i>Benefit of physical activity</i> .....	20
2.7.2 <i>Benefit of fruit and vegetable consumption</i> .....	20
2.8 WORKPLACE HEALTH PROGRAMMES .....	20
2.9 DEVELOPING SUCCESSFUL HEALTH PROGRAMMES .....	22
2.10 WORKPLACE INTERVENTIONS IN KIRIBATI .....	23
<b>CHAPTER 3. RESEARCH METHODOLOGY</b> .....	<b>24</b>
3.1 RESEARCH STRATEGY METHODOLOGIES .....	24
3.1.1 <i>Quantitative</i> .....	24
3.1.2 <i>Qualitative</i> .....	25
3.1.3 <i>The methodology used in this research</i> .....	25
3.2 SETTING .....	26
3.3 PARTICIPANTS .....	27

3.4 SAMPLING TECHNIQUE .....	27
3.5 RESEARCH INSTRUMENTS .....	28
3.5.1 <i>Semi-structured interview</i> .....	28
3.5.2 <i>The transect walk</i> .....	28
3.6 PROCEDURE .....	29
3.6.1. <i>Interview process</i> .....	29
3.6.2 <i>Transect walk process</i> .....	30
3.7 DATA ANALYSIS.....	31
3.8 SUMMARY .....	32
<b>CHAPTER 4. STUDY FINDINGS.....</b>	<b>33</b>
4.1 THE PARTICIPANTS.....	33
4.2 KNOWLEDGE OF DIABETES .....	33
4.2.1 <i>Definition of diabetes</i> .....	33
4.2.2 <i>Ideas about the prevention of diabetes and barriers to attaining these</i> .....	34
4.2.2.1 <i>Balanced diet</i> .....	34
4.2.2.2 <i>Problems in attaining a balance diet</i> .....	35
4.2.2.3 <i>Exercise</i> .....	36
4.2.3 <i>Lifestyles prior diagnosis</i> .....	37
4.2.4. <i>Diagnosis</i> .....	38
4.2.5 <i>Treatment</i> .....	39
4.2.6 <i>Workplace conditions</i> .....	40
4.2.6.1 <i>Resources within and near workplaces</i> .....	40
4.2.6.2 <i>Routines within the workplace</i> .....	41
4.2.7 <i>Healthcare services</i> .....	42
4.2.8 <i>Recommendations made by participants</i> .....	43
4.3 FINDINGS OF TRANSECT WALKS.....	43
4.3.1 <i>Transect walk 1</i> .....	44
4.3.2. <i>Transect walk 2</i> .....	49
<b>CHAPTER 5. ANALYSIS OF THE FINDINGS.....</b>	<b>51</b>
5.1 ANALYSIS OF THE TRANSECT WALKS .....	51
5.2 KNOWLEDGE OF DIABETES .....	52
5.3 ACCESSIBILITY AND AVAILABILITY OF FOOD SOURCES. ....	55
5.4 SYMPTOMS AND DIAGNOSIS .....	55
5.5 TREATMENTS .....	56
5.6 WORKPLACE CONDITIONS .....	56
5.7 HEALTHCARE SERVICES .....	57
5.8 RECOMMENDATIONS.....	57
5.9 STRATEGIES .....	58
5.10 LIMITATIONS OF THE STUDY .....	59
5.11 CONCLUSIONS.....	60
<b>REFERENCES .....</b>	<b>61</b>
<b>APPENDICES .....</b>	<b>75</b>
APPENDIX A .....	75
APPENDIX B .....	76
APPENDIX C .....	77
APPENDIX D .....	79
APPENDIX E .....	80
APPENDIX F .....	81
APPENDIX G.....	82

## TABLE OF TABLES

TABLE 1: ARTICLES IDENTIFIED IN LITERATURE SEARCH .....	16
---	----

## TABLE OF FIGURES

FIGURE 1: PHOTOS 1 AND 2 - DOUBLE STOREY BUILDING; OFFICE UPSTAIRS AND SHOPS DOWNSTAIRS .....	45
FIGURE 2: PHOTOS 3 AND 4 - FOODS SOLD WITHIN THE AREA .....	46
FIGURE 3: PHOTO 5 - LOCAL MARKET SELLING LIMITED STOCK OF LOCAL FOOD CROPS .....	47
FIGURE 4: PHOTO 6 - MAIN ROAD AND SOME OF THE OFFICE BUILDINGS.....	47
FIGURE 5: PHOTOS 7 AND 8 - WITHIN THE AREA CLOSE TO THE SHOPS AND OFFICE BUILDINGS ON THIS SIDE.....	48
FIGURE 6: DIAGRAM OF A TRANSECT WALK WITHIN THE WORKPLACE.....	49
FIGURE 7: PHOTO 9 - FAST AND CHEAP LUNCH FOR BUSY WORKERS .....	50

## ATTENSTATION OF AUTHORSHIP

I hereby declare that this is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person or material which a substantial extent has been accepted for the qualification of any other degree or diploma of a university or other institution of higher learning, except where due acknowledgement is made in the acknowledgements.

Signature: 

Date: 30/10/2015

## **ACKNOWLEDGEMENTS**

It is with great pleasure and gratitude to praise and give glory to the Almighty God as without His guidance and mercy this thesis would never be accomplished. The Lord has been part of this difficult journey making it possible to start and finish this thesis. I would like to thank the New Zealand government for providing funds through New Zealand Aid Scholarship (NZ Aid) allowing me to undertake this study. The completion of this study will greatly assist me in improving health among I-Kiribati citizens.

My truthful appreciation goes to the most dedicated, one and only supervisor, Penny Neave (PhD), for her understanding and sincere assistance throughout this thesis; without her continuous support this thesis will never be possible. Her patience and excellent guidance have allowed the successful completion of this thesis. My sincere thanks also goes to Shoba Nayar who had given her time to proof read this thesis.

A special appreciation to all those workplaces in Kiribati who have taken part in this study; and for those participants who agreed to be interviewed. All the information provided had made it possible for this thesis to be completed.

My deepest appreciation goes to my dear husband Taiaki Irata and our children James, Tawaieta, Thomas and Itinnata for their understanding and patience in my absence and failures as a wife and a mother during the course of this study. I am grateful for my husband's continuous support which has contributed towards the successful completion of this thesis. I am also grateful for my sister, Rotia Reeve and her family who have looked after my children throughout the course of this study.

Finally, I would like to thank all my family and friends for their encouraging words, prayers and support in one way or another; assisting me in my struggle, making this difficult journey possible, the successful completion of this Master's programme. The Almighty God will always bless you all.

## **ABSTRACT**

Type II diabetes is one of the major public health issues among low income countries affecting the adult population. In Kiribati there are an increasing number of diabetic cases; most of these cases have undergone surgery, predominantly amputations, reducing people's quality of life. Workers in urban areas may be at risk of developing type II diabetes due to their busy careers, which makes them highly dependent on processed foods. Their rates of physical exercise may also be low.

This research was carried out to explore the perceptions of full time workers who had been diagnosed with type II diabetes regarding workplace conditions that were contributing toward their risks in developing this disease. The research mainly concerned their lifestyles and experiences within the workplace prior to their diagnosis.

The study employed a qualitative research methodology and used semi-structured interviews and transect walk methods to conduct the study. Semi-structured interviews involved face to face interviews with participants and two transect walks were conducted; one was conducted outside workplaces within the area and the other transect walk took place within one of the participating workplaces.

Results show that these full time workers are vulnerable in developing type II diabetes. This is due to limited access to fresh local foods and the increased availability of processed foods within the area. Limited access to local foods are related to problems like limited space to grow fresh foods due to urbanisation, finding no time to do gardening and damaging storms which continuously ruined crops due to climate change. There are also no fitness centres within the area, as well as no safe pathways to promote physical exercise. It was also found that knowledge of diabetes among these workers was poor. The study also showed that there were no health promotion activities within workplaces to promote the general health and welfare of these workers.

In conclusion, this study suggests that a multi-sectoral approach be used to take workable measures to improve the health of these workers. This includes full time

workers, as well as all those experts on related problems which are contributing to the risks of type II diabetes. However there is also a need to inform and involve international agencies about climate change impact on local food production as well as corporate companies about the need to export healthy packaged or processed foods. These, hopefully, will provide more opportunities for healthier lifestyles for those full time workers in Kiribati within an urban area in Bairiki.



## **Chapter 1. Introduction**

### **1.1 Diabetes: Definition and Common Types Affecting the Population**

Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (WHO/IDF Consultation Group, 2006). There are three types of diabetes known as gestational diabetes, type I and type II.

Type I diabetes is a lack of insulin production; previously known as insulin-dependent diabetes and is commonly seen in children (Steyn et al., 2004; WHO/IDF Consultation Group, 2006). Type I diabetes is caused by a destruction of the pancreatic beta cells which regulates insulin (American Diabetes Association, 2010; Whiting, Unwin, & Roglic, 2010). If it is not treated, it can lead to ketoacidosis; accumulation of poisonous ketones (waste products) in the blood and urine, resulting in loss of consciousness or death (Whiting et al., 2010). Type I diabetes is not currently preventable.

Type II diabetes (formerly called non-insulin-dependent diabetes (NIDDM) or adult-onset diabetes) is a common chronic condition with disturbed carbohydrate and fat metabolism. This happens due to a deficiency in the production of insulin in the pancreas or impaired function of the insulin produced due to a high deposition of fat, causing increased levels of blood glucose (Steyn et al., 2004; Tulchinsky & Varavikova, 2000). Type II diabetes often results from excess body weight and physical inactivity (Pacific Island Countries, 2003; WHO/IDF Consultation Group, 2006).

The focus of this study is on type II diabetes, as it is the most prevalent; particularly affecting low and middle income countries. It is an important public health issue in Kiribati, the country in which the author lives and works as a diabetic specialist.

### **1.2 Causes of Type II Diabetes**

The development of insulin resistance in type II diabetes is not well understood, but is thought to involve both genetic and environmental factors (Dagogo-Jack, 2006).

### **1.2.1 Genetic factors**

The findings of previous studies concerning the risk of type II diabetes in relation to biological changes will be identified and discussed. This will be based on how women with gestational diabetes and type I diabetes have put their offspring at risk in their later, adult, life.

### **1.2.2 Gestational diabetes and type II diabetes**

Gestational diabetes (diabetes in pregnancy) is one risk factor for type II diabetes, both in the child and the mother; although it can be avoided by pregnant women with gestational diabetes through adopting a healthy lifestyle and adhering to prescribed medication (Hjelm, Berntorp, Frid, Aberg, & Apelqvist, 2008). However, unmanaged gestational diabetes increases the risk of adult off-spring developing type II diabetes because of their inability to tolerate glucose (Clausen et al., 2008).

A followed up study by Clausen et al. (2008) was done on 597 offspring adult born to mothers with gestational diabetes and type I diabetes who were either in low or high genetic tendency to type II diabetes. The study was conducted in 2002-2005 at Rigshospitalet, Denmark on babies born in 1978-1985. Based on their mother's glucose metabolism during pregnancy, and genetic predisposition, they were grouped into 1) offspring of women with diet-treated gestational diabetes mellitus (GDM), 2) offspring of genetically predisposed women with a normal oral glucose tolerance test (OGTT), 3) offspring of women with type I diabetes, and 4) offspring of women from the background population. Participants, who had not been diagnosed, underwent an examination of a 2-h 75-g OGTT after overnight fasting; participants with diabetes had a fasting venous testing. Weight and height were measured and questions asked regarding their job, health, and medication. The results of the study reported that there is high prevalence among offspring adults that were born to mothers with either gestational diabetes or type I diabetes. Thus, being exposed to a hyperglycaemic environment, both in offspring adults born to mothers with gestational and type I diabetes, were at risk in developing type II diabetes. The study had a high number of participants followed through; with many dropouts during the follow up. Because this study greatly depended on the mothers' medical record, there could be undiagnosed cases of gestational diabetes among a group of O-BP (not exposed to hyperglycaemic environment) which may hinder the results toward a null hypothesis affecting the

difference between the O-BP (no exposure to hyperglycaemic environment) and the three other groups.

On the other hand, women with a history of gestational diabetes were also at a higher risk in developing type II diabetes (Schaefer-Graf, Buchanan, Xiang, Peters, & Kjos, 2002). The presence of gestational diabetes increases the risk of type II diabetes among these women due to a continuous reduced production of insulin during and after pregnancy. The risks are higher among those women who gained excess weight, physical inactivity and consumed high energy-dense foods (Schaefer-Graf et al., 2002).

### **1.2.3 Age and type II diabetes**

As noted in other Pacific Island countries, the prevalence of diabetes generally increases with age (Whiting et al., 2010). It is interesting to note that in Kiribati diabetes is somewhat more common among men than women, especially among those aged 45 years and older (Cheng, 2010). However, the global prevalence of type II diabetes in women and men depend on their differences in lifestyle leading to the risk of developing type II diabetes (Hilawe et al., 2013). According to Hu (2011), Asian women are vulnerable to gestational diabetes, giving their children a higher chance to contract type II diabetes in their later lives.

Ontario Ministry of Health also reported that the prevalence of diabetes increases with age; three per cent of people aged 35-64 and 10 per cent of people 65 and older, are currently diagnosed with diabetes in Canada. Among Aboriginal people, 10 per cent of the population aged 15 and over, and 23 per cent of the population 65 and older have been diagnosed with diabetes. These results support the idea of higher risk of diabetes among older populations (Leontis & Walker, 2014) mainly in developing and poor countries, like Kiribati (Wild et al., 2004).

### **1.2.4 Body weight**

Whilst the degree of insulin reduction and usage may vary significantly between individuals, the highest risk factors contributing toward the development of type II diabetes are being overweight (an adult who has a body mass index (BMI) between 25 and 29.9) or obese (a BMI of 30 and over) (Centers for Disease Control & Prevention, 2012). Obesity is thought to be particularly associated with type II diabetes, particularly deposition of fat around the stomach (Hartemink, Boshuizen, Nagalkerke,

Jacobs & van Houwelingen, 2006; Jeon, Lokken, Hu, & van Dam, 2007; Resnick et al., 2000). Almost 80% of type II diabetics are obese (Albert, Zimmet, & Shaw, 2007).

A cross-sectional pilot study on students was conducted in Lebanese private schools from April–June 2007 using short questionnaires in regard to their sex, age, diabetes-related symptoms and if they had eaten on that day (Salameh & Barbour, 2009). A blood sample for glucose testing was taken and classified according to the reading; weight and height were also measured. The result of the study showed that 18.7 per cent were at risk of obesity and 3.0 per cent were obese. The boys had a significantly higher number of obesity, than the girls, with a result of 4.7 per cent versus 1.3 per cent and at risk of obesity of 26.7 per cent versus 10.7 per cent with a p value of less than 0.001. The study results found that there were more overweight and at risk of obesity among the boys where a high number of abnormal random readings and fasting glucose readings were also high. Thus a strong correlation between obesity and at risk obesity and diabetes status was shown.

It is also identified, in other studies, that insulin resistance is high among those who are overweight or obese (Yajnik, 2004). Thus the notion that those with more fat deposition were in a high risk of developing type II diabetes is supported.

### **1.3 Nutrition and Type II Diabetes**

As indicated above, the amount of fat stored in the body is associated with the risk of type II diabetes. This is affected by the nutritional intake of the individual. The next section describes those food groups that may be associated with fat storage in the body that contribute to the development of type II diabetes.

#### **1.3.1 Beverages**

Sugar sweetened drinks are thought to contribute to the risk of developing type II diabetes. A study which used a cross-sectional and cohort design was conducted to explore the relationship of the high consumption of sugar sweetened beverages (SSB), such as fruit drinks, cordials, energy and vitamin water, and the development of type II diabetes (Hu & Malik, 2009). In this study SSB were found to contribute toward weight gain, and increases the risk of type II diabetes because they contain a high amount of sugar which leads to insulin resistance and abdominal fat (Hu & Malik, 2009). Moreover, they do not compensate for subsequent meals, thus causing an increased intake of calories. Specifically, as the body consistently releases a high

amount of insulin to reduce the regular amounts of excess amounts of sugar in the blood this may lead to insulin resistance (Wardlaw & Smith, 2013).

### **1.3.2 Carbohydrates**

Carbohydrates are the main energy source for cells in the body. The amount of carbohydrate required by the individual is dependent on the energy expenditure (Wardlaw & Smith, 2013). An excess intake of carbohydrates, especially refined carbohydrates like white rice, noodles and white flour, increases the amount of glucose in the blood, and therefore significantly increases the risk of type II diabetes (Smolin & Grosvenor, 2008; Wardlaw & Smith, 2013). Regular consumption of these refined carbohydrates initiates the secretion of insulin hormone in high amounts to control excess blood glucose and the risk of developing type II diabetes.

### **1.3.3 Absorption mechanism and nutrients conversion**

Proteins, such as fish, chicken, eggs and beans, play an important part in the creation of every new cell in the body (Wardlaw & Smith, 2013). However, excess consumption of these proteins means they are converted to carbohydrate and stored as fat (Smolin & Grosvenor, 2008; Wardlaw & Smith, 2013). Fat is stored in the form of triglycerides (type of fats found in the blood, main constituents of natural fats and oils) in adipose tissue (80 per cent lipid and only 20 per cent water and protein). Therefore, energy storage means that the body is gaining weight (Wardlaw & Smith, 2013), which is a contributing factor toward type II diabetes (Clausen et al., Hjelm et al., 2008; Yajnik, 2004).

## **1.4 Physical Activity**

There is much debate about the amount of physical exercise needed to manage body weight. For example Wardlaw and Smith (2013) recommended that physical exercise of 60 minutes per day of moderate to vigorous activity is essential to manage body weight and prevent weight gain. On the other hand, the World Health Organisation (WHO, 2015) suggested that 30 minutes of regular exercise each day is sufficient, or 150 minutes of moderate to intense physical activity. However, with insufficient amount of physical exercise and poor diet, the body will continuously store energy as fat resulting in weight gain. Physical exercise also improves the body's composition; having more muscle mass and less fat (Smolin & Grosvenor, 2008; Wardlaw & Smith, 2013; Whiting et al., 2010). Therefore, adequate physical exercise positively affects blood cholesterol and blood glucose regulation.

### **1.5. Prevention and Control of Type II Diabetes**

Recent successful trials show that prevention or delaying the onset of type II diabetes is possible. Knowler (2002) and Tuomilehto (2001) clearly indicated that physical activity protects and reduces the chance of getting type II diabetes by maintaining body fitness with respect to body mass. Physical activity also helps diabetes patients as it reduces plasma glucose levels by enhancing and improving the action of insulin (Albert, Zimmet & Shaw, 2007; Hartemink et al., 2006). A combination of moderate weight loss, increased physical activity and adequate nutritional value reduces the chance of type 2 diabetes by 60 per cent (Whiting et al., 2010).

