

Knowledge, Attitude and Practice (KAP) related to Type 2 Diabetes Mellitus (T2DM) among Healthy Adults in Kiribati

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Abstract

Background: Type 2 Diabetes Mellitus (T2DM) kills more than 4.9 million adults yearly, and it is one of the major threats to global public health for low- and middle-income countries that mostly affects the adult population. Kiribati is currently facing the increasing prevalence of morbidity and mortality from T2DM.

Objective: To find out the level of Knowledge, Attitude and Practice (KAP) towards T2DM among healthy adults in South Tarawa, Kiribati.

Methods: This cross sectional study was conducted on South Tarawa, Kiribati at three randomly selected public health clinics from September 25 to November 20, 2017. Non-diabetic patients from both sexes who aged 18 years and above were selected by a simple random sampling technique to participate in this study. A pretested structured questionnaire was used to collect data and SPSS (version 22) was used for data analysis. Descriptive statistics was used to study the characteristics of the population and level of KAP.

Results: 405 persons participated in this study. Majority of the participants were in the age range of 18-24 years (30.4%), were females (66.2%) and had ever married (68.6%). The study revealed that the mean knowledge score was 20.47 (± 3.49) which shows that participants had moderate level of knowledge towards T2DM. The mean score for attitude score was 61.06 (± 5.48) which shows that participants had high level of attitude towards T2DM. The mean practice score was 4.57 (± 2.01) which shows that participants had a low level of practice towards T2DM.

Conclusion: A great emphasis on health education regarding symptoms, risk factors modification and prevention is T2DM are necessary.

Keywords: Type 2 Diabetes Mellitus, Knowledge, Attitude, Practice, Kiribati

1. Introduction

Diabetes is one of the main fast-growing Non-communicable Disease (NCD) risk to global public health (Fatema, et al., 2017). Due to the current rapid demographic transitions, from traditional to more westernized lifestyles, there is a disproportionate increase in the incidence of diabetes in developing countries (WHO, 2015).

Diabetes mellitus is a common metabolic disorder, that accounts for a high number of mortality and morbidity through its micro and macro vascular complications (Srinivasan et al., 2012). It is among the top 10 causes of death in adults, and was estimated to have caused four million deaths globally in 2017 (International Diabetic Federation, 2017). The global diabetes prevalence in 2019 was approximated to be 9.3%, which will rise to 10.2% by 2030 and 10.9% by 2045. The prevalence was higher in urban (10.8%) than rural (7.2%) areas, and in high-income (10.4%) than low-income countries (4.0%). One in two (50.1%) people living with diabetes do not know that they have diabetes (Saeedi et al., 2019). Between 2000 and 2016, there was a 5% increase in premature mortality from diabetes. Almost half of all deaths attributable to high blood glucose occur before the age of 70 years. The World Health Organisation (WHO) estimates that diabetes was the seventh leading cause of death in 2016 (WHO, 2020). Eighty-eight million people aged 18 years and over have prediabetes, a precursor of diabetes. 9 out of 10 don't know that they have pre-diabetes. Hence there is a need to explore the knowledge and perception of the

non-diabetic on diabetes (CDC, 2020).

The three main types of diabetes are Type 1 Diabetes (T1D), Type 2 Diabetes Mellitus (T2DM), and Gestational Diabetes Mellitus (GDM). The majority of people with diabetes are affected by T2DM i.e. 90%–95% of adult diabetes are T2DM (CDC, 2020; Hackethal, 2016). T2DM is on the rise and is no longer believed to be the only diseases of the rich nations.

Kiribati is one of the low-middle income countries that has experienced the fastest growing and greatest burden of T2DM (GBD, 2010). It is ranked as the second highest premature deaths of diabetes after Fiji, accounting for 3,746.6 (Whitman, 2016; Kiribati Institute for Health Metrics and evaluation reports, 2017). Furthermore, Kiribati and other Pacific Island Countries (PICs) are also experiencing the dramatically increasing rate of T2DM (Kiribati Institute for Health Metrics and Evaluation, 2017). According to the Kiribati Ministry of Health statistics reports in 2013, 100 confirmed new cases of T2DM were being reported each year. The report also confirmed 4800 T2DM cases being recorded from 2007 to 2012; 380 of these had undergone amputations (Teitake, 2015; Kiribati Ministry of Health Annual Report, 2011). In 2014, the number of amputations in Kiribati was 136 which was double the figure of the previous year (Whitman, 2016).