In a prospective study, a sample of 762 were recruited from 10 Melbourne workplaces with sedentary jobs and participated in a pedometer workplace programme. All baseline information was recorded in terms of demographic, behavioural, anthropometric and biochemical measurements. Participants were observed at 4 and 12 months for self-reported vegetable intake, sitting time and other measurements. The study showed that participation in a pedometer-based physical activity programme both improved physical activity and improved chronic disease risk factors, and played a role in controlling type II diabetes immediately after the programme started. Some participants had this benefit after 12 months (Freak-Poli, Wolfe, Brand, de Courten, & Peeters, 2013).

Among the participants who had improved during the program, there were 52 per cent for physical exercise, 16 per cent for blood pressure and 17 per cent for waist circumference at 4 months period. These improvements were continued at 12 months but dropped by 21 per cent for physical activity, 7 per cent for blood pressure and 6 per cent for waist circumference (Freak-Poli et al., 2013). This shows that significant improvements within the 4 month period were decreasing 8 month later; there is no specific reasons shown in these changes. The study lacked a control group and, therefore, it is not definite that the improvements in health behaviours resulted from their participation in the programme. However, the study clearly identified the reduction of these health risks behaviours toward the development of chronic diseases such as type II diabetes.

Other prospective randomised controlled studies like the Diabetes Prevention Program (DPP) and the Finnish Diabetes Prevention Study have clearly stated that controlling

the intake of adequate nutrition and enhancing physical activity helps to delay the onset of type II diabetes and prevent the progression of the disease (Ramachandran, Snehalatha, Mary, Mukesh, Bhaskar, & Vijay, 2005).

### **1.6 Symptoms, Diagnosis and Treatment**

The symptoms of type II diabetes are hard to notice, especially when they were mild. These signs and symptoms tend to develop more slowly which usually take months or even years to notice (Ramachandran, 2014). In addition, people may show little or no symptoms at all (Ramachandran, 2014). Because these signs and symptoms gradually develop it is difficult to spot them and realise them at once. This could lead to damage to the body that may have already been taken place before these symptoms were noticed (Ramachandran, 2014). Therefore, cases of type II diabetes are hard to find except through a routine medical check-up.

The study by Al-Maskari et al. (2013), which is a cross-sectional survey investigating the knowledge, attitude and practice (KAP) of diabetic cases in Al-Ain District of Dubai, showed that most participants were fully aware of the symptoms because they actually experienced them or had seen them in other patients. In this survey, the dependent variables measured were sex, age, level of education, marital status, profession, income, insulin treatment, mode of diagnosis and duration of diabetes. The study showed that most of these participants had seen a diabetic educator identifying that there is a strong relationship in seeing a diabetic educator and the increase in participant's knowledge on diabetes.

According to the International Diabetes Federation (2013), common signs of type II are polyuria (profuse urination and urinary frequency) and polydipsia (abnormal thirst); these are commonly associated with high levels of blood glucose. Unexplained body aches are also common signs experienced by these diabetics cases (IDF Diabetes Atlas, 2013). However, symptoms that are mild or slowly developed would remain unnoticed (Alberti, Zimmet, & Shaw, 2007; Ramachandran, 2014) and left untreated.

Inexpensive early diagnosis could be accomplished through simple blood testing. According to Steele, Steel and Waine (2007), some patients would be advised to control the disease by lifestyle changes in a few months, only if the HbA1C (a measure of glucose bound to haemoglobin) is 7.5 per cent (Inzucchi et al., 2012). With individuals, who do not have any other related heart diseases, the treatment of oral

medication will be appropriate if HbA1C is above 7.5 per cent and if the reading of HbA1C is more or equal to 7.0 per cent when taken before the client eats and drinks (Steele et al., 2007).

The common treatment for type II diabetes involves lowering blood glucose using oral medication and, in some conditions, may also require insulin. Those who have a higher HbA1C of more than 7.5 per cent or failed to control their diabetes with healthy lifestyles start on oral medication and may change or stop if necessary.

The following study showed that oral medication and lifestyle changes reduces the prevalence of diabetes in the population. A randomised controlled study in a multi-ethnic group was carried out to determine whether the progress of type II diabetes could be improved by lifestyle and metformin medication. Adequate information and regular advice was provided and maintained to provide moral support and ensure that the intervention was carried out as planned (Ramachandran et al., 2006). The study was not a blinded study; however these researchers were blinded until the study was closed. There was also a loss of follow up with some participants. However, the study identified the effectiveness of healthy lifestyle adoption in terms of moderate and continuous physical activity and a healthy diet in preventing diabetes. The study also showed that these were effective among the high risk population in developing diabetes. The use of metformin treatment was also identified as effective; however there were no differences if both metformin and lifestyle modification were used in treating and controlling diabetes. Metformin is an antidiabetic medication taken orally (Ramachandran et al., 2006).

### **1.7. Adherence of Prescribed Medication**

A study by Paddison (2010) investigated the physical and psychological wellbeing among adults with type II diabetes in New Zealand. It identified the need to improve the experiences of Pacific peoples who showed greater doubts and worry about diabetes prescribed medication related with the increase of HbA1c level (the mean glucose concentration over the previous period approximately 8-12 weeks, depending on the individual). People, who were overweight, worried about the effect of prescribed diabetes treatment and those diagnosed with type II diabetes were highly vulnerable to harmful results due to poor adherence to medications and poor metabolic control (Paddison, 2010).



Similarly, a previous study on self-regulation and self-management in asthma has shown that lower medication concern increases self-reported medication adherence (Horne & Weinman, 2002) and encourages medication adherence. Thus, as shown in this study, people with little doubts and better understanding on the use of these medications, and how they work, willingly take the medications as directed.

Other, previous, studies which identify the causes of non-adherence to medication include little access to information about medication, limited knowledge about the disease, and patients being excluded in the treatment plan (Haynes, McDonald, & Garg, 2002; Mancuso & Rincon, 2006). The information about medications, mainly concerned how to take them. How often they have to take these medications are not clear and failing to provide adequate information on side effects are all contributing factors toward poor medication adherence (Mancuso, and Rincon, 2006).

### **1.8 Beliefs and Cultural Differences**

Beliefs and cultures strongly affect people's views on how diseases develop, which resulted in different preferences on how to treat these diseases. A study by Hjelm et al. (2003), on religious and cultural beliefs among women with diabetes (different ethnic groups living in Sweden), showed that they had the same understandings on health. However, they had different behaviours and practices toward health and illness due to their beliefs and cultures. For example, in this study the Swedes showed a positive attitude toward their health and actively changed to control diabetes but the Ex-Yugoslavian Muslims focused on enjoying life and were unwilling to act to control their diabetes. Even though the Arabs believed that the disease is 'the will of God', they actively searched for more information and were willing to change to improve their health. This study identified the differences among these women with different backgrounds that contributed to their behaviours and practices toward their health and illness.

### **1.9 Global Incidence and Mortality Rate**

Diabetes is a leading cause of death and disability worldwide. It is the most challenging health issue in the 21<sup>st</sup> century due to its rising prevalence affecting the adult population (Whiting et al., 2010). Type II diabetes accounted for 90 per cent of all diabetic cases worldwide (WHO, 2012a).

Akter, Rahman, Abe, and Sultana (2014) stated that the latest diabetes global prevalence was 8 per cent in 2011, and is predicted to increase by 2 per cent by 2030. According to the WHO (2014), it is estimated that 1.5 million deaths was caused by diabetes and more than 80 per cent of these deaths occurred in low- and middle-income country countries like Kiribati. It is also predicted that diabetes will be the seventh leading cause of deaths in 15 years time from now, mainly in low- and middle-income countries (WHO, 2014).

### **1.10 Type II Diabetes in Kiribati**

Kiribati is a low socioeconomic country with a high prevalence of diabetes affecting the adult population. In previous studies and reports, it has been confirmed that the diabetes rate in Kiribati is increasing with other Pacific islands. Cheng (2010) showed the alarming rate of diabetes within the Pacific islands; Kiribati having a higher rate of 28 per cent over Nauru and the Solomon Islands. According to the WHO STEPS report, which is a STEP wise approach that uses questionnaires, physical measurements and biochemical measurements in assessing the risk of non-communicable diseases, the prevalence of diabetes is about 30 per cent in Tarawa (as cited in Beale, 2010; Kiribati NCD risk factors, 2009).

According to the latest WHO data published in April 2011, diabetes mellitus deaths in Kiribati reached 59 or 13.50 per cent of total deaths. The age adjusted death rate was 83.16 per 100,000 of population indicating Kiribati as one of the most affected countries by type II diabetes, compared to all other countries in the world (World Health Ranking, 2011). Type II diabetes is the second cause of death in Kiribati; with most cases found in urban Kiribati.

A report by the Ministry of Health in Kiribati says 100 new cases of diabetes are being reported each year. The report reveals that almost 4,800 diabetes cases were recorded from 2007 to 2012 and, of that figure, 380 people have undergone surgery such as amputations (Kiribati Ministry of Health Annual Report, 2011; Radio New Zealand International, 2013).

### **1.11 Social Determinants of Type II Diabetes**

It has been widely agreed that the alarming rate of type II diabetes worldwide, and in low income countries, is a result of transitional lifestyle patterns. People used to produce and work hard for their food before machinery was used to replace manpower

(Ashton, 1948; Clark, 2007). Within the Pacific Islands root crops, fresh fruit and vegetables, and fish used to be the main source of carbohydrates, vitamins and protein foods (Lako, 2001; Mavoa & McCabe, 2008; WHO, 2008a). These island people used to work hard to feed the family. Nowadays, most people depend on processed foods. People are less active and live a sedentary life; less farming and fishing. Therefore, the dramatic increase in the incidence of diabetes greatly relates to the major changes in the type of diet consumed, from a traditional indigenous diet to a high diet of processed foods and fast foods (Steyn et al., 2004).

Worldwide, food supply and pricing greatly affect the choice of foods available to the individual and the community as a whole (Whiting et al., 2010). Food industries are producing cheap processed foods and increasing the cost of healthy foods (Whiting et al., 2010). As a result, there is a dramatic increase in people depending on cereals and sugars as their main source of energy food, reducing consumption of traditional foods which are mainly roots crops and fresh vegetables (Lako, 2001; Mavoa & McCabe, 2008; WHO, 2008). Colonisation and globalisation had a great impact on the people's lives in Pacific Islands such as Tonga (Evans et al., 2003) and Fiji, where there is a similar situation to Kiribati. Kiribati was once colonised by the British and the settling of the British government partly contributed to these changes due to the availability and accessible of these processed foods. Kiribati people slowly adapted to these foods over time. Additionally, European dominance of trade affected people's lives in less developed countries. People became more dependent economically and were more likely to purchase imported foods due to limited supplies of local foods.

The increasing trade of processed foods increased the risks of diseases such as type II diabetes for these countries; but poor countries had to agree with the trade to maintain their good relationship for continuous support (Evans et al., 2003; Hughes & Lawrence, 2005) in terms of donations and aids. Limited local foods were also used for business trade such as the exportation of coconut fruit and other food crops contributing to a reduction in local food consumption (Hughes & Lawrence, 2005).

Like any other country, Kiribati's economic development and modernisation (Kiribati Ministry of Health, 2011; WHO Kiribati Report, 2010) has increased reliance on motorised transport as the main means of transportation within the island. These changes, together with a strong tradition of feasting, a high consumption of

carbohydrates and pork; and a gift of tobacco which is considered a polite behaviour and spiritual belief – where people have to smoke in respect of their ancestors or to offer tobacco to their respective ‘anti’- nature god (Kiribati NCD risk factors, 2009), have led to over-nutrition, increase in tobacco use and a reduction of activity in adults, increasing the risk of type II diabetes.

The WHO Steps survey results showed that behavioural risk factors for chronic diseases, like type II diabetes, are commonly practiced in Kiribati. Only one third of the population are current non-smokers. The majority of people between the ages of 24 – 65 years have low fruit and vegetables consumption each day.

As for physical activity, engaging in health-enhancing physical activity is not a common practice in Kiribati; meaning that the majority of I-Kiribati are not achieving the minimum recommended levels of physical activity, which is 30 minutes of moderate-intensity physical activity for 5 days of the week (Kiribati NCD risk factors, 2009). The survey showed half of I-Kiribati reported a low level of total physical activity not conducive for health.

Climate change introduces more problems by destroying these food crops. The main food crops in Kiribati like coconut tree and pandanus tree (fruit crop) are being affected by these changes due to coral erosion and damaging storms (Kiribati Climate Change, 2013). The damaging storms uproot coconut trees and pandanus trees reducing the number of food crops on the island. Inclusively, the giant root crop known as ‘bwabwai’ grown in water-pits is being affected by the increasing sea level which washes ashore adding more salt to the water and ruining these crops (Kiribati Climate Change, 2013; Save Kiribati, 2015). This greatly contributes to a reduction of local food supply leaving limited choices to these people but to buy cheap processed foods (Save Kiribati, 2015).

Working conditions are known to be one factor that contribute to type II diabetes. As the country has become more industrialised, more people are working in offices and jobs that involve less physical movements rather than working in the fields (Leontis & Walker, 2014). Working in offices reduces the body’s physical activity and may result in workers spending more time sitting down (Hamilton & Zedric, 2007).

However, although much is known about how diet and lack of activity contribute to the development of type II diabetes, nothing is known about how the workplace

influences type II diabetes in Kiribati. This study aims to fill that gap through exploring the perceptions of full time workers who have been diagnosed with type II diabetes. It is hoped that this study will provide valuable information to others about how they feel their working conditions initially contributed to their risk of developing this disease. The study may assist other full time workers by providing information about high risk behaviours, lifestyles and conditions in the workplace that may have contributed toward the risk of type II diabetes.

The next chapter will explore further (using the academic literature) how workplaces contribute to the development of type II diabetes.

## **Chapter Two: Literature Review**

This chapter explains and sets the background of the current study by looking at previous studies on type 2 diabetes in the workplace; focusing on studies that explored knowledge, attitude and behaviour risks of type II diabetes. This is to gain a perspective of this issue from the standpoint of people with type II diabetes, as this will be the focus of this research. Studies which include interventions and health promoting activities in the workplace will also be considered to determine if there is evidence of best practice of health promotion activities within workplace settings.

### **2.1 Brief Definition**

#### **2.1.1 A healthy workplace**

The WHO emphasises, in its definition, that a healthy workplace is a place where both workers and managers work together to set achievable goals to maintain their good health. A health workplace provides workers, at all levels, with sufficient health information, support and access to activities aimed to promote their physical, psychological and social health. Workers and managers also work together to develop a safe environment to prevent accidents from happening with guidance and assistance from health professionals. As a result of this, workers and managers have more control over their own health, as well as increasing their productivity (Burton, 2010; Hayday, 2004).

#### **2.1.2 Worker**

A worker is defined as “one who works at a particular occupation either as an officer or doing manual or industrial labour work” (Farlex, 2014). A worker can be any person with a particular job either within private business or in the government sector.

Work locations may include places like offices, warehouses, the roadside, farms or gardens. However, in this study, the focus was mainly on those sedentary jobs as this group may be more at risk of developing type II diabetes than manual workers

### **2.2 Literature Review**

The literature review was conducted by carrying out a search through google scholar. The researcher searched for published articles from 2003 to 2012 which were written in English and met the following criteria. Firstly, the researcher identified any study that either evaluated any workplace health promotion activity which involved diet,

physical exercise, or both, targeting current adult workers of 18 years and over. Secondly, the researcher identified studies that examined risk behaviours in the workplace, within the Pacific, including knowledge, attitudes and practices of type II diabetes. Limited relevant studies were identified within the Pacific region. The researcher extended the search to other larger developing countries such as India, Cameroon, Malawi, Laos and South Africa and Indonesia which investigated these issues. Due to limited studies on type II diabetes and workplaces within these countries, other studies within developed countries were also considered. The following studies were identified, as outlined in Table 1, p. 16.

Five main ideas were identified from the literature review:

1. Knowledge about workplace as a health promotion setting
2. What is known about the social and economic benefit of workplace health programs
3. Knowledge of attitudes and risk factors of type II diabetes within the workplace
4. Perceptions about healthy behaviours to prevent type II diabetes
5. Knowledge about best practices for workplace health programs

### **2.3 Workplaces**

Workplaces have been widely accepted as an appropriate setting for health promoting and disease prevention activities (WHO, 2013a). This was first recognised in 1950s, followed by a joint International Labour Organisation (ILO)/WHO in 1995 focusing on occupational health (Quintiliani et al., 2008; WHO, 2003). The WHO continued to recognise the effectiveness of workplace health programmes through the Ottawa charter in 1986 (WHO, 1986), and through the Jakarta statement on health promotion in 1997 (WHO, 1997). This was then incorporated in the Bangkok charter to promote health within a globalised world in 2005 (WHO, 2007a). Later the WHO Global plan of action on worker's health initiative 2008-2017 was approved in the 60th World Health Assembly in 2007 (WHO, 2007b). It was clearly mentioned through this initiative that health promotion activities in workplaces are effective in reducing non-communicable diseases through promoting healthy eating and physical activity (WHO, 2007b).

**Table 1: Articles identified in literature search**

<b>Author, Year</b>	<b>Study Design</b>	<b>Population</b>	<b>Findings</b>
Pronk & Kottke (2009)	Broad-scale application of business strategy to promote physical activity	Interventions among working population	Enhancing physical activity within workplaces has been proven successful in improving good health and productivity
McCrady & Levine (2009)	21 free living subjects were studied for 20 days	21 subjects with sedentary jobs and have different weight and body fat	It was proof that subjects sit more during their work time than in their leisure time
Thorp et al. (2012)	A convenience sample of selected workplaces	193 employees working in offices, call centres and customer service	There are significant differences in all sedentary and activity outcomes during working hours within different workplace settings; Workers at call-centre are sedentary and less active; customer service workers are mostly active and less sedentary
Ramachandran et al. (2006)	Randomised controlled clinical trial	1,332 subjects who were at high risk of type II diabetes	Both modification of lifestyle and metformin oral medication reduce the incidence of diabetes among Asian Indians with impaired glucose tolerance
Rush et al. (2009)	12 weeks longitudinal group intervention	50 healthy subjects	The intervention found significant improvement in reduction of total cholesterol of all participants involved
Siefken et al. (nd)	12 weeks longitudinal group intervention	207 working women	The programme showed improvements in physical activity among those who were involved
Borg et al., 2010	A quasi-experimental trial	332 inactive staff	The intervention of step by step guidebook and pedometers increases physical activity among those inactive staff involved with no extra support



Workplaces are perfect locations to sustain, and promote health, reducing the impact of high risk behaviours, both at primary and secondary stages (Arena et al., 2013). Workplaces have been described as an appropriate setting to carry out health promotion activities because workers are easy to reach and the developed structure can be used to communicate efficiently with the target population (Merrill et al., 2011). Moreover, the social support networks within workplaces have been described as useful in reducing the costs for health promotion activities and implementing them to promote healthy behaviours. Various types of people with different health needs can be reached within workplaces (e.g. young males, breastfeeding mothers, different ethnic groups, people with a disability, etc.) who may not be able to access any health promoting activities or information elsewhere (Burton, 2010; Russell, 2009).

## **2.4 Social and Economic Benefit of Workplace Health Programmes**

Various studies have identified the benefit of workplace health programmes in promoting health, increasing workers' performance and productions toward the economic development of the workplace (Aldana et al., 2005). The introduction of workplace health programmes produced positive impacts on the workers, their productions and the economic development of the workplace (Merrill, et al., 2011; Neville et al., 2011). In this case, there will be less demand for health services as health awareness and services are being controlled and introduced at workplaces through health promotion activities (Burton, 2010; Russell, 2009). Health care services are accessible to workers who are in a busy career as well as promoting health for their families.

On the other hand, health deficits impacted on the performance of workers and increased absenteeism. Von Korff et al.'s (2005) study found that among those who were employed and diagnosed with diabetes, almost 7 per cent had missed five or more days from work in the previous month and 4 per cent had severe difficulty with daily work tasks. Additionally, workplaces which do not have health promotion programmes in place increase the risks of related factors contributing to the workers' ill-health. In developed countries almost 28 per cent of workers suffer from health problems due to their current job condition (Gates et al., 2006). It was also estimated that ill-health problems related to work conditions would result in 367 million calendar days of sick leave in 2007 (Gates et al., 2006). Moreover, 1.4 million of these workers expect never to work again because of their working conditions which are continuously

pressing on their health. The negative impact of health problems due to working conditions resulted in workers leaving the job earlier because of their medical conditions (Burton, 2010; Hayday, 2004) and, therefore, having to leave before retirement age. The loss of these skilled workers may affect the productions and development of the company. These studies were conducted in high income countries and may not be generalised to developing countries like Kiribati. However they produced essential information on health deficits among workers and its impact on the development of the workplace services and productions.

## **2.5 Risk Factors in the Workplace**

The majority of the adult population spend almost one-third of their daily life at work (Burton, 2010; Haydon, 2004). Previous findings identify that most of the working hours was spent on sedentary time within the workplace. The findings of Thorp et al. (2012) showed that in a working population (among Australian employees), more than three quarters of the working hours was spent sitting down; with an increase in sitting time of more than 20 minutes and less than 30 minutes in longer sessions, as shown within call centres employees. The study also found that employees spend a great deal of time in sitting around with limited movements during working days than in any other times when they were not working (Healy et al., 2005; Thorp et al., 2012). Findings of an observational study among workers, who spend a great deal of time at their desks, also showed that sitting was more common during working hours than when they were not working (McCrady & Levine, 2011). The findings of these two studies, which showed that workers spent much time on sedentary activities within workplaces compared to other times when they were not working, have similar results with other studies (McCrady & Levine, 2011; Tigbe et al., 2011) which stated that sedentary jobs engaged workers in less physical activity while they were working. Therefore, these workers are at higher risk of contracting type II diabetes due to the increased sedentary time.

In workplace settings, the use of computers, telephones, emails and machines has taken over most manual works, increasing the proportionate number of workers being engaged in sedentary work (Schulte et al., 2004). Mohan et al. (2007) stated that the working population has changed from manual work as in agriculture to a more advanced office work. According to Schulte et al. (2004) energy-dense food and beverages were also accessible within these workplaces.

## **2.6 Increased Dependency on Processed Foods**

Due to economic development, there are changes taking place increasing the risk of type II diabetes (Hughes & Lawrence, 2005). Environments have become urbanised and obesogenic leading to a high consumption of energy-dense foods and reducing levels of physical activity.

According to Williams (2001) “Coca-colonization” has changed Tarawa (the capital city of Kiribati) which is dependent on advertising products and imported products, mainly processed foods and drinks, and relying on motor vehicles as their main transportation. These factors have contributed to a reduction in physical exercise for most workers who were sitting at the desk in the office for almost all day. The shops were always available for these busy workers to buy processed food such as cream biscuits, noodles, snack foods, soft drinks, and canned meats. Fruit and vegetables were hard to find (Kiribati NCD Risk Factors, 2009; Williams, 2001; WHO, 2013b). Due to a low annual income, estimated to \$5,000 a year for those people who were working in non-skilled jobs (Williams, 2001), most people turned to junk foods which were cheap and tasted better,.

The increased consumption of energy-dense foods, which are high in saturated fat, sugar and salt, due to urbanisation mostly in low-and-middle-income countries, are referred to as ‘nutrition transition’ (Popkin & Gordon-Larsen, 2004). Additionally, the increasing direct power by external international corporations has pressured the problem. These huge businesses create new food markets in developing and under developed countries by buying shareholdings in local food industries aiming for an economic benefit from these processed foods (Chopra, et al., 2002; Hawkes, 2005). It is likely that globalisation promotes high consumption of highly processed foods increasing the risk of type II diabetes (Unwind, 2007). Due to their low economic status and poor resources, developing countries have agreed to these conditions to maintain their good relationships and for continued assistance and funding from larger developed countries (Chopra et al., 2002; Hawkes, 2005).

## **2.7 Healthy Behaviours**

Healthy behaviours include those behaviours that may prevent, control and delay type II diabetes; focusing on eating healthy local foods and having sufficient physical

activity within workplaces. These healthy behaviours greatly contribute to promoting and maintaining good health in reducing risks behaviours of type II diabetes.

### **2.7.1 Benefit of physical activity**

According to the WHO (2007c) physical inactivity greatly contributes toward the development of type II diabetes and other non-communicable diseases, increasing the number of premature deaths. Therefore, there is a need to increase physical activity to avoid these premature deaths and to promote health among full time workers. Previous studies have shown the benefit of physical activity in reducing the risks of type II diabetes (Bull et al., 2010; Haskell, Blair, & Hill, 2009). Regular physical activity can prevent and reduce the incidence of type II diabetes by 58 per cent (Kottke & Pronk, 2006; Mikus et al., 2012). The benefit of regular physical activity was realised in the 2011 United Nations meeting in preventing and controlling type II diabetes and other non-communicable diseases. These physical activities may include household tasks like gardening, cleaning or cutting toddy, as well as recreational activities (volleyball or football), walking or joining the gym.

### **2.7.2 Benefit of fruit and vegetable consumption**

Fruits and vegetables are the most important components of diet that can reduce the chance of contracting type II diabetes with regular consumption and in the right amounts of 400 to 500g per day (Robertson et al., 2004). A nutrition intervention will promote a high consumption of fruits and vegetables and assist in reducing the chance of contracting type II diabetes. This can be effectively carried out within the workplace using a multi-components approach; through integrating resources with evidence of longer-term sustainability and stakeholder involvement (Blanchette & Brug, 2005; Pomerleau et al., 2005). For example, A- 5- Day Power Plus Programme increased fruit and vegetable consumption and a Minnesota Heart Health programme resulted in the reduction of smoking behaviour demonstrating the effectiveness of this approach. A multi-setting community wide approach increased fruit and vegetable consumption by 14 per cent in a public health intervention targeting 5 to 12 year olds (Department of Health, 2010).

## **2.8 Workplace Health Programmes**

The main aim of workplace health programmes is to promote workers' health through the reduction of individual risk-related behaviours such as sedentary lifestyles, unhealthy eating habits, and other preventable health behaviours (Quintiliani et al.,

2008). Through the workplace direct impacts can be enforced on these workers' general health and wellbeing (Pelletier et al., 2005). Workplaces can reach a large number of employed adults, as well as their families, and, therefore, have been shown to be an effective means of promoting healthy lifestyle behaviour (Goetzel & Ozminkowski, 2008). A great number of intervention studies have been carried out in workplace settings to promote and advocate health behaviours within workplaces to improve workers' health. For example, Borg et al. (2010) found that a guideline step by step walking programme with a pedometer, among inactive staff in Australia, has successfully improved physical activity from moderate to vigorous physical activity among those workers involved. There was a significant increase on all measurements for all workers but those in a standard and maintenance group attained higher measurements compared to the standard group alone (118 min versus 69 min,  $p=0.029$ ). The use of pedometers and a step by step guide book encouraged these workers to attain the required amount of steps in the longer period without further support. The study limitation was that it greatly depended on self-reported changes and the sample selection only included those workers who were considered inactive.

A similar study of a 12 week longitudinal group intervention, with a follow up after 52 weeks, was conducted to determine the effect of a 9 week diet and physical activity intervention in the workplace in New Zealand (Rush et al., 2009). Continuous follow up and support was provided at 0, 3, 6, 9, and 12 weeks (included 50 healthy workers); at week 3 a motivational seminar was held and at week 6 the group were given daily kiwi fruit for 3 weeks. A comparison of baseline measurements between the 12 weeks and 52 weeks showed improvements in measurements. The study proved that continuous support and accurate information on diet and physical activity over 9 weeks resulted in improving health and reducing behavioural risks of diseases, as shown in the follow-up within the 52 weeks period. The study failed to follow-up all participants that were involved in the intervention, and the sample selection by researchers was relatively small. Siefken et al. (n.d.) found that workplace health programmes in Vanuatu, among working women, are effective in increasing the number of steps per day over baseline readings by 2,513 steps per day. At baseline, 14 per cent were classified as being inactive and this number dropped to 5 per cent at follow up. However, only 38 per cent were being active after the 12 week programme. The study

only focussed on working women in Vanuatu; therefore, these results are not true to women who are not working.

These primary studies have identified the importance and success of workplace interventions in addressing the risks of type II diabetes. These interventions also confirmed positive effects within these workplaces by increasing the amount of physical activity and encouraging healthy diet consumptions through a continuous support, accurate information being provided and a follow up of participants involved (Goldgruber & Ahrens, 2010). Despite their limitations, differences in sample selection and settings, these studies have provided information on the importance of implementing workplace programmes in promoting health for a working population.

## **2.9 Developing Successful Health Programmes**

Lifestyle modification, which includes consumption of healthy foods and increasing physical activity, has been proven to reduce the chance of contracting type II diabetes (Alberti et al., 2007; Tuomilehto et al., 2001). However it was hard for people to modify their lifestyle due to the existing environment and social status (Knowler et al., 2002). Within developing countries there is a need to inform and attract policy makers to the need to prevent type II diabetes (Dagogo-Jack & Tennessee, 2006). Public health professionals need to convince the government on these issues. Once the government has realised the need for urgent action, it will be easier for all other departments to come together for a multi-national strategy in controlling the problem of diabetes. These departments will involve Ministries of health, agriculture, nutrition, and education, and experts coming together to plan and implement public education focusing on nutrition and physical education, as well as practical measures in addressing these problems (Dagogo-Jack & Tennessee, 2006).

For the success of these programmes they need to employ culturally appropriate methods in preventing and controlling type II diabetes as well as involving workers or the community in planning these health programmes (Arnstein, 2007). This is to consider the need of employers and employees in developing these workplace interventions seeking their full participation, identifying gaps and for sustainable programmes within workplaces (Babu et al., 2014). This will involve a “bottom up approach” which will be based on employees’ and employers’ needs; empowering them by taking control of their own health aiming for a healthy life (Arnstein, 2007;

Babu et al., 2014). Pilot studies within a smaller population, like workplace settings, are worth trying, to identify the constraints and appropriate interventions of these health promoting activities (Dagogo-Jack & Tennessee, 2006).

Additionally, the application of a RE-AIM framework can be used to interpret studies into real settings and assist in planning programmes that work well within workplace settings. The framework can also be used to detect the strengths and weaknesses of different approaches to health promotion activities and disease prevention such as in type II diabetes prevention programmes (Ganglio, Shoup, & Glasgow, 2013). Therefore, the use of this framework can assist in developing appropriate interventions that work within a particular workplace setting.

## **2.10 Workplace Interventions in Kiribati**

A workplace intervention is a cost-effective way to assist in reducing health issues in a low socioeconomic country like Kiribati. It is important to note that even small changes in behaviour within the working population are likely to show significant effects on disease risk (Lowe, 2003; WHO/World Economic Forum, 2008). For example, population-wide strategies to reduce serum cholesterol are cost effective in community-based interventions, even if serum cholesterol is reduced by only 2% or more (WHO/World Economic Forum, 2008). Successful workplace interventions could then be implemented in the general population so that more people were involved in these interventions aiming to promote health for a wider population.

With all this information provided from previous studies, it is clear that further study on type II diabetes and workplace conditions contributing toward the development of type II diabetes in Kiribati is necessary. The current study will employ a qualitative method to inquire about these workers' experiences and lifestyle prior to their confirmation of lab-test diagnosis having type II diabetes. Semi-structured interviews and transect walks through participating workplaces will be used to collect data.

## **Chapter 3. Research Methodology**

In this chapter, the methodology and methods used by the researcher to carry out this study are identified and discussed. Firstly, the researcher discusses the two different methodological approaches to conducting a study and then justifies the methodology used. Following this, the methods used in the study are described.

### **3.1 Research Strategy Methodologies**

#### **3.1.1 Quantitative**

Quantitative research collects data in numbers which can be easily categorised in rank order or measured in units. These types of data can measure the significant differences of raw data through descriptive and inferential statistics (DePoy & Gitlin, 2011). Descriptive statistics is a technical way of presenting a summary of data in a meaningful way, known as “data reduction”, through charts and tables using frequency distribution, occurrences and proportions (Baum, 2008; DePoy & Gitlin, 2011). Inferential statistics is concerned with identifying whether a relationship exists between exposure and outcomes. Statistical tests can be carried out to investigate if these differences are significant (Baum, 2008; DePoy & Gitlin, 2011), commonly using a p-value. For example, if the p-value is less than 0.05 or values of 0.1 and 0.01 (DePoy & Gitlin, 2011), then the result will be considered significant and confirm that there is a relationship between two measured phenomena. The null hypothesis which states that there is no relationship between the two measured phenomena will be rejected.

Experiments typically yield quantitative data, as they are concerned with measuring things. However, other research methods, such as observations and questionnaires can produce both quantitative and qualitative information (Baum, 2008). For example, a rating scale or closed questions on a questionnaire would generate quantitative data as these produce either numerical data or data that can be put into categories such as “yes” and “no” which can then be quantified. Experimental methods limit the possible ways in which a research participant can react to and express appropriate social behaviour. Findings do not consider relevant and contributing conditions and circumstances toward the phenomenon under study (Baum, 2008; DePoy & Gitlin, 2011). A quantitative study attempts to answer questions such as how many, how much, who and when (Baum, 2008).



### **3.1.2 Qualitative**

Qualitative research aims to uncover the meaning of people's experiences in different situations. In relation to the development and improvement of healthcare practices, qualitative research contributes through understanding the human experience (Fossey, Harvey, McDermott, & Davidson, 2002; Grant & Giddings, 2002). It is concerned with investigating human welfare, values and dignity through presenting 'raw data' and making sense of these data.

In qualitative research, the aim is to find out deeply about people's perspectives on a studied phenomenon within a particular situation (Grant & Giddings, 2002). This includes understanding their beliefs and exploring their own perceptions by allowing them to talk and to listen attentively with understanding. This allows greater understanding of different knowledge, behaviours and practices within a studied population. This information guides health professionals to have a greater understanding of why people, within a particular social context, are behaving or reacting in such ways. This will also be useful in developing more appropriate care and needs for a studied population (Giddings & Wood, 2001b as cited in Grant & Giddings, 2002).

### **3.1.3 The methodology used in this research**

The application of a qualitative methodology in this proposed study was appropriate to explore perceptions on whether and how workplace conditions put full time employees at a risk of contracting type II diabetes. The main focus area was employees' experiences and behaviours prior their diagnosis stage. The researcher sought to inquire about their lifestyle behaviours, routines and foods available at workplaces which may have contributed to their risks in contracting the disease.

This qualitative study was a primary study; collecting original data using semi-structured interviews and transect walks within the studied area. A purposive sample was used in this study using the inclusion criteria as set by the researcher. These inclusion criteria were set based on the researcher's own views that participants would provide sufficient information on the studied topic. Primary data was collected from this purposive sample through the deployment of open-ended questions and transect walks through the workplaces of those who participated in the study.

In developing the research questions, the researcher considered what was found in previous studies as relevant to the research topic. According to the literature reviewed, the highest risk factors contributing toward the development of type II diabetes are being overweight (an adult who had a body mass index (BMI) of 25 and 29.9) or obese (an excessively high amount of body fat, adipose tissue with a BMI of 30 and over) (Centers for Disease Control & Prevention, 2012). Abdominal obesity was considered to be particularly harmful and this was identified as being due to insufficient physical activity and a high consumption of energy-dense foods which are mainly processed, such as white rice, sugar and plain flour (Hartemink, Boshuizen, Nagalkerke, Jacobs, & van Houwelingen, 2006; Jeon, Lokken, Hu, & van Dam, 2007).

Based on the literature reviewed, the following research questions were developed to answer the main question of this research;

1. What do the workers know about diabetes?
2. What do workers know about the contributing factors to type II diabetes?
3. What was your previous lifestyle in terms of food consumed and exercise before you found out you have type II diabetes?
4. What are your reasons for this lifestyle (your answer to No.3)?
5. What are the roles of workplace conditions in contributing to the diagnosis?
6. What healthcare services are available within or near workplaces before your diagnosis?
7. What are your recommendations to improve workplaces?

### **3.2 Setting**

This qualitative study was conducted at Bairiki village, one of the biggest villages on the main island of Tarawa, the capital city of Kiribati, where more than half of the population reside (Kiribati MHMS Annual report, 2011).

Tarawa is one of the urbanised areas where most of the government ministries and businesses are located. This area was chosen as it was hoped that the many workplaces located within would provide the required number of participants within the sample population.

### **3.3 Participants**

The sampling procedure used in this study was purposive sampling. The sample was selected based on the researcher's subjective views that the sample would provide sufficient information about the topic which the researcher was interested in exploring. It was anticipated that people working within these workplaces would be able to provide the information required based on the inclusion criteria. Additionally, due to time and budget constraints, purposive sampling was a cost-effective method and saved time which allowed the researcher to complete the data collection process within the time-frame (Russell, 2006). Participants were recruited based on the following inclusion criteria.

The study was carried out within four workplaces. These workplaces were identified through the researcher walking through the area. Participants comprised of those who were working within participating workplaces and had been diagnosed with laboratory-diagnosed type II diabetes, were aged between 18-50 years old (retirement age in Kiribati), and who were either male or female. Due to time and cost constraints, recruiting 10 participants was considered sufficient to provide adequate and sufficient information for this study.