Early diagnosis and proper management of diabetes can reduce a lot of problems associated with Diabetes Mellitus (DM) (Nathan et al., 2009). The aim is to have optimal glycaemic control to prevent the macro and micro vascular complications. This involves lifestyle modification such as healthy diet, regular exercise, weight loss in addition to oral hypoglycemics therapy. Therefore, apart from governmental support and good health-care professional involvement, knowledge and attitude play a crucial role in obtaining a healthy life. T2DM remains a big concern in the country and the KAP study is the appropriate tool for creating greater awareness in prevention, diagnosis, risk factor control and disease management as supported by previous KAP studies.

Knowledge plays a pivotal role in development, early prevention and detection of any future disease (Fatema et al., 2017). Because diabetes is a silent disease and many sufferers only become aware of having the disease after developing one of the complications, general knowledge of diabetes can help in earlier detection of the disease and fewer complications (Maryam & Seham, 2016). The chronic comorbidities of DM, that has a significant impact on the quality of life of diabetic patients can be prevented with adequate knowledge on DM. Having the knowledge can aid people to assess their risk of diabetes, encourage them to seek out appropriate treatment and care while inspiring them to take charge of their health (Moodley & Rambiritch, 2007).

For DM patients, positive KAP is important. KAP elements are inter-related and dependent on each other. It is believed that people's attitude to health and their uptake of health services, including health education services, are strongly affected by their knowledge, culture and beliefs. Thus, people with sufficient knowledge, positive attitude and good practices are vital for effective control of T2DM. It is also assumed that people with good knowledge of diabetes had good attitudes and practices (Baradaran & Knill-Jones, 2004; Maina et al., 2010; Rathod et al., 2014). Furthermore, an obvious growing body of evidences for KAP studies have reinforced the need for greater awareness of prevention, diagnosis, risk factor control and disease controlling. Facts have shown that increasing knowledge regarding diabetes and its complications have significant benefits in the prevention, management and treatment of diabetes. Generally, a KAP study correlated to diabetes would be useful for primary detection, prevention and to help diminish the consequences (Saadia et al., 2010; Demaio et al., 2013; Islam et al., 2014; Rathod et al., 2014; Koley et al., 2016).

There are very few studies undertaken on awareness of diabetes of the diabetic patients (Wee et al., 2002) and no data on awareness of diabetes of the entire population (Fatema et al., 2017). Because knowledge is a critical component of behavioural change, it is important for the public to be aware of T2DM (Mahrooqui et al., 2013). People are more likely to participate in prevention and control measures once awareness is created (Ericksson et al., 2001). Even though various forms of media have been used to educate the public about diabetes mellitus, the impact of such efforts is yet to be appraised. It is not clear on how much the public actually knows regarding this disease through the current programs. An understanding of the level of public awareness along with their knowledge, attitude and practice towards diabetes mellitus will be helpful to plan for future programs such as health promotion interventions (Wee, 2002). Therefore, the current study intends for the first time to be conducted on healthy adults visiting public health clinics in South Tarawa, Kiribati to assess their level of KAP. Because the burden of diabetes on health care and its economic implications are enormous especially for developing countries such as Kiribati, prevention is important. The results of the study can aid in future development of programmes and techniques for effective health education and will provide baseline data for evaluating intervention programs as no such studies have been previously conducted in Kiribati.

2. Methods

2.1 Study Design and Setting

This study was a quantitative cross-sectional study design which was conducted over 8 weeks from the 25th of September 2017 to the 20th of November 2017. It was conducted on South Tarawa, Kiribati at three randomly selected public health clinics namely; Temwanoku Betio, Bairiki and Bikenibeu east clinic. These three public health clinics were randomly selected out of the 11 public health clinics as interested sites by the researcher to conduct this research by dividing the area into three groups as one each from the east (Bikenibeu clinic), central (Bairiki clinic) and west (Temwanoku Betio clinic).

2.2 Study Population and Sample

The study population included all I-Kiribati and was conducted among adults aged 18 years and above who attend public health clinics in South Tarawa, Kiribati. The inclusion criteria for people to participate in this study sample were: those willing to participate, non-diabetic patients (who identify themselves as non-diabetics), both sexes, aged 18 years and above, must have attended any one of the three identified public health clinics, and be a Kiribati resident.