### **3.4 Sampling Technique**

In selecting the sample of 10 participants, four of the biggest workplaces at Bairiki village were identified for this study by the researcher as she walked through the area. The researcher drew a radius of 500 meters to walk around identifying the first four largest workplaces within that area. This took place in the first week of the data collection process and was repeatedly done over three days to familiarise the researcher with the place, identify large workplaces, and develop a good transect map of the place. The researcher finally developed a transect map of these workplaces found within the selected area. The four largest workplaces in terms of the size of the workplace were identified through this transect walk and the number of people employed within were identified by asking any senior officer either by phone or during the transect walk.

A written letter was sent to the Chief Executive Officer (CEO) of each of the workplaces identified, explaining the study and seeking permission for the business or

government department to take part in this study. A letter from the Ethics Committee of AUT University (Appendix G) approving the study was attached to this letter.

The study was then advertised within these workplaces that agreed to participate. Advertisements for the study (Appendix A) were placed and distributed on the bulletin boards of each workplace or at the tea room, and in the area where every employee could see. These advertisements provided contact details of the researcher and asked for volunteers who met the inclusion criteria. The advertisement also included the benefit and the purpose of this study. Participants were given a week to decide whether to participate.

Two participants agreed to participate from two workplaces (A & B) within the first week in which the advertisement was posted. Three more participants agreed to participate in the study late in the second week of the advertisement. The researcher moved on to another two workplaces (C & D) and advertised the study after obtaining consent from the CEOs. The remaining five participants were recruited from the next two large workplaces (C & D) within two weeks of the advertisement being placed.

### **3.5 Research Instruments**

#### **3.5.1 Semi-structured interview**

An open-ended question with guided topics, written in the English language, was used as a main gathering instrument for this study (Appendix B). The choice of semi-structured interview was to allow for a guided discussion but to freely allow participants to discuss these issues (Cliff, French, & Valentine, 2010). In the context of this study, open-ended questions allowed participants to share their experiences which would provide a clear understanding on whether or how workplace conditions contributed to the development of type II diabetes (Arnstein, 2007; Li, Drury, & Taylor, 2013).

#### **3.5.2 The transect walk**

A transect walk is an organised walk along a scheduled route and this was a tool thought to be helpful in showing distribution of resources and relevant information for the study within the area (Dunn, 2007; Glantz & McMahan, 2007). This was a useful tool to gain understanding of workplace conditions (Rambaldi et al., 2006) which were contributing to the development of type II diabetes. Unfortunately, only one workplace agreed for a transect walk to take place. Therefore there was only one transect walk

conducted within one of these participated workplaces. This transect walk was conducted by the researcher and guided by a knowledgeable official about the workplace. The transect walk through this participating workplace helped to identify issues and conditions that may have contributed toward the risk of type II diabetes. These participants may have been working in other workplaces before contracting the disease; however the information provided within this workplace assisted in providing essential information about workplace conditions contributing toward the development of type II diabetes. The other transect walk was conducted outside workplaces, looking at the overall environment of the area, to identify resources available for these full time workers in terms of foods, activities, fitness centres.

### **3.6 Procedure**

Data was collected through interviews and transect walks. The data collection process took over an 8-9 week time period. The first 4-5 weeks were used for identifying large workplaces, advertisements and recruiting process, followed by data collection. First of all, the researcher walked around the area identifying the largest workplaces. The first transect walk was conducted on the 4<sup>th</sup> November 2014, within the area outside the workplaces for about 30 to 60 minutes. The researcher only aimed to identify resources available for these full time employees in terms of foods, fitness centres, infrastructure and other environmental factors that may have contributed toward the development of type II diabetes. The other transect walk, which was conducted within one of these participating workplaces, was conducted on the 18<sup>th</sup> November 2014 and took about 15 to 20 minutes. This transect walk was done by the researcher with the assistance of the knowledgeable official about the workplace. These two transect walks were conducted at different times with a lapse of weeks in between depending on sufficient time for the researcher to do the transect walk and a suitable time of a volunteered workplace.

#### **3.6.1. Interview process**

Potential participants were asked to contact the researcher via phone at any time of the day and night from 8am in the morning but not later than 10pm throughout the week. They were also advised that they could contact the researcher through email at any time to arrange a suitable time for an interview to take place. The researcher informed potential participants that the researcher would try to reply by email as soon as possible

and no later than four hours after the email was received. All communications with volunteer participants were treated as confidential.

Since there were a small number of workers in each workplace, it was considered possible that everyone knew the movements of all other members of staff. Therefore, the researcher conducted the interview at the home of participant to maintain anonymity and confidentiality.

The duration of the interviews was about 45 to 60 minutes long. The interviews were conducted at the home of participants, outside working hours, either during the weekend or after working hours in the afternoons. The interviews were carried out with the participant in a quiet room if possible, using a guide. It was planned that each interview would be tape-recorded so that the verbatim conversation between the participant and the researcher could be recorded (Burns & Grove, 2007). However, there were only four interviews that were tape-recorded. This is because the remaining participants requested to do interviews without being recorded. To respect these participant's decisions, interviews were carried out without recordings. For all interviews, whether recorded or not, notes were also taken by the researcher.

Before the interview started, individual participants were given full information about the study (Appendix C); the nature and what was expected from the study including potential benefits, the outcomes and their contribution in improving the understanding of workplace conditions in relation to preventing type II diabetes. A written consent form was provided to all participants before the commencement of the interview. Interviews were carried out by the primary researcher only after informed and voluntary consent (Appendix D) were signed by the participant.

### **3.6.2 Transect walk process**

The first transect walk was conducted within the study area (Bairiki). The areas that the researcher was interested to explore were food stalls, shops, local supermarkets, roads or pathways, and fitness centres. This was to identify the most accessible foods within the area and to explore other conditions that were contributing toward the risk of developing type II diabetes. Photographing of different spots and note-taking by the researcher were made throughout this transect walk. Like interviews, the notes taken from this transect walk were also transcribed for analysis. This transect walk took 20-30 minutes of the researcher's time.

The last transect walk was carried out within one of the workplaces where some of the participants worked. The researcher was guided by a knowledgeable official of this workplace, in terms of the building, work routine, workers' tasks and activities within the workplace. The knowledgeable official was selected by the CEO. The aim of this transect walk was to observe, identify, and discuss the environmental factors which were related to the study. First of all, informed consent was obtained from the CEO before proceeding with the transect walk (Appendix E). The researcher briefly described to the official what was required from this transect walk, which included the identification of food sources, activity areas, routines, working equipment/facilities and tasks that were carried out by the workers within this workplace. The transect walk within the workplace took about 15-20 minutes of the official's time. It was conducted during working hours to observe normal routines carried out within the workplace. It was carried out in the seventh week of the collection data process. It started around 10.30am in the morning and ended at 10.45am. Throughout the transect walk, the researcher asked questions about the workplace related to the study as a form of mobile interview (Maman et al., 2009).

### **3.7 Data Analysis**

Once the interview and transect process phase was completed, the researcher analysed the data using thematic analysis (Vaismoradi, Turunen, & Bondas, 2013). The main aim of this study was to explore perceptions of these participants and findings of transect walks in relation to workplace conditions that may have contributed toward the risks of type II diabetes. The use of thematic analysis is appropriate to group emerging themes according to their relations and to report these findings based on participants' responses and transect walk findings.

First of all, the audio recorded interviews and notes were transcribed. The researcher listened to the interview recordings several times and read the written notes to understand what participants were trying to express through their own words (Vaismoradi et al., 2013). The researcher spent about three to four hours to transcribe these audio recordings and written notes; referring back to the original recordings and documents if required. These data were colour coded according to themes (Deploy & Gitlin, 2011; Girbich, 1999).

### **3.8 Summary**

In this chapter the researcher described the two different research methodologies (quantitative and qualitative) that are used in research. The researcher justified her reasons in using qualitative methodology as appropriate for this study. Additionally, the researcher explained how she collected her data; carrying out semi-structured interviews and transect walks. The choice of tool used for data analysis was also described. The next chapter reports and discusses the findings of this study.



## Chapter 4. Study Findings

In this chapter, the findings of the study, both the semi-structured interviews (SSIs) and transect walks (TWs), will be reported. Firstly, the research sample's demographic information (gender, age, and employment status) are described, followed by the results of data collected in the interviews using participants' own words; and photos and maps as taken and drawn in the transect walk.

The abbreviations after the quotes stands for participants who are either male or female and numbered according to the sequence of the interview taking place, as clearly described in Appendix F. For example, P1F means that a participant is a female who was the first participant interviewed.

### 4.1 The Participants

Participants comprised four males and six females who worked full time, had been diagnosed with type II diabetes, and were between the ages of 18 to 50 years (retirement age in Kiribati). Participants were selected from workplaces located in Bairiki village who met the inclusion criteria and agreed to participate in this study.

The age of 10 ten participants ranged between 27 to 49 years. There were four participants under the age of 30 years, two were between the age of 31 to 39 years and the other four were over 40 years of age. These participants had worked for different number of years within their respective workplaces, and the time they had worked in these ranged from 10 to 35 years.

### 4.2 Knowledge of Diabetes

#### 4.2.1 Definition of diabetes

Seven of the participants defined diabetes according to how they felt about it in terms of the problems and experiences they had experienced. These participants said that they knew diabetes through having these problems before and after the confirmation of their diagnosis; excessive thirst and 'dry mouth', increased hunger, frequent urination – especially at night, tiredness, numbness or tingling sharp pain in the hands and feet and the development of multiple sores.

*Diabetes... what I know about diabetes... is like having these signs like frequent pee – peeing pattern has been changed, emptiness and feeling hungry, I just want to eat most of the time...(pause) thirst – mouth feels dry. (P2F)*

Or

*...its uh... thirsty is what I usually experience, I really hate it, it's so hard even to feel any water in my mouth... really dry mouth. I have to get up and get some water... it so dry and I really need water or any drink and have to pee frequently. Dizziness is also what I have gone through and my hands and feet are numb and have sharp pain both in my feet and hands... really hurt sometimes. And now I am having these sores... like boils!!! (P1F)*

The remaining three participants defined diabetes according to the causes and its impact on their body. They feared that diabetes had a negative effect on their personal and social lives. Additionally, they said diabetes can result in other medical problems:

*...damaging because with diabetes, I will develop other medical problems like multiple sores, weakness and having other disease like hypertension as I have mentioned.....people will also say I look older now than my age... those people who knew me before said I am older than my age and no longer attractive (laugh). (P9F)*

*It can be resulted in being handicapped.....can't see properly and even one foot have to be taken off, it affects one's life in so many ways, very sad but that what I think of diabetes... (P10F)*

Among these explanations of diabetes, only one participant talked about the insulin production which resulted in having high blood sugar in the body.

*Diabetes.....it is a disease like... the body will not be able to tolerate much sugar that you will take in...(pause) from the foods that you eat (long pause). And maybe my body... the insulin in my body is not strong enough to break down the sugar in the body. (P8F)*

However, there were no clear explanations on diabetes and what actually caused the blood sugar level to rise in the body. Only one participant talked about insulin production in relation to diabetes.

#### **4.2.2 Ideas about the prevention of diabetes and barriers to attaining these**

The following themes were identified:

##### **4.2.2.1 Balanced diet**

All participants mentioned the need for a balanced diet, explaining it is the inclusion of fresh local foods such as fruits and vegetables in the diet. However, they described problems in attaining this balanced diet to maintain their good health and to prevent diabetes.

*Foods like fruits, vegetables or root crops and green leaves that are healthy need to be included in the diet. Is it like a half of the plate with some fish and*

*rice, but it so hard to get these types of foods. I don't eat much of these foods..."*  
(P5F)

#### **4.2.2.2 Problems in attaining a balance diet**

**Accessibility and cost.** The unavailability and the cost of these local healthy foods were the main problems for these participants which prevented them from eating the required amounts of these foods every day. Eight participants talked about the cost and the need to have more money to buy these local healthy foods and their limitations in accessing these types of foods.

*Food that you eat makes you sick...not enough fresh local foods in Kiribati, most people can't grow their own foods and have to buy them... It is not reliable to rely on these fresh local foods as they are not always available... For my food I just eat what the family have prepared, and that is rice and fish or other meat no fruits or vegetables, can't afford to buy that every day for the family. (P10F)*

**Gardening.** Five participants talked about gardening as one way of increasing their accessibility to fresh local healthy foods but there were obstacles in developing and maintaining these gardens. P4M and P5F said that planting these fresh local foods need adequate space and a fertile soil. However, in the urban areas in which they lived it is difficult and very rare to find a suitable space to plant these crops.

*Only if you have space.... a fertile ground. Especially in Tarawa, you can hardly walk between houses, it's so crowded and there is no space for gardening. People would prefer to build a small house to sleep in than to plant their foods....(laugh). Where I live there is hardly any space- overcrowding is the main problem. There could be some space... enough space in other areas but not in my area! I can't even plant one tree. (P4M)*

Three of the participants also mentioned that gardening took a great deal of time. It was described as being something that required lots of hard work and required adequate knowledge and skills to grow nice big fruits and crops. They also said that they felt over-tired and gave up gardening very easily especially when the animals were eating and ruining their crops.

*This is a more urbanised area and there is hardly any space to grow foods... the time – pretty much occupied with our work and other community commitment within the church, we do not have time to do gardening. (P9F)*

*It could have been easy to get them if we plant these foods. We used to have a garden but not anymore... it is so frustrating when I got up in the morning and find out that what we have grown were all gone – eaten and ruined by pigs, dogs and chickens. They have eaten the crops! (P2F)*

One of these three participants said that gardening required sufficient water supply for the plants to grow well. Insufficient water supply in this area was another big issue which was stopping them from planting their own foods.

*We used to do gardening.... but not anymore it's so tiring work. Where I live the crops don't grow well... they die very easily, and another need is water.... we have to get a lots of water for the plant to grow well. The water is not that easy to get here in Tarawa... we hardly had enough drinking water... involves lots of work. (P6M)*

#### **4.2.2.3 Exercise**

Participants explained that exercise was not a common practice in Kiribati. Although seven of the participants were aware of the benefit of exercise to their health, none of the 10 participants were involved in an exercise program. Some had started 30 minutes walk programme but gave up after they became de-motivated; felt they had no time and felt exhausted after they had finished work.

*I have no routine exercise... I just want to eat and have a rest. I hardly do any physical work that involve a lot of movement....(pause) For me I always thought I had enough exercise moving around in the office for a while... going out for a short walk during my lunch break do the shopping but not every day, I did this occasionally... When I came back from work, I was too tired to do any exercise or housework, I just need to sit around, eat... yeah no exercise. I was too tired to think of doing any... and I just don't feel like doing anything. (P7M)*

The remaining three of these 10 participants were not sure of the benefits in doing exercise to improve their health. Therefore an exercise programme was not a priority activity for them in maintaining good health and preventing diabetes prior to their diagnosis.

*Is there anything else that is contributing toward the development of diabetes?*  
(researcher)

*I don't think so... I only know that the way I eat and what I eat greatly affect my blood sugar reading... There was no actual exercise programme that I am involved in. My only exercise are my duties at home like cutting toddy, feeding the pigs and walking. (P3M)*

*I can't think of any particular reason, yeah I don't usually think about exercise... I don't even know about exercise. I thought that my exercise like house-working and cleaning up at the workplace, walking are enough to keep me going. (P1F)*

#### 4.2.3 Lifestyles prior diagnosis

Participants talked about these lifestyles and beliefs before it was confirmed by a lab test that they had diabetes. They thought that these might have contributed to their risks in developing the disease.

**Over-eating for a healthy baby.** Among the participants two felt that overeating may have contributed towards them developing diabetes. They mentioned that they were diagnosed as having diabetes in their first pregnancy and this was subsequently confirmed as type II diabetes. During their pregnancy, they ate more to compensate their need as well as their baby; baby consuming a high energy-dense food with little fruits and vegetables.

*One thing that lead you to diabetes is over-eating. I just had to eat to the fullest especially when there is fresh fish – fried or grilled I just love eating it... and with rice only... I was confirmed having diabetes in pregnancy when I was pregnant with my first baby (gestational diabetes). But sadly after giving birth, I was confirmed as a diabetic case. (P2F)*

*It was during my pregnancy when I started to eat much... I just feel like eating all the time (laugh). That's how I eat during my pregnancy, I thought that by eating this much will make my baby healthy. A healthy baby... On my 7<sup>th</sup> month of pregnant, I was confirmed as having diabetes and hypertension in this pregnancy!!! (P1F)*

The women felt that by eating as much as they could, they would have a healthy baby and did not realise that they were putting themselves at high risk in developing diabetes.

**Aging.** Two other participants talked about aging as one of the causes of diabetes, and believed this to be a disease that only affected older people. One said that it was shocking to have type II diabetes while she was just in her late twenties. She could not believe that she had diabetes because she believed that she was too young for diabetes.

*I was too young to have diabetes, I was in my late 20s when this was happened. I believe that I would have diabetes in my late 30s... that when people get diabetes not at an early age! (P5F)*

**Genetic factors.** Three participants believed that there was a genetic component to the risk of developing diabetes.

*It's a disease that is not contagious, that can be passed on in the family... blood I mean that it can be passed in the family... (P6F)*

Their main concern was that their children were at a higher risk than others and would probably get it in their late years.

*I'm worried about my children, it seems that they are at a higher risk. (P5F)*

**Other beliefs.** One participant believed that diabetes was caused by black magic, particularly because of the painful symptoms they experienced.

*my family said it was a curse (black magic) from my work colleagues, we don't even know it was diabetes... because I was taking a course at that time for my promotion and everyone believed it was black magic to make me sick and would not complete the course (study). (P5F)*

One of these participants strongly believed in these magical powers and thought that black magic was causing all these problems.

**Choice of beverage.** Surprisingly, two participants mentioned that changing their lifestyle from drinking sweet tea and other sweet drinks to drinking water increased their risk in developing diabetes. They mentioned that this sudden change to their lives affected them physically.

*I do believe that I first had diabetes when I try to change my lifestyle – meaning my usual drink from too sweet to water. I used to drink sweet drinks, a two heaps of sugar in my cup of tea but I suddenly changed from this sweet to water. (P3M)*

*I usually drink milk or juice with lots of sugar, a very sweet drink... but then I changed... we had to drink water and juice with little sugar – taste more like plain water. With all these changes in my diet, I was thinking that it was contributing toward my diagnosis. Most people believed that changing your diet from drinking and eating too sweets to drinking water will increase the risk of getting diabetes. (P5M)*

#### 4.2.4. Diagnosis

Four participants mentioned that they were confirmed as having diabetes through a blood test only.

*I was one among those who were tested for diabetes, diabetes screening and I found out I had diabetes. But before that I had been tested (lab) for diabetes and was told that I had diabetes, but I always ignore that...but in 2008 I finally accepted the fact that I have diabetes. (P8F)*

*That was how I found out I had diabetes through this test... (P3M)*

However, the rest of participants mentioned that they knew they had diabetes when they were admitted to the hospital for other medical reasons. They did not know that these problems were related to diabetes.

*I was admitted to the hospital for having pain in my hand, I can't even write using my painful hand and it was my right hand (right handed)...can't even hold the pen, both my feet are weak and painful... my family said it was a curse (black magic) from my work colleagues, we don't even know if it is diabetes. (P5F)*

**Health seeking behaviour.** Among the participants three did not realise the importance of visiting clinics or hospital for general medical check-up. They were pre-occupied with their work and would not find time to do their medical check-up, especially to screen out their risks of diabetes at an early stage. They considered themselves as healthy until they were admitted to the hospital.

*I was sick and admitted to the hospital... having dizziness and body ache... and they even check my blood sugar and was seen high... very high and that is when I first found out that I had diabetes. (P6M)*

In addition, one participant said that seeking a proper diagnosis was not a priority for her as she was preoccupied with her work.

*The only time we visited them is when we are very sick, and demand for their services... sometimes it's too late. (P9F)*

#### **4.2.5 Treatment**

Five participants talked about their choices in selecting the right medication for their diabetes. There were two types of medications mentioned in this study. Local medicine, using leaves or herbs, was believed to be the best medicine for diabetes in Kiribati. Participants strongly believed that the diabetes medication provided from the hospital, such as tablets and injections, would create more problems.

*It's other people saying and stories... I just don't know which one is true because sometimes when you visit the clinic to seek further help... they just can't clarify on the query... that is using diabetes medication will make you more sick... and develop other medical problems. (P10F)*

Participants also mentioned that there was limited information provided for using these diabetes medications by health professionals. Most people chose local medication due to other people's experiences, saying that these local medications were more powerful and effective in treating diabetes.

*Even when I started the medication, I don't really understand why I used such medications... there's a great for these nurses and medical staff to provide adequate information on these medications and their use in our body... why we have to take in these medications? Because there has been little information on diabetes, people believes that using these medications will make you more sick, even I also believe this and had to discontinue my medications... We had*

*our own local medications that what they say that will help stop diabetes so I had to stop these medications and start on local medication. (P8F)*

The availability and the accessibility of these medications was another concern, as mentioned by one participant, which could alter the adherence of medication adequately.

*Oh... what I can think of at this time is coming to the clinic and get my medication that is after I was confirmed as a diabetic case but they would say that they run out of stock. (P1F)*

#### **4.2.6 Workplace conditions**

In this study, participants mentioned three main things that were contributing toward workers developing diabetes. These were resources within the workplace in terms of foods, exercise centres and initiatives. They also believed the tasks and activities they undertook in the workplace contributed to them developing diabetes.

##### ***4.2.6.1 Resources within and near workplaces***

**Foods.** All participants mentioned that within the workplace the main food consumed were only foods available within and near these workplaces. These were food stalls which provided the same type of foods referred as “normal food” in the homes. There was fish and rice with little or no cabbage, pumpkin or pawpaw seen on the plate. These participants found that the cost of buying a meal from these food stalls were expensive.

*Food stall provide the same meal with what we eat at home... rice, fish or chicken but I think it will be too expensive to eat at these stalls every day. (P10F)*

Additionally, the fast foods to which they had access consisted mostly of bread and noodles. These participants preferred to eat a fast and cheap meal.

*the food stall are too expensive to eat at... we just have to eat anything cheap. (P8F)*

*The food available at work were foods sold at the food stall and in the canteen. The canteen we have at the workplace only sold noodles – cheap and easy to cook. (P2F)*

**Exercise centres and initiatives.** Within the area, there were no fitness centres or exercise programs accessible for these workers.

*The only available exercise centre which was recently built was about 6-7 kilometres away from these workplaces. (P5F)*



Participants mentioned that it will be another cost to join the club.

Two of these participants mentioned about workplace health promotion activities during lunch time which offered tennis, volleyball and a walking programme. The participants believed that these programmes were not successful due to the lack of support from the management and the Ministry of Health.

*There are groups within some other workplaces that use lunchtime to play volleyball and compete between each team... but I don't think this was successful. There was no support, a management support and the support from the Ministry of Health. It was mainly the social committee initiative within the workplace, volleyball but it was just a committee outside the structure of the workplace... so it seems weak in its own decisions – the workers have to use their time outside working hours – lunchtime, they will be disciplined if they interfere with the working hours. (P4M)*

However, in these health promotion activities, there were only a few workers involved. Most of the workers were not interested to join.

*It's just the workers' initiatives, we used to run in the field but it's just once and then vanished... each worker have to do their own thing – playing bingo or chatting away (laugh). (P5F)*

#### **4.2.6.2 Routines within the workplace**

Most of the responsibilities in the workplace involved minimal physical exercise. Five of these participants said they had to sit most of the time. They also mentioned that most workers played bingo, chatted and rested throughout their lunch breaks.

*People working in the office have to sit most of the time with no exercise... during lunch breaks there are no health activities except playing bingo and just relaxing around... sitting down chatting...*

*I was working in the office, and I have to sit most of the time than moving around, holding meetings and paper work. (P8F)*

*Other workers who do most of the physical work, labour work are so lucky that they don't have to sit all the time not like me I have to sit in front of the computer all day – no physical exercise. (P4M)*

Three participants mentioned that the workload and the demand of work affected their meal schedule. They skipped their meals to finish their work. In other conditions, they missed breakfast to get to work on time.

*Yes... if I get up late, I don't have much time to have breakfast. I will just have to go to work without it but will go back home for lunch... That's the only thing affecting me... my meals. I miss meals when I have lots of work to do - a busy life. (P4M)*

#### 4.2.7 Healthcare services

No healthcare services had been provided in three workplaces. The fourth had been visited by the healthcare team once that year. Seven of these participants mentioned that there were no previous and present health promotion activities or other health visits to their workplaces.

*There were no health care services within my workplace. I have to visit the nearest clinic when I need medical assistance... It is so sad, there never been any health activities within the workplace. (P3M)*

*There was none in the workplace. The worker have to go to the clinic or to the nearest hospital if in need of these services. I think that if there was one we could have known these signs of diabetes and something could have been done to prevent further problems in relation to this disease. (P9F)*

One participant blamed the Ministry of Health for these health problems. They had ignored these full time workers by not providing accessible healthcare services, and felt this had resulted in sickness and deaths.

*I have never seen a team from the Ministry of Health visiting workplaces – there is no such service, I have been working in different areas and for a long time within the government Ministries and never come across the Health team visiting the workplace... it would have been a great help if the Ministry of Health pay a visit to these workplaces for the screening at least just to find out how healthy the workforce is especially in identifying diabetes and hypertension. The Ministry of Health leave it all to us... ignorant to the workforce. (P4M)*

This participant added

*There are so many that have passed away because of this ignorant... at least something to promote the health of the workforce and prevent early deaths? (P4M).*

However, the remaining three participants said that there was a visit by a healthcare team at the workplace for a BMI check, as well as screening of diabetes and hypertension. This was seen as being helpful in identifying new cases of diabetes and hypertension. Participants said that there was no information provided on these diseases in terms of prevention and treatment.

*Oh yes there was once or twice on body weight... they came and do weighing, height, but there was no continued care... All the workers were not involved... they just came that time and there seems to be no follow up... not continuous... and workers not even bother to participate... only those that they feel sick at that time when the health team arrived... but then after that nothing happened. There was no awareness or workshop before and after the screening. (P6M)*

#### **4.2.8 Recommendations made by participants**

Overall, these participants wished for a healthy workplace through the joint forces of these managers, workers and the Ministry of Health. They mentioned that if these healthcare services, within these workplaces, were provided, more workers will be involved in these health promotion activities. Seven participants mentioned that the support of the Ministry of Health and the leaders within these participated workplaces was required for a continuous health promotion activity like exercise.

*I am hoping for a health activity like exercise during lunch break... walking or netball any sport. I think the workplace is one good place to establish these health activities, a group of people can join and as I have seen it I hardly can find a time for exercise when I am at home. (P7M)*

There were three participants who proposed for a regular visit to these workplaces to trace high risks cases and follow up of these known cases. These will be helpful in maintaining a good health of these full time workers and avoid the development of diabetes.

*I just hope that there will be a continuous visit by the Ministry of Health in providing these services that were required by the workforce. The weight and height program to identify the health status of busy workers. I wish for a team that will carry out a screening programme. (P3M)*

Two of these participants recommended a healthy food strategy to be implemented locally so that workers would have more access to healthy foods.

*The food stall need to be improved... to provide healthy foods that contain fresh vegetables and fruits or green leaves. I was hoping that the Ministry of Health will assist these people who sell foods at the workplace to educate them and to see that they are starting to provide healthy foods. (P1F)*

Additionally, one participant recommended farming skill lessons to allow people to grow their own foods and increase the production of these fresh healthy foods.

*There is a need to encourage people to grow their own foods through group sessions on agricultural skills appropriate for this environment and maybe more easy for the people... if there is one (laugh). (P10F)*

#### **4.3 Findings of Transect Walks**

The first transect walk was done on the 28<sup>th</sup> of October 2014 by the researcher. This was helpful in collecting relevant information about the local environment and, in particular, factors which may have contributed toward the development of type II diabetes within this area, especially for workers. The focus was on foods available in

the area for workers, exercise activities and centres within the area close to these workplaces. During this transect walk, photos were taken with permission. The photos showed office buildings, resources available within the area like foods available, shops and what the land was mainly used for.

The second transect walk was done by the researcher and the in-charge officer of the selected workplace who agreed for this transect walk to proceed on the 19<sup>th</sup> November 2014. This was carried out within the workplace only to identify resources provided for workers to use in terms of food, space and their routine.

#### **4.3.1 Transect walk 1**

The photos, on the following pages, shows office buildings, resources available within the area like foods available, shops and the use of land within the focus area of the study.

**Figure 1: Photos 1 and 2 - Double storey building; office upstairs and shops downstairs**



At this double storey building, shops were located downstairs and buildings upstairs were used for offices. Shops were available for full time workers to buy their foods, especially processed and packaged foods.

**Figure 2: Photos 3 and 4 - Foods sold within the area**



Foods were put in containers ready to be sold. There was a half full container of rice with some fish or chicken.



A plate with half full of rice, some chicken, raw fish and little cabbage.

**Figure 3: Photo 5 - Local Market selling limited stock of local food crops**



The market sold limited fresh local foods. At the end toward this side (bottom of photo), there is a container half full of rice with some fish. Rice seems to be the only available and affordable energy type of food in this area.

**Figure 4: Photo 6 - Main road and some of the office buildings**



Some of the office buildings in the area which are closely built to each other. The main road was mainly used by cars and for walking.



**Figure 5: Photos 7 and 8 - Within the area close to the shops and office buildings on this side**

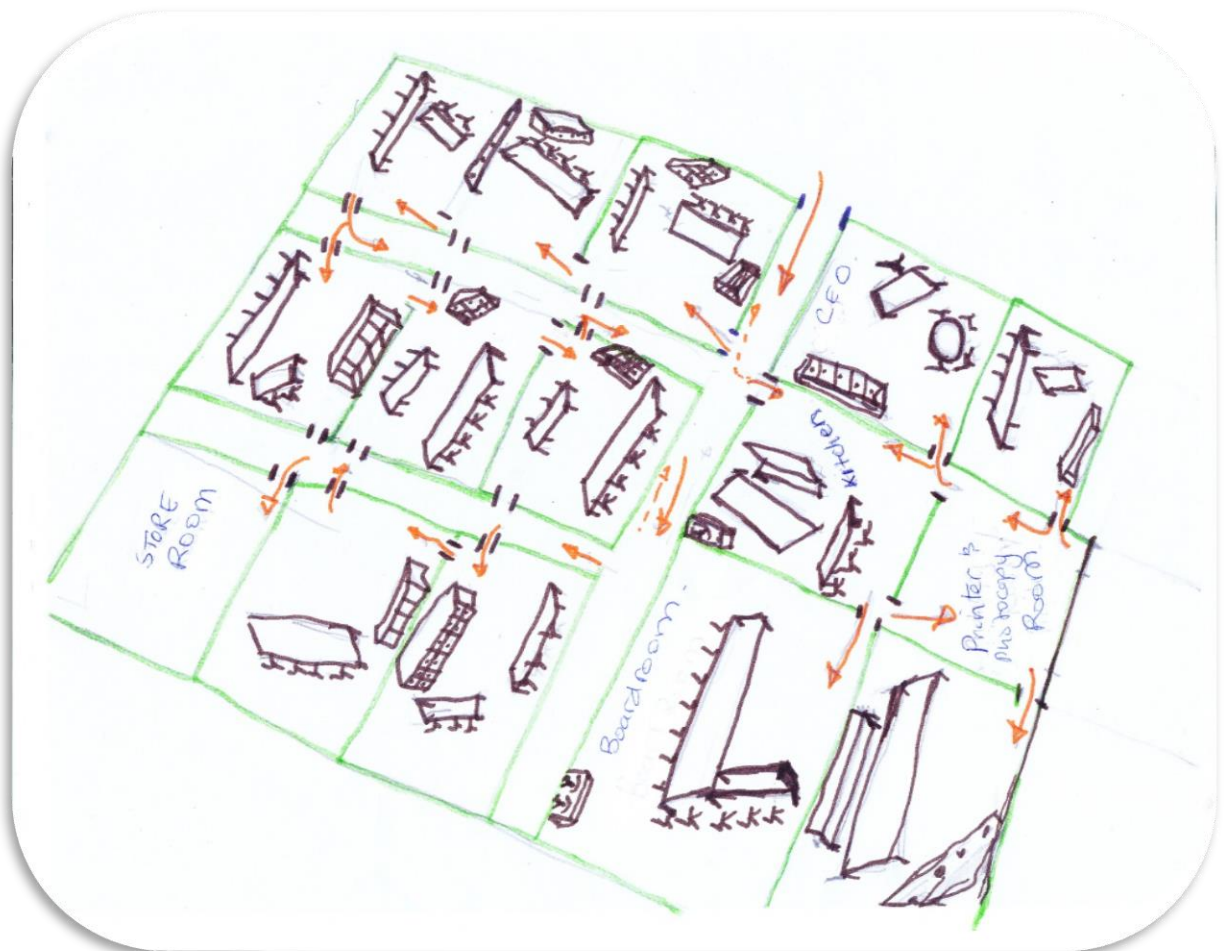


Motor vehicles are a common transport used. Bicycles were hardly used in this area.



#### 4.3.2. Transect walk 2

Figure 6: Diagram of a transect walk within the workplace



During the transect walk, the researcher developed a transect map of the workplace building. There was a small kitchen for staff but there was no fridge, microwave or cupboards to put their food in. There was only one electric kettle and workers had to bring their own tea, coffee or milk for their hot drinks or had to buy their hot drinks. The water tap provided unsafe water for drinking; therefore workers need to boil the water before they could drink it. If the electric kettle was broken, there would be no safe water for drinking within this workplace. All workers using this kitchen had to bring their own eating utensils to use. The toilet block was located about 10 metres away from the main office building. In one room, five or six people shared a small room with a table, a few computers, a cabinet or drawers and a chair to sit on. There was limited space within the room. Each room was overcrowded and hot; although a few fans were provided

**Figure 7: Photo 9 - Fast and cheap lunch for busy workers**



## **Chapter 5. Analysis of the Findings**

The study aim was to explore full time workers' perceptions, in Bairiki, on workplace conditions that may have put them at high risk of contracting type II diabetes. In this chapter, the researcher presents the main findings from the participants' perceptions and transect walks in relation to the risks of type II diabetes. This information includes problems in relation to preventions, causes, symptoms, diagnosis, and treatment of the disease. The findings of this study are compared to other relevant studies as reviewed in the literature review chapter.

### **5.1 Analysis of the Transect Walks**

The findings of the transect walks identified many factors that contributed to the development of type II diabetes. These factors included the types of foods available, infrastructure of roads and office buildings, accessibility and availability of shops selling processed foods, limitation of local supermarkets and fitness centers; and activities for these full time workers within the area. Most of these factors were beyond the control of individual workers, and some may take public health interventions at a national level, whilst others require regulation to resolve them.

These transect walks identified problems in relation to the availability of healthy local foods. There was only one supermarket and fresh fruits and vegetables were hardly seen in this area. There were many shops accessible for these full time workers to buy cheap processed food. Food stalls were also available but provided very little fresh fruits or vegetables on the plate. They sold mainly fish or chicken and rice with little cabbage. These workers relied mostly on noodles and bread because they were cheap and fast to prepare.

The infrastructure of roads showed no walking paths to facilitate walking around the area. The main road was the only access road to walk on the side and motor vehicles passed by on the same road which was not safe.

The rooms within the workplace have limited spaces and are basically designed for two or three people to work; however at the time of the transect walk, five or six people were working in a small room. There were no cooking utensils nor a fridge. These would have helped workers to bring fresh food for lunch. In addition to these problems, there were no fitness centers or activities for workers to promote physical activity. Due to these issues, these full time workers were at high risk of developing type II diabetes.

## **5.2 Knowledge of Diabetes**

There were different levels of understanding on different areas of type II diabetes among these participants. These comprised as their understanding about the disease, prevention measures, the causes, signs and treatment of type II diabetes. Most participants had a good basic understanding of the disease. However, 20-30 per cent of these participants had poor knowledge of type II diabetes; although this might not be true in recognising the symptoms of type II diabetes.

For example, almost 80 per cent of these participants recognised the symptoms of type II diabetes and talked more about these symptoms in defining diabetes. These were mainly based on their personal experience of being diagnosed and experiencing the disease. Only 10 per cent partly defined diabetes in relation to biological changes within the body which contributed toward the development of type II diabetes.

The findings of this study also showed that some participants understood the benefits of exercising in preventing and controlling type II diabetes, but there were others who were not aware of these benefits. Some of these participants (7/10) who knew about the benefit of exercise and a 30 minutes exercise gradually withdrew from these exercise programmes due to a lack of support and self-will to continue. Others who had not started any exercise programmes did not understand the benefit of exercise. These findings were in line with the study by Islam et al. (2014) on knowledge, attitudes and practice (KAP) in rural Bangladesh. The study collected data through an interview using categorical responses on KAP of diabetes including demographic factors regarding level of education and socio-economic status. This study found that the level of understanding on diabetes was very low in this area. The findings of this current study also showed that knowledge on diabetes was low; even among those who had been diagnosed with type II diabetes. These differences in knowledge were related to their level of education and socio-economic status.