2.3 Sampling and Sample Size

This study adopted a cluster sampling based on the geographical location of South Tarawa. There is a total of eleven Public Health clinics on South Tarawa, Kiribati: 3 clinics in Betio (West), 4 in the Central and 4 in the Eastern site of the country. One clinic was randomly selected from each area, i.e. 3 clinics out of the 11 clinics were randomly selected from each geographical location as sites for conducting this survey namely: Temwanoku clinic in Betio (West), Bairiki clinic (Central) and Bikenibeu clinic (East). Then the individual subjects were randomly selected from each clinic, i.e. every 2nd name was picked until the sample size was reached. The sample size was determined using a sample size calculator; employing the 50% knowledge with 5% margin error and 95% confidence interval i.e. the total sample size required for this study was 385 (Raosoft, 2004). Considering the 5% drop out, then the expected sample size of 385 was increased to 405 for this study.

2.4 Data Collection Tools

A self-administered questionnaire in English and Kiribati versions was used to collect information from the participants. The questionnaire in this study was developed to collect data on participants' KAP related to T2DM, by taking questions from previous similar studies and using literature review.

The questionnaire consisted of 52 questions which were divided into four sections. Section A had 12 background related questions, Section B had 15 knowledge related questions, Section C had 15 attitude related questions and Section D had 10 practice related questions.

For the knowledge related questions, each 'correct' answer was coded as '2', "I don't know" as '1' and a 'wrong answer' as "0." The reason for adding the category of "I do not know" is to reduce the chance of guessing the answer and thus getting a right answer by chance which would subsequently increase the knowledge score. A person may have wrong knowledge about the topic asked and hence give an incorrect response which results in score of 0 rather than having no knowledge about it and writing "do not know" to get a score of 1. The rationale for this scoring is that no knowledge is considered better than wrong knowledge. The maximum score was '30' while minimum score was '0'. A 0–15 score were assessed as low level of knowledge, 16–22 as medium and 23–30 as high level of knowledge (Tekanene, 2018)

For the attitude related questions, Likert scale was used to measure the attitude with 5 categories of response. Each item was rated on a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). The minimum score was 15 and maximum 75. A score of 15–45 was assessed as low level of attitude, 46–60 assessed as medium and 61–75 assessed as high level of attitude.

For the practice related questions, responses with a 'Yes' were coded as '1' and responses with a 'No' will be coded as '0'. The maximum score was '10' and the minimum was '0'. Scores less than 5 were assessed as low level of practice while scores greater than 5 were assessed as high level of practice (Mohammadnezhad et al., 2015; Lincoln et al., 2017).

In addition, a scale of weight and height measurement was used for measuring individuals Body Mass Index (BMI). BMI under 18.5 kg/m² is underweight, 18.5–25 is normal weight, 25–30 is overweight and more than 30 is obese.

The questionnaire was validated by 3 experts in the relevant field for content validity to ensure validity of the study i.e. to assess the construction of each question and to guarantee if they can read it and whether it is answering

objectives of the study and not affected by other factors. Their comments were taken on board in revising and improving questionnaires as a final version prior to the actual commencement of the study. A pre-test was conducted prior to data collection, to assess the validity of the questionnaire. Therefore, a pilot test of the questionnaire was conducted prior to the actual data collection. Ten participants who had met the inclusion criteria were given the questionnaire to ensure that the questions were understandable and readable for face validity. After the validity of the questionnaire, the final version was given to two bilingual translators to ensure the correct translation of English into Kiribati language.

2.5 Study Procedure

The researcher conducted a brief oral presentation for those who came to visit the clinic during their waiting time to inform them about the purpose of the study. An information sheet (English or Kiribati language) was given to them to understand the study and its purpose. For those willing to participate and met the inclusion criteria, a consent form was given (English or Kiribati language) to sign prior to filling the questionnaire. The questionnaire was given to them in both English and Kiribati language, so the participants could choose which one to use. The self-administered questionnaire took an average time of 20–30 minutes to fill.

Any adults coming to the clinic who met the inclusion criteria were first enrolled, and then the selection of samples was based on the enrolment lists, i.e. every 2nd name was picked until the sample size was reached. Next, the information sheet was given to the selected individuals to read and understand about the study. The participants signed an informed consent if they were willing to participate in this study. Then a self-administered questionnaire was given to those who were able to complete the questionnaire at the same time and the researcher collected it herself. For those who wished to complete it later, they were given pre-paid envelop and asked to bring the completed questionnaire in the envelop the next day to the health centre and put in the box that was provided at the clinic. People who cannot read and cannot write were assisted by the main researcher, i.e. by reading the questions and the choice of answers in Kiribati and write down their own answers.