Similar findings were also found in a study by Al-Maskari et al. (2013) which was carried out in the hospital settings in Eastern District of Abu Dhabi Emirate. The study reported that the score in knowledge were different depending on their socio demographic status. These findings showed that basic knowledge and understanding on diabetes were higher among men and those with higher education level which is very similar to the findings in Islam et al.'s (2014) study. Other previous studies have

also reported that low knowledge on diabetes was common among those who had been diagnosed with diabetes (Al-Adsani, Moussa, Al-Jasem, Abdella, & Al-Hamad, 2009; He & Wharrad, 2007). These studies were conducted in different settings using different instruments and with different ethnic and age groups; however, they reported the same findings in identifying poor knowledge of diabetes among each studied population.

The research reported in this thesis found that there were five main causes of type II diabetes based on these participants' perceptions, beliefs and knowledge in relation to the causes of type II diabetes. These include over-eating in pregnancy as they thought this would make their baby healthy, without realising this could cause gestational diabetes (diabetes in pregnancy); having not enough exercise; and high consumption of energy-dense foods such as fish and rice, which was also referred to as 'normal diet' by some participants. These participants also believed that family hereditary led to type II diabetes. With aging, one participant believed that growing old was a risk factor of type II diabetes.

The study findings which identify gestational diabetes as one risk factor of type II diabetes was also found in a study at Rigshospitalet, Denmark from 1978-1985 (Clausen et al., 2008). The study sample of 597 adults who were born to mothers with gestational diabetes or type I diabetes; aimed to identify the impact of exposure to hyperglycaemic environment of these offspring adults before they were born and how it affected their risk in contracting type II diabetes. The study found a high prevalence of type II diabetes and pre-diabetes among those offspring adults who were born not only to mothers with gestational diabetes but also among those who were born to mothers with type I diabetes. The result of the study identified that adult offspring who were born to mothers with gestational diabetes risked developing type II diabetes in their later life. The risks of mothers who had developed gestational diabetes were also high as shown in the result of a study by Schaefer-Graf, Buchanan, Xiang, Peters, and Kjos (2002). This study also identified that those women with a history of gestational diabetes had a higher risk if they increased their weight, had low physical activity and consumed high energy-dense foods.

Among those who believed that sufficient physical activity contributed to good health and reduced the risk in developing type II diabetes, similar findings were also found

in previous studies (Freak-Poli, Wolfe, Brand, de Courten, & Peeters, 2013; Ramachandran, Snehalatha, Mary, Mukesh, Bhaskar, & Vijay, 2005). These two studies found that an increase in participation and engagement in physical activity lowers the risks of developing type II diabetes as well as improving other risks factors (Freak-Poli et al., 2013; Ramachandran et al., 2005).

The current study findings also showed that older people were more vulnerable in contracting type II diabetes. Similar to this finding, the report by Cheng (2010) showed that the prevalence of diabetes was high among men aged 45 years and older. However Bray (2004) has recommended that 65 per cent of diabetic cases were related with increased weight. Previous studies also agreed that increase in weight was greatly associated with type II diabetes among all genders and in different ethnic groups (Hu & Malik, 2009; Kiawi et al., 2006; Seidell, 2000).

The research presented in this thesis also found out two of participants believed that changing the type of drink from sweet drink to water contributed to the risk of type II diabetes. They strongly expressed that this was the main cause of their diagnosis. Contrary to this finding, the study by Hu and Malik (2009) on sugar sweetened beverages, like fruit drinks or cordials, found that these drinks promote weight gain and initiate the development of insulin resistance. Therefore these sugar sweetened drinks contributed to the development of type II diabetes as identified in this study (Hu & Malik, 2009).

This study also found that one participant believed that black magic causes diabetes. In contrast, in a study on religious and cultural beliefs among ethnic minority women with diabetes in Sweden, findings revealed that Arabs did not realise that the symptoms they were having (tiredness, thirst, polyuria, polydipsia, etc.) were related to the presence of diabetes; they also believed that the disease was partly God's plan (Hjelm et al., 2003). Hjelm et al. (2003) also showed that other different ethnic groups like the Ex-Yugoslavian Muslims were unwilling to change believing that they had to enjoy in this life; and the Swedes willingly participated in promoting their health and controlling their diabetes.

### **5.3 Accessibility and Availability of Food Sources.**

The findings of this study showed that most participants talked about healthy foods, as referred to “balance diet”; however there was limited access to these healthy foods which contributed to their risks in contracting type II diabetes. The findings of the study by Hughes and Lawrence (2005) were similar to these findings. The result of Hughes and Lawrence’s study showed that there were more imported foods available for these island people as an impact of colonisation, trade and investment for the countries that had colonised them. These countries dominate the food system within Pacific Islands by producing processed foods including fatty meat (Hughes & Lawrence, 2005). This increases the population’s dependency on these unhealthy foods increasing the risk of type II diabetes. However, according to a study that was carried out in New Zealand (a developed country), healthy foods were more available within urbanised areas than in rural areas. These healthy foods were found to be more expensive than any other food sources within an urban area (Wang et al., 2009).

### **5.4 Symptoms and Diagnosis**

Almost all of these participants realised the signs of type II diabetes. Most of these participants mentioned that they had two or three signs of diabetes and knew it was type II diabetes. These signs included thirst and dry mouth, emptiness, weakness and having sharp pain at both hands and feet. Other participants experienced frequent urination, especially at night time, tiredness and developing multiple sores.

A few of these participants confirmed their diagnosis with type II diabetes through a blood test only. Other participants found out that they had type II diabetes when they were admitted to the hospital for other medical problems without realising that these were related to type II diabetes. The study also identified the problem of attending the clinic for a routine medical check-up because participants were busy with their career work.

A cross-sectional study by Al-Maskari et al. (2013) was conducted to investigate KAP among diabetic cases in Al-Ain District. The study showed similar findings, identifying that most participants were fully aware of the symptoms because they actually experienced them or had seen them in other patients.

## **5.5 Treatments**

In this study there were two types of medications identified; local medication using leaves or herbs and prescribed medications including oral medications and injections. The study found that local medication was commonly used by participants due to other people's experiences saying that leaves and herbs were the best medications in treating type II diabetes. The study also identified other reasons for relying on these herbs and leaves medications. This was because, in some areas, there was limited access to prescribed oral medications for continuous treatment. The study also found that there was limited information on the benefit of using prescribed medications in controlling type II diabetes.

Different findings were found in the study of Paddison (2010) which showed that anxiety and uncertainty on prescribed medications greatly reduce participants' adherence to these prescribed medications. The study also showed that anxiety was common among those who were overweight, worried about the effect of prescribed diabetes treatment and diagnosed with type II diabetes leading to poor adherence to these medications and poor metabolic control (Paddison, 2010).

## **5.6 Workplace conditions**

The findings of this study identify conditions of the workplace that have contributed and encouraged the high risks behaviours in contracting type II diabetes. These participants reported that there were food stalls which provided a good meal for full time workers but were expensive to buy every day. However, there were little amount or no fruits and vegetables included in the dish; it was mainly fish or chicken and rice. The study also found that packaged foods like noodles was cheaper and easy to cook for these busy full time workers; and always available and accessible in the nearby shops and workplace canteens.

In addition, exercise was not a common practice within these workplaces. There were no initiatives for exercise programmes; and health programmes that were in place were discontinued at some stage due to the absence of moral support from the management and the Ministry of Health. Within these participating workplaces, most of the participants had to sit at their desk to do their work; there were limited physical movements involved. The study also found that the workers spent their lunch break playing bingo and talking. There were no, or limited, physical activities during the



lunch time break. These participants said that they were sitting most of the time while doing their work and during their breaks. These routines and activities within participating workplaces limited physical movements which presented a high risk in developing type II diabetes.

Hughes and Lawrence's (2005) study showed that Pacific people were highly dependent on unhealthy processed foods due to their increased availability in the shops. Other studies also found that workplace conditions, especially sedentary jobs, contribute to the risks of type II diabetes. The study by Thorp et al. (2012) confirmed that more of the working hours was spent on sitting down. The studies by McCrady and Levine (2011) and Tigbe et al. (2011) agreed to these findings saying that workers spend more time on sedentary behaviours than in any other times when they are not working.

### **5.7 Healthcare Services**

The findings in this study showed that there were no sustained health programmes within participating workplaces. There were visits from the Ministry of Health team which was done once in a year in some workplaces without any follow up. The study also identified the problem that these participants were busy with their work and hardly had time to visit the clinics. It was also found that there were initiatives for promoting good health within these workplaces but they were not successful due to the lack of support from the management and the Ministry of Health.

The findings also mentioned that this was the Ministry of Health's failure to develop healthcare services within workplaces; which resulted in many premature deaths among full time workers.

### **5.8 Recommendations**

This study identified proposals for promoting good health within workplaces. The first recommendation is a need for workplace managers and the Ministry of Health to develop health strategies applicable for these workplaces. The study also identified the need to develop a healthy food strategy by encouraging people who sell foods for these busy workers to provide only those which contain fruits and vegetables. In addition, there is a need for the Ministry of Health to develop a plan to visit these workplaces regularly to follow known type II diabetes cases, identify risks of acquiring type II

diabetes and maintain a healthy workforce. Furthermore, the study identified the need to increase farming skills to increase the availability of healthy local foods.

These recommendations are in line with previous study findings showing that workplace health programmes are effective in reducing high risks behaviours among workers as well as influencing their families' health (Goetzel & Ozminkowski, 2008; Quintiliani et al., 2008). Borg et al. (2010) confirmed a significant increase in physical activity through this workplace intervention. Other studies also confirmed improvements in health behaviours among those workers that are involved in workplace interventions (Rush et al., 2009; Siefken et al., nd).

## **5.9 Strategies**

This is a very important public health topic, and likely to become so in the future. This small qualitative study has identified the complexity of the issue and shown how workers themselves are aware of how diabetes could be prevented. Political will, as well as public interventions, are necessary. Some could be implemented in Kiribati, whilst others, such as climate change and the impact of global corporate companies on food availability in Kiribati require the input of international agencies.

However, there is a need to identify an accurate approach appropriate within the context of these workplaces to address these problems. A multi-sectoral approach is appropriate to address the different dimensions of type II diabetes issues. In addition, there is a need to address problems, as mentioned in this study, which are beyond the health sector and therefore need to involve different areas to improve these. For example, there is a need to increase the production of healthy local foods which requires provision of free seedlings, nutrition advisors and the development of physical activities within workplaces.

A partnership meeting would be one initial step to identify the needs of these workplaces through a jointly developed committee involving all workers within workplaces and different skill areas in the planning and decision-making phase. This group could include all workers and management staff. Therefore, for the success and buy-in, these managers will be asked for their donation to partially fund the project; however the Ministry of Health will be the main funding body. Funding will include expertise, salaries, stationery, seedlings, and garden tools. Delegation of power and

establishing this joint committee will enhance these workers' participation and ownership of the project (Arnstein, 2007).

However, there are issues that need collaboration with other international organisations to reduce the impact of climate change on local food production. Food crops are greatly affected due to damaging storms and the increasing sea level washing ashore and uprooting food crops. The increase of water salinity also ruins food crops. These are contributing to the problem in reducing the capacity of producing local healthy foods and, in turn, people will depend on unhealthy processed foods.

Additionally, global corporate companies need to be informed on this problem to produce healthier food sources for people living in low income countries like Kiribati. There is a need to come together with these global corporate companies to develop and enforce strategies on the production of healthier processed foods. It is hoped that through these agreements people living in these low income countries will have more access to healthy foods.

#### **5.10 Limitations of the study**

Based on the sample size and participant selection, the study is not generalisable and representative of a larger population. Participants were selected based on the inclusion criteria which were set by the researcher. The study only included 10 participants in this study (small size) due to time and budget constraints, and only included those who are working in Bairiki. Face to face interviews with the tape-recorder in some interviews may have affected these participants in answering the questions. However, most of these participants requested interviews with no recordings and the researcher may have missed out important information during these interviews mainly when participants talked fast. Some participants chose to answer questions briefly and showed less interest throughout the interview and these all have an impact on the findings of this study. Additionally, it was planned that a transect walk will be carried out in each participating workplaces. Unfortunately there was only one participating workplace that agreed for this transect walk. The findings of this transect walk might not be true to other workplaces.

### **5.11 Conclusions**

This study aimed to find out workplace conditions in Kiribati that may have contributed toward the development of type II diabetes through full time workers' perceptions that have been diagnosed with type II diabetes. The findings of this study have identified problems that were continuously putting these full time workers at higher risk of developing type II diabetes. It is hoped that the results of this study will provide adequate information on workplace health issues in relation to type II diabetes and might help in developing and implementing workplace health initiatives and activities. Additionally some ideas on future strategies in addressing these problems and in developing workplace health promotion activities are included in this study's strategies.

## References

- Alberti, K. G. M. M., Zimmet, P., & Shaw, J. (2007). International diabetes federation: a consensus on type II diabetes prevention. *Diabetic Medicine*, 24(5), 451-463. doi:10.1111/j.1464-5491.2007.02157.x
- Aldana, S. G., Merrill, R. M., Price, K., Hardy, A., & Hager, R. (2005). Financial impact of a comprehensive multisite workplace health promotion program. *Preventative Medicine*, 40, 131-137.
- Al-Adsani, A. M., Moussa, M. A., Al-Jasem, L. I., Abdella, N. A., & Al-Hamad, N. M. (2009). The level and determinants of diabetes knowledge in Kuwait adults with type II diabetes. *Diabetes Metab*, 35(2), 121-128. doi: 10.1016/j.diabet.2008.09.005
- Al-Maskari, F., El-Sadang, M., Al-Kaabi, J. M., Afandi, B., Nangelkerke, & N., Yeatts, K. B. (2013). Knowledge, attitude and practices of diabetic patients in the United Arab Emirates. *PLoS One* 8. doi: 10.1371/journal.phone.0052857.
- American Diabetes Association. (2010). Diagnosis and classification of diabetes mellitus. *Diabetic Care*, 33(1), 562-569.
- Arnstein, S. R. (2007). A ladder of citizen participation. *Journal of the American Institute of Planners*, 35(4), 216-224. doi: 10.1080/01944366908977225
- Arena, R., Guazzi, M., Briggs, P. D., Cahalin, L. P., Myers, J., Kaminsky, L. A., Lavie, C. J. (2013). Promoting health and wellness in the workplace: a unique opportunity to establish primary and extended secondary cardiovascular risk reduction programs. *Mayo ClinProc*, 88, 605-617.
- Ashton, T. S. (1948). *The Industrial Revolution (1760–1830)*. Oxford University Press.
- Baum F (2008). *The new public health*. New York, Oxford University Press.
- Beaglehole, R., & Bonita, R. (2009). *Global public health*. Oxford, UK: Oxford University Press.
- Beale, R. (2010). *Diabetes in Kiribati: Her own words. Pacific islands medical aid*. Retrieved 08/06/2013 from <http://www.pacificislandsaid.org>.
- Binns, W. (2006). Healthy workplaces. *Canadian HR Reporter*, 19, 22-23.

- Blanchette, L., & Brug, J. (2005). Determinants of fruit and vegetable consumption among 6–12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition & Dietetics*, 18(6), 431-43.
- Borg, J., Merom, D., & Rissel, C. (2010). Staff walking program: a quasi-experimental trial of maintenance newsletter to maintain walking following a pedometer program. *Health Promotion Journal of Australia*, 21, 26-32.
- Bray, G. A. (2004). Medical consequences of obesity. *Journal of Clinical Endocrinology and Metabolism*, 89, 2583-2589.  
doi:<http://dx.doi.org/10.1210/jc.2004-0535>.
- Bull, F. C., Gauvin, L., Bauman, A., Shilton, T., Kohl, H. W., & Salmon, A. (2010). The Toronto charter for physical activity: A global call for action. *Journal of Physical Activity and Health*, 7(4), 421-422.
- Burns, N., & Grove, S. K. (2007). *Understanding nursing research: Building an evidence-based practice* (4th ed.). Philadelphia, PA: Elsevier Saunders.
- Cheng, M. H. (2010). Asia-Pacific faces diabetes challenge. *Lancet*, 376(9733), 2207-2210.
- Chopra, M., Galbraith, S., & Darnton-Hill, I. (2002). A global response to a global problem: the epidemic of overnutrition. *Bulletin of the World Health Organization*, 80(12), 952–958.
- Clark, B., Thorp, A., Winkler, E., Gardiner, P., Healy, G., Owen, N., & Dunstan, D. (2011). Validity of self-report measures of workplace sitting time and breaks in sitting time. *Medicine and Science in Sports and Exercise*, 43(10), 1907-1912. doi: 10.1249/MSS.0b013e31821820a2.
- Clark, G. (2007). *A Farewell to Alms: A Brief Economic History of the World*. Princeton University Press. ISBN 0-691-12135-4.
- Clausen, T. D., Mathiesen, E. R., Hansen, T., Pedersen, O. P., Jensen, D. M., Lauenborg, J., & Damm, P. (2008). High prevalence of Type 2 diabetes and Pre-diabetes adult offspring of women with gestational diabetes mellitus. *Diabetes Care*, 31(2), 340-346.
- Clifford, N., French, S., & Valentine, G. (2010). *Key methods in geography* (2<sup>nd</sup> ed.). London, England: Sage Publications.
- Dagogo-Jack, S. (2006). Primary prevention of type II diabetes in developing countries. *Journal of the National Medical Association*, 98(3), 415-419.

- Department of Health. (2010). *Getting children aged 5 to 12 years to eat more fruits and vegetables. Victorian government initiative*. Retrieved on October 1st 2013 from [http://docs.health.vic.gov.au/docs/doc/2F81C3DDFE06DFBECA257B1E001AABCD/\\$FILE/incr\\_easing\\_ffrui\\_vege5-12years.pdf](http://docs.health.vic.gov.au/docs/doc/2F81C3DDFE06DFBECA257B1E001AABCD/$FILE/incr_easing_ffrui_vege5-12years.pdf)
- DePoy, E., & Gitlin, L. N. (2011). *Introduction to research. Understanding and applying multiple strategies* (4<sup>th</sup> ed.). Missouri, MA: Elsevier Mosby.
- Despres, J. P. (2006). Intra-abdominal obesity: an untreated risk factor for type 2 diabetes and cardiovascular disease. *Journal of Endocrinological Investigation*, 29(3 Suppl.), 77-82.
- Dunn, C. E. (2007). Participatory GIS—A people's GIS? *Progress in Human Geography*, 31(5), 616-37.
- Evans, M., Sinclair, R., Fusimalohi, C., Laivaa, V., & Freeman, M. (2003). Consumption of traditional versus imported foods in Tonga: Implications for programs designed to reduce diet-related non-communicable diseases in developing countries. *Ecological Food Nutrition*, 42(2), 153-176.
- Farlex. (2014). *The free dictionary*. Access at <http://www.thefreedictionary.com/employee>
- Flores, J. C., Hirschhorn, J., & Altshuler, D. (2003). The inherited basis of diabetes mellitus: implications for the genetic analysis of complex traits. *Annual Review of Genomics and Human Genetics*, 4, 257-291.
- Fossey, E., Harvey, C., McDermott, F., & Davidson, L. (2002). Understanding and evaluating qualitative research. *Australian and New Zealand Journal of Psychiatry*, 36, 717-732.
- Freak-Poli, R., Wolfe, R., Brand, M., de Courten, M., & Peeters, A. (2013). Eight-month post program completion: change in risk factors for chronic disease amongst participants in a 4-month pedometer-based workplace health program. *Obesity*, 21(9), E360-E368.
- Ganglio, B., Shoup, J. A., & Glasgow, E. R. (2013). The RE-AIM Framework: a systematic review of use over time. *American Journal of Public Health*, 103(6), e38-e46.