2.6 Data Management and Analysis

The data was coded and checked for completeness and consistency. All responses from questionnaires were entered into Microsoft Excel and a quality check was performed; data cleaning (i.e. initial frequency analysis was done to see that all responses have been entered and any wrong entries were identified easily) and analysis. Then it was exported to SPSS (version 22). Data was analysed using the following tests: descriptive and graphical statistics were used to study the characteristics of the population (including frequency, percentage, table, mean and standard deviation).

2.7 Ethical Consideration

Prior to data collection, the ethics approval was obtained by Fiji National University's College Health Research Ethics Committee (CHREC), and also a consent agreement was obtained from Kiribati Ministry of Health. Participants were given an information sheet, consent form and questionnaire, all in English and Kiribati versions. Participants were also given a full explanation on every component of the study and were fully aware that all information they gave, and their identity will remain anonymous, confidential and will be used for the study purpose only. Those who were not willing to participate in the study were coerced to take part and their decisions were respected. For those who were not able to read particularly aged people were assisted by the researcher and assistant.

The computer used was password-protected, patients completed forms were kept locked in the cabinet for the maximum of 2 years where no one can access them except the main researcher. After analysing data, participants were informed about the result of the study.

3. Results

3.1 General Characteristics of Participants

The sample size of the study was 405 and all participants answered the questionnaire completely with 100% response rate. Majority of the participants were in the age range of 18–24 years (30.4%), were females (66.2%), had ever married (68.6%), had obtained a high school certificate (57.5%), were household owners (53.8%), had about 5–8 members in their family (46.7%), were unemployed (62%), had monthly income of <500 AUD (81.7%), were obese (52.1%), had no family members with diabetes (52.3%) and belonged to Roman Catholic church (55.6%) (Table 1).

Table 1. General characteristics of participants (n=405)

Demographic characteristics	Categories	N	%
Age	18-24yrs	123	30.4
	25-32yrs	122	30.1
	33-39yrs	66	16.3
	40+yrs	94	23.2
Sex	Male	137	33.8
	Female	268	66.2
Marital status	Ever Married*	278	68.6
	Single	84	20.7
	Others	43	10.6
Religion	RCC*	225	55.6
	Others	98	24.2
	Kiribati Uniting church	44	10.9
	LDS*	38	9.4
House ownership	Owner	218	53.8
	Live with relatives	163	40.2
	Rented	24	5.9
Family member	<4 ppl	68	16.8
	5-8 ppl	189	46.7
	9-12 ppl	91	22.5
	13+ ppl	57	14.1
Monthly income	<500 AUD\$	331	81.7
	501-1000 AUD\$	58	14.3
	>1000 AUD\$	16	4.0
Occupation status	Not working	251	62.0
	Working	154	38.0
Education level	No education	19	4.7
	Primary school	69	17.0
	High school	233	57.5
	TVET	75	18.5
	University	9	2.2
BMI	<18.5	0	0
	18.5-24	61	15.1
	25-30	132	32.8
	30+	212	52.1
Family member with T2DM	No	212	52.3
	Yes	139	34.3
	I don't know	54	13.3

*Ever Married (i.e. married, widowed, divorced, separated) *Roman Catholic Church (RCC) *Latter-day Saints (LDS).

3.2 Frequency of Response on Knowledge-Related Questions

Most of the participants knew that T2DM was a chronic disease in which blood glucose was too high (60%), knew the causes of T2DM (71.4%), the dietary restriction of T2DM (30.9%), diet contributing to high sugar (56.5%), the hereditary cause of T2DM (39.3%), knew the symptoms (59%), diagnosis (43.7%) and control (77%) of T2DM and overweight as a risk factors (64.4%) for T2DM and how to maintain a healthy weight (78.3%). However, majority of the participants had no knowledge on types of diabetes (77.3%), insulin (79.5%), complications of T2DM (49.4%) and smoking as a risk factor (50.6%) for developing T2DM (Table 2).