- Glantz, N., & B. McMahan. 2007. Formative research and participatory GIS mapping: elder well-being in Chiapas, Mexico. *Practicing Anthropology*, 29(4), 6-13.
- Gloyn, A. L. (2003). The search for type 2 diabetes genes. *Ageing Research Reviews*, 2(2), 111-127.
- Goetzel, R., & Ozminkowski, R. J. (2008). The health and cost benefits of worksite health promotion programs. *Annual Review of Public Health*, 29, 303-23.
- Goldgruber, J., & Ahrens, D. (2010). Effectiveness of workplace health promotion and primary prevention interventions: a review. *Journal of Public Health*, 18, 75-88.
- Government of Kiribati. (2012). *Kiribati Development Plan 2012-2015*. Retrieved August 15th 2013 from <http://www.aisaid.gov.au/countries/pacific/kiribati/Documents/kiribati-development-plan-2012-2015.pdf>
- Grant, B. M., & Giddings, L. S. (2002). Making sense of methodologies: A paradigm framework for the novice reader. *Contemporary Nurse*, 13, 10-28.
- Grbich, C. (1999). *Qualitative research in health*. London, England: Sage Publications.
- Hamilton, M.T., Hamilton, D. G., & Zedric, T. W. (2007). Role of low energy expenditure and sitting in obesity, metabolic syndrome, type 2 diabetes and cardiovascular disease. *Diabetes*, 56, 2655-2667.
- Hansen, L. (2003). Candidate genes and late-onset type 2 diabetes mellitus. Susceptibility genes or common polymorphisms. *Danish Medical Bulletin*, 50(4), 320-346.
- Hartemink, N, Boshuizen, H. C., Nagelkerke, N. J. D., Jacobs, M. A. M., & van Houwelingen, H. C. (2006). Combining risk estimates from observational studies with different exposure cutpoints: a meta-analysis on body mass index and diabetes type 2. *American Journal of Epidemiology*, 163(11),1042-1052.
- Haskell, W. L., Blair, S. N., & Hill, J. O. (2009). Physical activity: health outcomes and importance for public health priority. *Preventive Medicine*, 49, 280-282.
- Hawkes, C. (2005). The role of foreign direct investment in the nutrition transition. *Public Health Nutrition*, 8(4), 357-365.



- Haynes, R. B., McDonald, H. P., & Garg, A. X. (2002). Helping patients follow prescribed treatment: clinical applications. *Journal of the American Medical Association*, 288(22), 2880-2883.
- Healy, G., Lawler, S., Thorp, A., Neuhaus, M., Robson, E., Owen, N., & Dunstan, D. (2012). *Reducing prolonged sitting in the workplace. An evidence review: Full report*. Retrieved on the 11th July 2014 from [http://www.vichealth.vic.gov.au/~media/ResourceCentre/PublicationsandResources/Economic%20participation/2012%20workplace/CHW\\_Sitting\\_Full\\_Web\\_Final.ashx](http://www.vichealth.vic.gov.au/~media/ResourceCentre/PublicationsandResources/Economic%20participation/2012%20workplace/CHW_Sitting_Full_Web_Final.ashx)
- He, X., & Wharrad, H. J. (2007). Diabetes knowledge and glycemic control among Chinese people with type II diabetes. *Internaitonal Nursing Review*, 54(3), 280-287. doi: 10.1111/j.1466-7657 .2007 .00570.x
- Hilawe, E. H., Yatsuya, H., Kawaguchi, L., and Aoyama, A. (2013). Differences by sex in the prevalence of diabetes mellitus, impaired fasting glycaemia and impaired glucose tolerance in sub-Saharan Africa: a systematic review and meta-analysis. *Bulletin of the World Health Organisation*, 91, 671-682D. doi: 10.2471/BLT.12.113415
- Hjelm, K., & Atwine, F. (2011). Health-care seeking behaviour among persons with diabetes in Uganda: an interview study. *BMC International Health & Human Rights*, 11, 11.
- Hjelm, K., Bard, K., Nyberg, P., & Apelqvist, J. (2005). Swedish and Middle-Eastern-born women's beliefs about gestational diabetes. *Midwifery*, 21, 44-60.
- Hjelm, K., Bard, K., Nyberg, P., & Apelqvist, J. (2003). Religious and cultural distance in beliefs about health and illness in women with diabetes mellitus of different origin living in Sweden. *International Journal of Nursing Studies*, 40, 627-643.
- Hjelm, K., Berntorp, K., & Apelqvist, J. (2011). Beliefs about health and illness in Swedish and African-born women with gestational diabetes living in Sweden. *Journal of Clinical Nursing*, 21, 1374-1386.
- Hjelm, K., Berntorp, K., Frid, A., Aberg, A., & Apelqvist, J. (2008). Beliefs about health and illness in women managed for gestational diabetes in two organisations. *Midwifery*, 24(2), 168-182.

- Horne, R., & Weinman, J. (2002). Self-regulation and self-management in asthma: exploring the role of illness perceptions and treatment beliefs in explaining non-adherence to preventive medication. *Psychology and Health*, 17(1), 17-32.
- Hu, F. B., & Malik, V. S. (2010). Sugar-sweetened beverages and risk of obesity and type 2 diabetes: epidemiologic evidence. *Physiology & Behaviour*, 100, 47-54.
- Hu, F. B. (2011). The role of diet, lifestyle, and genes. *Diabetes Care*, 34(6), 1249-1257.
- Hughes, R., & Lawrence, M. (2005). Globalisation, food and health in Pacific Islands countries. *Asia Pacific Journal Nutrition*, 14(4), 298-306.
- IDF Diabetes Atlas. (2013). *International Diabetes Federation* (6th ed.). [Accessed on January 6, 2015] from <http://www.idf.org/diabetesatlas>
- Index Mundi. (2013). *Kiribati demographics profile*. Retrieved from [http://www.indexmundi.com/kiribati/demographics\\_profile.html](http://www.indexmundi.com/kiribati/demographics_profile.html)
- Islam, F. M. A., Chakrabarti, R., Dirani, M., Islam, T., Ormsby, G., Wahab, M., Critchely, C., & Finger, R. P. (2014). *Knowledge, attitude, and practice of diabetes in rural Bangladesh: the Bangladesh Population based Diabetes and Eye Study (BPDES)*. Retrieved from [http://research.avondale.edu.au/edu\\_papers/69](http://research.avondale.edu.au/edu_papers/69).
- Jeon, C. Y., Lokken, R. P., Hu, F. B., & van Dam, R. M. (2007). Physical activity of moderate intensity and risk of type 2 diabetes: a systematic review. *Diabetes Care*, 30(3), 744-752.
- Kiawi, E., Edwards, R., Shu, J., Unwin, N., Kamadjeu, R., & Mbanya, J. C. (2006). Knowledge, attitudes and behavior relating to diabetes and its main risk factors among urban residents in Cameroon: a qualitative survey. *Ethnicity and Disease*, 16, 503-509.
- Kiribati Climate Change. (2013). *Office of the President, Republic of Kiribati*. Retrieved on 12 November 2014 from [http://www.climate.gov.ki/tag/changing climate](http://www.climate.gov.ki/tag/changing%20climate)
- Kiribati NCD Risk Factors. (2009). *STEPS report 2004-2006. WHO Western Pacific region*. Retrieved on 11 September 2014 from [http://apps.who.int/fctc/implementation/database/sites/implementation/files/documents/reports/kiribati\\_annex1\\_steps\\_report\\_2004\\_6.pdf?ua=1](http://apps.who.int/fctc/implementation/database/sites/implementation/files/documents/reports/kiribati_annex1_steps_report_2004_6.pdf?ua=1)

- Kiribati Ministry of Health. (2011). *Annual report*. Retrieved from [http://www.phinnetwork.org/Portals/0/Annual%20Report\\_Kiribati\\_2011\\_Part01.pdf](http://www.phinnetwork.org/Portals/0/Annual%20Report_Kiribati_2011_Part01.pdf).
- Knowler, W. C., Barret-Connor, E., Fowler, S. E., Hanman, R. F., Lachin, J. M., Walker, E. A., & Nathan, D. M. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine*, 346(6), 393-403.
- Kottke, T. E., & Pronk, N. P. (2006). Physical activity: optimizing practice through research. *American Journal of Preventive Medicine*, 31(4), S8-S10.
- Lako, J. K. (2001). Dietary trend and diabetes: its association among indigenous Fijians 1952 to 1994. *Asia Pacific Journal Clinical Nutrition*, 10(3), 183-187.
- Leontis, L. M., & Walker, K. A. C. (2014). *Type II diabetes risk factors*. Retrieved on 10th May 2014 from [www.endocrineweb.com/conditions/type-2-diabetes/type-2-diabetes-risk-factors](http://www.endocrineweb.com/conditions/type-2-diabetes/type-2-diabetes-risk-factors)
- Li, J., Drury, V., & Taylor, B. (2013). 'Diabetes is nothing': The experience of older Singaporean women living and coping with type 2 diabetes. *Contemporary Nurse*, 45(2), 188-196.
- Lowe, G. S. (2003). *Healthy workplaces and productivity: a discussion paper*. Retrieved on the 12th July 2014 from [http://www.nqi.ca/assets/files/products/healthy\\_20workplaces\\_productivity-english\\_20report.pdf](http://www.nqi.ca/assets/files/products/healthy_20workplaces_productivity-english_20report.pdf)
- Lozano, R., Naghavi, M., Foreman, K., Lim, S., Shibuya, K., & Aboyans, V. (2012). Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 3(80), 95-128. doi: [http://dx.doi.org/10.1016/S0140-6736\(12\)61728-0](http://dx.doi.org/10.1016/S0140-6736(12)61728-0) PMID:23245604
- Maman, S., Lane, T., Ntongwisangu, J., Mobida, P., Van Rooyen, H., Timbe, A., Visrutaratna, S., & Fritz, K. (2009). Using participatory mapping to inform a community – randomized trial of HIV counselling and testing. *Field Methods* 21(4), 368-387. doi: 10.1177/1525822X09341718
- Mancuso, C. A., Rincon, M. (2006). Impact of health literacy on longitudinal asthma outcomes. *Journal of General Internal Medicine*, 21(8), 813-817.

- Mavoa, H. M., & McCabe, M. (2008). Sociocultural factors relating to Tongans' and indigenous Fijians' patterns of eating, physical activity and body size. *Asia Pacific Journal Nutrition*, 17(3), 375-384.
- Mayo Clinic. (2014). *Type II diabetes*. Retrieved from <http://www.mayoclinic.org/diseases-conditions/type-2-diabetes/basics/symptoms/con-20031902>
- McCrady, S. K., & Levine, J. A. (2009). Sedentariness at work: how much do we really sit? *Obesity*, 17(11), 2103-2105.
- Merrill, R. M., Aldana, S. G., & Bowden, D. E. (2010). Employee weight management through health coaching. *Eating and Weight Disorders*, 15(1-2), 52-59.
- Merrill, R. M., Hyatt, B., Aldana, S. G., & Kinnersley, D. (2011). Lowering employee health care costs through the Health Lifestyle Incentive Program. *Journal of Public Health Management and Practice*, 17(3), 225-32. doi: 10.1097/PHH.0b013e3181f54128.
- Mikus, C., Oberlin, D., Libla, J., Taylor, A., Booth, F., & Thyfault, J. (2012). Lowering physical activity impairs glycemic control in healthy volunteers. *Medicine & Science in Sports & Exercise*, 44(2), 225-231.
- Ministry of Health and Medical Services. (2009). *Kiribati Strategic Plan 2008-2011*. Retrieved on August 10th 2013 from [http://www.wpro.who.int/health\\_services/kiribati\\_nationalhealthplan.pdf](http://www.wpro.who.int/health_services/kiribati_nationalhealthplan.pdf)
- Mohan, V., Sandeep, S., Deepa, R., Shah, B., & Varghese, C. (2007). Epidemiology of type 2 diabetes: Indian scenario. *Indian Journal of Medical Research*, 125(3), 217-230.
- Montonen, J., Knekt, P., Jarvinen, R., Aromaa, A., & Reunanen, A. (2003). Whole-grain and fiber intake and the incidence of type II diabetes. *American Journal of Clinical Nutrition*, 77(3), 622-629.
- Murray, C. J., Vos, T., Lozano, R., Naghavi, M., Flaxman, A. D., & Michaud, C. (2010). Disability- adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 380, 2197–223. doi: [http://dx.doi.org/10.1016/S0140-6736\(12\)61689-4](http://dx.doi.org/10.1016/S0140-6736(12)61689-4) PMID:23245608

- Neville, B. H., Merrill, R. M., & Kumpfer, K. L. (2011). Longitudinal outcomes of a comprehensive incentivized worksite wellness program. *Evaluations and the Health Professions*, 34(1), 103-123.
- Pacific Island Countries. (2003). *Diabetes and the care continuum*. Geneva, Switzerland: WHO Publication.
- Paddison, C. A. M. (2010). Exploring physical and psychological wellbeing among adults with type 2 diabetes in New Zealand: identifying a need to improve the experiences of Pacific peoples. *New Zealand Medical Journal*, 123(1310), 30-42.
- Pelletier, K. R. (2005). A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: update VI 2000–2004. *Journal of Occupational and Environmental Medicine*, 47(10), 1051-1058.
- Philips, D. I. W., Jones, A., & Goulden, P. A. (2006). Birth weight, stress, and the metabolic syndrome in adult life. *Annals of the New York Academy of Sciences*, 1083, 28-36.
- Pomerleau, J., Lock, K., Knai, C., & McKee, M. (2005). Effectiveness of interventions and programmes promoting fruit and vegetable intake. Geneva, Switzerland: World Health Organisation.
- Popkin, B. M., and Gordon-Larsen, P. (2004). The nutrition transition: worldwide obesity dynamics and their determinants. *International Journal of Obesity and Related Metabolic Disorders*, 28(3), S2-S9.
- Pronk, N. P., & Kottke, T. E. (2009). Physical activity promotion as a strategic corporate priority to improve worker health and business performance. *Preventive Medicine*, 48, 316-321.
- Quintiliani, L., Sattelmair, J., & Sorensen, G. (2008). *The workplace as a setting for interventions to improve diet and promote physical activity: background paper prepared for the WHO/WEF Joint Event on preventing noncommunicable diseases in the workplace*. Retrieved from <http://www.who.int/dietphysicalactivity/Quintiliani-workplace-as-setting.pdf>
- Ramachandran, A. (2014). Know the signs and symptoms of diabetes. *Indian Journal of Medical Research*, 140(5), 579-581.

- Ramachandran, A., Snehalatha, C., Mary, S., Mukesh, B., Bhaskar, A. D., & Vijay, V. (2006). The Indian Diabetes Prevention Programme shows that lifestyle modification and metformin prevent type 2 diabetes in Asian Indian subjects with impaired glucose tolerance (IDPP-1). *Diabetologia*, 49, 287-297. doi: 10.1007.s00125-005-0097-z.
- Rambaldi, G., Kyem, P.A.K., McCall, M., & D. Weiner, D. (2006). Participatory spatial information management and communication in developing countries. *Electronic Journal on Information Systems in Developing Countries*, 25(1), 1-9.
- Resnick, H. E., Valsania, P., Halter, J. B., & Lin, X. (2000). Relation of weight gain and weight loss on subsequent diabetes risk in overweight adults. *Journal of Epidemiology and Community Health*, 54(8), 596-602. doi: 10.1136/jech.54.8.596
- Robertson, A., Tirado, C., Lobstein, T., Jermini, M., Knai, C., Jensen, J. H., James, W. P. T. (2004). *Food and health in Europe: a new basis for action*. Copenhagen: World Health Organisation Regional publications. Retrieved from <http://www.who.int/nutrition/publications/policies/isbn928901363X/en/>
- Rush, E., Cumin, M. B., Migriauli, L., Ferguson, L. R., & Plank, L. D. (2009). One year sustainability of risk factor change from a 9-week workplace intervention. *Journal of Environmental and Public Health*, 2009(569104), 1-7. doi: 10.1155/2009/569104.
- Russell, B. H. (2006). *Research methods in Anthropology. Qualitative and quantitative approaches* (4<sup>th</sup> ed.). Oxford, UK: Rowman & Littlefield Publishers.
- Sali, S. (2008). Diabetes in the Pacific nations. *Diabetes Research Clinical Practice*, 79, S1-S127.
- Save Kiribati. (2015). *Climate change*. Retrieved from <http://savekiribati.com/climate-change.php>
- Schaefer-Graf, U. M., Buchanan, T. A., Xiang, A. H., Peters, R. K., & Kjos, S. L. (2002). Clinical predictors for a high risk for the development of diabetes mellitus in the early puerperium in women with recent gestational diabetes mellitus. *American Journal of Obstetrics and Gynaecology*, 186(4), 751-756.
- Schulte, P. A., Wagner, G. R., Ostry, A., Blanciforti, L. A., Cutlip, R. G., & Krajinak, K. M. (2004). Work, obesity, and occupational safety and health.

*American Journal of Public Health*, 97(3), 428-436.  
doi:10.2105/AJPH.2006.086900.

- Schultz, A. B., Lu, C., Barnett, T. E., Yen, L. T., McDonald, T., Hirschland, D., & Edington, D. W. (2002). Influence of participation in a worksite health-promotion program on disability days. *Journal of Occupational and Environmental Medicine*, 44(8), 776-780.
- Seidell, J. C. (2000). Obesity, insulin resistance and diabetes: a worldwide epidemic. *British Journal of Nutrition*, 83(1), S5-S8.
- Serxner, S. A., Gold, D. B., Grossmeier, J. J., & Anderson, D. R. (2003). The relationship between health promotion program participation and medical costs: a dose response. *Journal of Occupational and Environmental Medicine*, 45(11), 1196-1200.
- Serxner, S., Gold, D., Anderson, D., & Williams, D. (2001). The impact of a worksite health promotion program on short-term disability usage. *Journal of Occupational and Environmental Medicine*, 43(1), 25-29.
- Siefken, K., Schofield, G., & Malcata, R. (n.d). Engaging urban Pacific women in healthy lifestyle behaviour. An outcome evaluation of a workplace-based physical activity intervention in Vanuatu. *Journal of Sport for Development*. Retrieved from <http://jsfd.org/2014/06/30/engaging-urban-pacific-women-in-healthy-lifestyle-behaviour-an-outcome-evaluation-of-a-workplace-based-physical-activity-intervention-in-vanuatu/>
- Sobngwi, E., Mbanya, J. C. Unwin, N. C., Kengne, A. P. Fezeu, L., Minkoulou, E. M., & Hunt, M. K. (2004). Worksite-based research and initiatives to increase fruit and vegetable consumption. *Preventive Medicine*, 39(2), S94-S100.
- Steele, C., Steel, D., & Waine, C. 2007. Diabetes Part 1 – Managing type II diabetes. *The Optician*, 233(6106), 24.
- Steyn, N. P., Mann, J., Bennett, P. H., Temple, N., Zimmet, P., Tuomilehto, J., Lindstrom, J. & Louheranta, A. (2004). Diet, nutrition and the prevention of type 2 diabetes. *Public Health Nutrition*, 7(1A), 147-165. doi: 10.1079/PHN2003586
- Thorp, A. A., Healy, G. N., Winkler, E., Clark, B. K., Gardiner, P. A., Owen, N., & Dunstan, D.W. (2012). Prolonged sedentary time and physical activity in workplace and non-work contexts: a cross-sectional study of office,

- customer service and call centre employees. *International Journal of Behavioural Nutrition and Physical Activity*, 9, 128.
- Tigbe, W. W., Lean, M. E., & Granat, M. H. (2011). A physically active occupation does not result in compensatory inactivity during out-of-work hours. *Preventative Medicine*, 53(1–2), 48–52.
- Tobias, M., Turley, M., Stefanogiannis, N., Hoorn, S. V., Lawes, C., Mhurchu, C. N., & Rodgers, A. (2006). Vegetable and fruit intake and mortality from chronic disease in New Zealand. *Australian and New Zealand Journal of Public Health*, 30(1), 26–31.
- Tulchinsky, T. H., & Varavikova, E. A. (2000). *The new Public Health: An introduction for the 21st century*. California: Academic Press.
- Unwin, N. (2007). Diabetes and the good, the bad and the ugly of globalization. *International Diabetes Monitor*, 19(3), 5–10.
- Uusitupa, M. (2002). Lifestyle matter in the prevention of type 2 diabetes. *Diabetes Care*, 25, 1650–1651.
- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, 15(3), 398–405. doi:10.1111/nhs.12048
- Wang, J., Williams, M., Rush, E., Crook, N., Forouhi, N. G., & Simmons, D. (2009). Mapping the availability and accessibility of healthy food in rural and urban New Zealand – Te Wai o Rona: Diabetes Prevention Strategy. *Public Health Nutrition*, 13(7), 1049–1055.
- Wardlaw, G. M., & Smith, A. M. (2013). *Wardlaw's nutrition Australia/New Zealand* (6<sup>th</sup> ed.). Sydney, Australia: McGraw-Hill.
- Whiting, D., Unwin, N., & Roglic, G. (2010). Diabetes: equity and social determinants. In Authors (Eds.), *Equity, social determinants and public health programmes* (pp.78–87). Geneva, Switzerland: WHO Publication.
- Williams, D. (2001). *Sweet temptations*. Retrieved 20th December 2014 from <http://content.time.com/time/world/article/0,8599,2048039,00.html>
- World Health Organisation. (1997). *Jakarta Declaration on leading health promotion into the 21st century*. Retrieved from <http://www.who.int/healthpromotion/conferences/previous/jakarta/declaration/en/>



- World Health Organisation. (2007a). *Bangkok charter for health promoting in a globalized world: A 60th World Health Assembly*. Retrieved from [http://www.who.int/healthpromotion/conferences/6gchp/hpr\\_050829\\_%20BCHP.pdf](http://www.who.int/healthpromotion/conferences/6gchp/hpr_050829_%20BCHP.pdf).
- World Health Organisation. (2007b). *WHO global plan of action on workers' health (2008-2017): baseline for implementation*. Retrieved from [http://www.who.int/occupational\\_health/who\\_workers\\_health\\_web.pdf](http://www.who.int/occupational_health/who_workers_health_web.pdf)
- World Health Organisation. (2007c). *A guide for population-based approaches to increasing levels of physical activity: implementation of the WHO global strategy on diet, physical activity and health*. Retrieved 30<sup>th</sup> June 2014 from <http://www.who.int/dietphysicalactivity/physical-activity-promotion-2007.pdf>
- World Health Organisation. (2008a). *Closing the gap in a generation: health equity through action on the social determinants of health*. Final report of the Commission on Social Determinants of Health. Geneva, Switzerland: Author.
- World Health Organization (2008b). *The global burden of disease: 2004 update*. Geneva, Switzerland: Author.
- World Health Organisation. (2009). *Global health risks: mortality and burden of disease attributable to selected major risks*. Geneva, Switzerland: Author.
- World Health Organisation. (2010). *Global recommendation on physical activity for health*. Retrieved 30th July 2014 from [http://whqlibdoc.who.int/publications/2010/9789241599979\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf?ua=1)
- World Health Organisation. (2011). *Diabetes fact sheet*. Retrieved from <http://www.who.int/mediacentre/factsheets>
- World Health Organisation. (2012b). *World Health Organization country cooperation strategy India 2012- 2017*. Retrieved from [http://www.who.int/countryfocus/cooperation\\_strategy/ccs\\_ind\\_en.pdf](http://www.who.int/countryfocus/cooperation_strategy/ccs_ind_en.pdf)
- World Health Organisation. (2012a). *Global status report on noncommunicable diseases 2014*. Geneva, Switzerland: Author.
- World Health Organisation. (2013a). *Workplace health promotion*. Geneva, Switzerland. Retrieved from [http://www.who.int/occupational\\_health/topics/workplace/en/](http://www.who.int/occupational_health/topics/workplace/en/)

- World Health Organisation. (2013b). *Food security*. Retrieved August 1, 2013, from <http://www.who.int/trade/glossary/story028/en/>
- World Health Organisation. (2014). *Global health estimates: deaths by cause, age, sex and country, 2000-2012*. Geneva, Switzerland: Author.
- World Health Organisation. (2015). *Global strategy on diet, physical activity and health*. Retrieved from <http://www.who.int/diabetes/en/>
- World Health Organisation/World Economic Forum. (2008). *Preventing non-communicable diseases in the workplace through diet and physical activity*. Retrieved 30th June 2014 from [http://whqlibdoc.who.int/publications/2008/9789241596329\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2008/9789241596329_eng.pdf?ua=1)
- WHO/IDF Consultation Group. (2006). *Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia: report of a WHO/IDF consultation*. Geneva, Switzerland: World Health Organisation.
- World Health Organisation Regional Office for Europe (WHO/EUROPE). (2003). *Good practice in occupational health services: A contribution to workplace health*. Retrieved 30<sup>th</sup> June 2014 from [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0007/115486/E77650.pdf](http://www.euro.who.int/__data/assets/pdf_file/0007/115486/E77650.pdf).
- World Health Report 2002. (2002). *Reducing risks, promoting healthy life*. Retrieved 30<sup>th</sup> June 2014 from <http://www.who.int/whr/2002/en/>
- Yach, D., Stuckler, D., & Brownell, K. (2006). Epidemiologic and economic consequences of the global epidemics of obesity and diabetes. *Nature Medicine*, 12(1), 62- 66.
- Zimmet, P. (2003). The burden of type 2 diabetes: are we doing enough? *Diabetes and Metabolism*. 29, 6S9- 6S18.
- Zimmet, P., Shaw, J. & Alberti, K. G. M. M. (2003). Preventing type 2 diabetes and the dysmetabolic syndrome in the real world: a realistic view. *Diabetic Medicine*, 20, 693-702.

## **APPENDICES**

### **Appendix A**

#### **Research Study Advertisement**

##### **VOLUNTEERS NEEDED**

For a research study on “Perceptions of Kiribati full time workers with type II diabetes on workplace contribution toward the risk of type II diabetes.”

If you are willing to take part in this research you will be invited for an interview. The interview will take an hour of your time which will be conducted in your own home a time that suits you. The interview consists of questions focusing on participant’s experiences before they were diagnosed with type II diabetes. This will include whether or how the workplace environment may have contributed toward risk factors for type II diabetes. The nature of this study will be clearly identified before you may decide to take part and you are free to withdraw at any time without being disadvantaged.

##### **Benefits**

- Improve the understanding of workplace conditions that may contribute to the development of type II diabetes
- Provide information on the overall picture of workplace conditions for health management, public health professionals and other practitioners.
- Contribute to the improvement of strategy formulation and resource allocation to modify healthy working environments by increasing accessibility to healthy foods and promoting physical exercise.

##### **Interested Participants must be:**

- Diagnosed with type II diabetes.
- Aged between eighteen to fifty years of age.
- Either male or female.
- Work full time within this business or government department.

If you are interested to participate, please do make a direct contact to a researcher.

##### **Researcher Contact Details:**

Tiroia Teikake

Email: tteikake35@gmail.com

Phone: (00 686) 93938

## **Appendix B**

### **Semi- structured Interview Guide for Individual Participants**

1. Knowledge of diabetes: how it is prevented; transmitted, diagnosis, treatment; natural history of the disease
2. When did they first find out they have the disease (process of being diagnosed, what happened)
3. Previous lifestyle before diagnosis including daily routine, food consumed and activity undertaken
4. Perceived contributors to type II diabetes.
5. Reasons for lifestyle: cost; time pressures etc.
6. Perceived role of workplace conditions in contributing to the diagnosis
7. Recommendations on how workplace could help prevent onset of type II diabetes

# Participant Information Sheet



*(Individual interview)*

**Date Information Sheet Produced:**  
15<sup>th</sup> of May 2014

**Project Title**

**Perceptions of Kiribati full time workers with type II diabetes on workplace contribution toward the risk of type II diabetes.**

**An Invitation**

My name is Tiroia Teikake and am currently undertaking a Master of Public Health program at Auckland University of Technology, Auckland, New Zealand. To complete my Master's program, I am undertaking a research on type II diabetes looking at how workplace conditions may contribute toward the risk of type II diabetes in Kiribati through full time workers' perceptions. I would like to invite you to participate in this study. Be assured that your participation is voluntary. You are free to withdraw at any time throughout the data collection process up to the analysis of data.

**What is the purpose of this research?**

A low physical activity and insufficient amount of fruit and vegetable consumption are contributory factors toward the risk of type II diabetes. Full time workers are at a high risk due to their busy career which may result in eating insufficient amount of healthy foods and low physical activity. This research will inquire how workplace conditions contribute toward the risk of type II diabetes. Its aims to answer the following question: "What are the perceptions of full time workers with type II diabetes on workplace contribution toward the risk of type II diabetes?" These information will be collected through semi-structured interviews with participants and a transect walk within workplace environment; collecting relevant information about the workplace as observed.

**How was I identified and why am I being invited to participate in this research?**

You have been invited as a potential participant because you are a full time worker within the selected workplace. You have been diagnosed with type II diabetes and lives in an urban area.

**What will happen in this research?**

If you are willing to take part in this research you will be invited for an interview. The interview will be conducted in your own home at your preferable time. The interview consists of 7 interview guide focusing on participant's experiences before they were diagnosed with type II diabetes. This will include how the workplace environment and routine may have contributed toward risk factors for type II diabetes. The information collected will be analysed trying to understand what is said in participants' words. The nature of this study will be clearly identified before you may decide to take part and you are free to withdraw at any time without being disadvantaged.

**What are the discomforts and risks?**

There are unlikely risks for you in taking part in this research.

**How will these discomforts and risks be alleviated?**

You are free to stop the interview and or to leave the interview whenever you are not comfortable with the question.

**What are the benefits?**

It is anticipated that the results of this study would improve the understanding of how workplace conditions contribute to the development of type II diabetes and inform health management, public health professionals and other practitioners to comprehend the overall picture of workplace conditions. More importantly, the outcome of this study may contribute to the improvement of strategy formulation and resource allocation to modify healthy working environments by increasing accessibility to healthy foods and exercise.

**What compensation is available for injury or negligence?**

Not applicable

**How will my privacy be protected?**

Confidentiality will be maintained throughout, as names of participants will not be recorded. All information and recordings will be kept securely for the time stipulated by AUTECH.

**What are the costs of participating in this research?**

The interview will take about an hour of your time.

**What opportunity do I have to consider this invitation?**

You will be given a week to decide whether you would like to participate or not. You can inform me of your availability for the interview.

**How do I agree to participate in this research?**

If you agree to participate, I will provide an information sheet and a consent form so that you can sign before we proceed on to the interview.

**Will I receive feedback on the results of this research?**

The result of this study will be presented back to the workplaces and the wider community through a power point presentation.

**What do I do if I have concerns about this research?**

Any concern regarding the nature of this study should be notified in the first instance to the supervisor, Penny Neave ([penny.neave@aut.ac.nz](mailto:penny.neave@aut.ac.nz))

Other concerns regarding the conduct of this research should be notified to the Executive Secretary, AUTECH, Kate O'Connor, [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz), 921 9999 extn: 6038.

**Whom do I contact for further information about this research?*****Researcher Contact Details:***

Tiroia Teikake: [tteikake35@gmail.com](mailto:tteikake35@gmail.com); Phone: 0210583964

***Project Supervisor Contact Details:***

Penny Neave: [penny.neave@aut.ac.nz](mailto:penny.neave@aut.ac.nz), 921 9999 extn: 6038.

Approved by the Auckland University of Technology Ethics Committee on 26/06/2014, AUTECH Reference number 14/172

## Appendix D

# Consent Form

For use when interviews are involved.



*Project title:* **Perceptions of Kiribati full time workers with type II diabetes on workplace contribution toward the risk of type II diabetes.**

*Project Supervisor:* **Penny Neave**

*Researcher:* **Tiroia Teikake**

- ☐ I have read and understood the information provided about this research project in the Information Sheet dated .....
- ☐ I have had an opportunity to ask questions and to have them answered.
- ☐ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ☐ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- ☐ If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.
- ☐ I agree to take part in this research.
- ☐ I wish to receive a copy of the report from the research (please tick one): Yes ☐ No ☐

Participant's signature: .....

Participant's name: .....

Participant's Contact Details (if appropriate):

.....  
.....  
.....  
.....

Date:

**Approved by the Auckland University of Technology Ethics Committee on 26/06/2014 AUTEK Reference number 14/172**

*Note: The Participant should retain a copy of this form.*

## Appendix E

### Consent Form

For use when transect walks are involved.



*Project title:* **Perceptions of Kiribati full time workers with type II diabetes on workplace contribution toward the risk of type II diabetes**

*Project Supervisor:* **Penny Neave**

*Researcher:* **Tiroia Teikake**

- ☐ I have read and understood the information provided about this research project in the Information Sheet dated .....
- ☐ I have had an opportunity to ask questions and to have them answered.
- ☐ I understand that our discussions in the transect walk is confidential and I agree to keep this information confidential.
- ☐ I understand that notes will be taken during the transect walk and photographs will also be taken and transcribed.
- ☐ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- ☐ If I withdraw, I understand that while it may not be possible to destroy all records of the transect walk of which I was part, the relevant information about myself including notes and transcripts, or parts thereof, will not be used.
- ☐ I agree to take part in this research.
- ☐ I wish to receive a copy of the report from the research (please tick one): Yes ☐ No ☐

Participant's signature: .....

Participant's name: .....

Participant's Contact Details (if appropriate):

.....  
.....  
.....  
.....

Date:

**Approved by the Auckland University of Technology Ethics Committee on 26/06/2014 AUTEK Reference number 14/172**

*Note: The Participant should retain a copy of this form.*



## **Appendix F**

### **Participant's code**

- **P1M** stands for participant 1, male
- **P2F** stands for participant 2, female
- **P3M** stands for participant 3, male
- **P4M** stands for participant 4, male
- **P5F** stands for participant 5, female
- **P6M** stands for participant 6, male
- **P7M** stands for participant 7, male
- **P8F** stands for participant 8, female
- **P9F** stands for participant 9, female
- **P10F** stands for participant 10, female

## Appendix G

26 June 2014

Penny Neave  
Faculty of Health and Environmental Sciences

Dear Penny

**Ethics Application: 14/172 Perceptions of Kiribati full time workers with type 11 diabetes on workplace contribution toward the risk of type 11 diabetes.**

Thank you for submitting your application for ethical review. I am pleased to advise that the Auckland University of Technology Ethics Committee (AUTEC) approved your ethics application at their meeting on 23 June 2014, subject to the following conditions:

1. Reflection of how dissemination will occur in ways that will both benefit and protect the participants. The committee notes that the intended power-point presentation in the workplace may result in the identity of participants being known to their employers. Clarification about what information, such as a summary report, is being given to the Managers of the workplaces;
2. Clarification whether being in full time employment is an inclusion criteria for the participants, and if it is, then inclusion of advice about this in the information Sheet;
3. Clarification about what language the interviews will be in, and if other than English, the provision of translations of the Information Sheets and Consent Forms;
4. Provision of the indicative interview questions;
5. Amendment of the Information Sheet as follows:
  - a. Inclusion of advice that the interviews may be conducted at a place of the participants choosing;
  - b. Inclusion of advice that participants may have a support person with them during the interview if they wish;
  - c. Inclusion of contact details for appropriate local counsellors of primary care services so that participants may get in touch if they need to.

Please provide me with a response to the points raised in these conditions, indicating either how you have satisfied these points or proposing an alternative approach. AUTEC also requires copies of any altered documents, such as Information Sheets, surveys etc. Once your response is received and confirmed as satisfying the Committee's points, you will be notified of the full approval of your ethics application. Full approval is not effective until all the conditions have been met. Data collection may not commence until full approval has been confirmed. If these conditions are not met within six months, your application may be closed and a new application will be required if you wish to continue with this research.

To enable us to provide you with efficient service, we ask that you use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz).

I look forward to hearing from you,

Yours sincerely



Kate O'Connor  
Executive Secretary  
**Auckland University of Technology Ethics Committee**

CC: Tiroia Teiake [zdz2038@aut.ac.nz](mailto:zdz2038@aut.ac.nz); [tteikake35@gmail.com](mailto:tteikake35@gmail.com)