Table 2. Frequency of responses on knowledge-related questions (n=405)

Question (n=405)	Responses	N	%
T2DM is a chronic disease in which blood glucose is too high	Yes	243	60.0
	I don't know	152	37.5
	No	10	2.5
How many types of Diabetes are there?	I don't know	313	77.3
	One	73	18.0
	three	19	4.7
What are the major causes of T2DM?	Physical inactivity, unhealthy foods.	289	71.4
	I don't know	112	27.7
	Mosquito bite	4	1.0
Is Type 2 diabetes hereditary?	Yes	159	39.3
	I don't know	142	35.1
	No	104	25.7
Which diet is restricted in T2DM?	Potato/rice	228	56.3
	I don't know	125	30.9
	Fruits	52	12.8
A diet high in fat and sugar	Increases blood sugar levels.	229	56.5
	I don't know	141	34.8
	Has no effect on the risk of getting T2DM.	35	8.6
Can type 2 diabetes be cured?	Yes	147	36.3
	No	139	34.3
	I don't know	119	29.4
Which one of the following is symptoms of T2DM?	Weight loss	239	59.0
	I don't know	143	35.3
	headache	23	5.7
Insulin is a hormone which	I don't know.	322	79.5
	Allows sugar to enter the cells of the body.	61	15.1
	Increases sugar in the blood.	22	5.4
The diagnosis of Type 2 diabetes in made by	A simple blood test measuring your blood glucose level.	177	43.7
	I don't know	138	34.1
	Taking blood pressure, height and weight.	90	22.2
How to control and manage Type 2 diabetes?	Regular exercise	312	77.0
	I don't know	79	19.5

	Wash hands	14	3.5
Being overweight/obese	Increases the risk of getting T2DM.	261	64.4
	I don't know	127	31.4
	Will maintain the blood glucose level.	17	4.2
To achieve and maintain a healthy weight	Exercise regularly	317	78.3
	I don't know	84	20.7
	Drink too much alcohol	4	1.0
Smoking	I don't know	205	50.6
	Has no effect on the risk of getting T2DM.	123	30.4
	Increases the risk of getting T2DM.	77	19.0
T2DM may cause health problems (complications) such as	I don't know	200	49.4
	Kidney disease	194	47.9
	Deafness	11	2.7

3.3 Frequency of Response on Other Questions

With regard to the participants' source of information about T2DM, it mainly came from radios (46.9%). Majority of respondents (68.1%) were aware of T2DM (Table 3).

Table 3. Frequency of responses on other questions ($n=405$).

Questions	Responses	N	%
Know about T2DM	Yes	276	68.1
	No	129	31.9
Source of information	Radio	190	46.9
	Friends/family	93	23.0
	None	51	12.6
	Others	41	10.1
	Newspaper	18	4.4
	Health care workers	12	3.0

3.4 Frequency of Response on Attitude-Related Questions

Table 4 displays the results of the participants' attitudes based on a Likert scale scoring system consisting only of responses of strongly agree, agree, neutral, disagree, and strongly disagree. Strongly agree and agree were combined together to show the total percentage of good attitude, Neutral for not aware, while disagree and strongly disagree were also combined together to show the total percentage for poor attitude.

The majority of the participants agreed/strongly agreed that diabetes is the worst thing that can ever happen to them (87.4%); that they would feel embarrassed about having diabetes (56.8%); that most people would find it difficult to adjust of having diabetes (55.1%); that seeking help from the clinic for T2DM should be a priority(93.6%); that someone with diabetes should follow a controlled diet, 387 (95.6%); that it is good to include green leafy vegetables and fruit in their daily diet (95.6%); that it is good to avoid extra added salts and sugar in their diets(64.7%); that it is good to have fruit rather than sweets (91.3%); that diabetes complications may be prevented if blood glucose level is well maintained (89.1%), it important for a diabetic to maintain a healthy weight (91.9%); that checking blood sugar level is important (97.1%); that they should be examined for diabetes (97.8%) that family members should be screened for diabetes (92.1%); that missing medicine for a diabetic person has a negative effect on disease control (88.9%); and that regular visits to nurses at the clinic enables one to control the disease (97.5%).

Table 4. Frequency of responses on attitude – related questions

Attitude (n= 405)	Strongly Agree		Agree		Neutral		Disagree		Strongly disagree		Total	
	n	%	n	%	n	%	n	%	n	%	N	%
Diabetes is the worst thing that can ever happened to me	158	39.0	196	48.4	27	6.7	21	5.2	3	0.7	354	87.4
I would feel embarrassed about having diabetes.	79	19.5	151	37.3	42	10.4	111	27.4	22	5.4	230	56.8
Most people would find it difficult to adjust to having diabetes.	51	12.6	172	42.5	50	12.3	100	24.7	32	7.9	223	55.1
Seeking help from the clinic for T2DM should be a priority.	136	33.6	243	60.0	17	4.2	6	1.5	3	0.7	379	93.6
I think someone with diabetes should follow a controlled diet.	202	49.9	185	45.7	12	3.0	2	0.5	4	1.0	387	95.6
I think it is good to include green leafy vegetables and fruits in my daily diet.	187	46.2	201	49.6	10	2.5	4	1.0	3	0.7	388	95.8
I think it is good to avoid extra added salts and sugar in my diet.	113	27.9	149	36.8	18	4.4	46	11.4	79	19.5	262	64.7
It is good to have fruits rather than sweets.	182	44.9	188	46.4	21	5.2	11	2.7	3	0.7	370	91.3
It is important for a diabetic to maintain a healthy weight.	121	29.9	251	62.0	19	4.7	9	2.2	5	1.2	372	91.9
Diabetes complications may be prevented if blood glucose level is well control.	130	32.1	231	57.0	30	7.4	10	2.5	4	1.0	361	89.1
Checking of your blood sugar level is important.	193	47.7	200	49.4	9	2.2	1	0.2	2	0.5	393	97.1
I should be examined for diabetes.	171	42.2	225	55.6	9	2.2	0	0	0	0	396	97.8
Family members should be screened for diabetes.	162	40.0	211	52.1	27	6.7	5	1.2	0	0	354	92.1
Missing medicines for a diabetic person has a negative effect on the disease control.	168	41.5	192	47.4	18	4.4	17	4.2	10	2.5	360	88.9
Regular visits to the clinic to nurses at the clinic enable one to control the disease.	201	49.6	194	47.9	9	2.2	1	0.2	0	0	395	97.5

3.5 Frequency of the Response on Practice-Related Questions

Most of the participants (83.5%) did not go every six months to check their blood glucose; did not control their weight (59%); did not do physical exercise to maintain their weight (52.6%); spent less than 30 minutes per day doing exercise (52.1%); were smokers (55.6%); did not drink alcohol (80%). With regards to the participant's diets, majority had not taken food on time (58.3%), more than half of the participants (52.8%) mentioned that they did add extra salt to their regular diets and neither ate fruits (57%) nor vegetables (51.9%) (Table 5).

Table 5. Frequency on Practice- related questions (n=405)

Questions (n=405)	Responses	N	%
Do you go every six months to check your blood glucose	No	338	83.5
	Yes	67	16.5
Do you control your weight?	No	239	59.0
	Yes	166	41.0
Do you normally do physical exercise to maintain your weight?	No	213	52.6
	Yes	192	47.4
How much time do you spend for exercise per day?	< 30 mins	211	52.1
	> 30 mins	194	47.9
Do you smoke?	Yes	225	55.6
	No	180	44.4
Do you currently drink alcohol?	No	324	80.0
	Yes	81	20.0
Do you take food timely?	No	236	58.3
	Yes	169	41.7
Do you add extra salt to your regular diet?	Yes	214	52.8
	No	191	47.2
Do you eat fruits?	No	231	57.0
	Yes	174	43.0
Do you eat vegetables?	No	210	51.9
	Yes	195	48.1

3.6 Level of Knowledge, Attitude and Practice

Table 6 illustrates the distribution of the participants' level of knowledge, attitude and practice towards T2DM and the mean score of each. Most of the participants had a moderate level of knowledge (60.2%) and attitude (49.6%) towards T2DM and high level of practice (51.1%) towards T2DM.

Table 6. Distribution of responses by level of Knowledge, Attitude and Practice and their mean score

Variables	N	%	Mean ± SD
Knowledge			
High level of knowledge (23-30)	115	28.4	
Medium level of knowledge (16-22)	244	60.2	20.47±3.487
Low level of knowledge (0-15)	46	11.4	

Attitude			
High level of Attitude (61-75)	196	48.4	
Medium level of Attitude (46-60)	201	49.6	61.06±5.470
Low level of Attitude (15-45)	8	2.0	
Practice			
High level Practice (≥5)	207	51.1	
Low level Practice (<5)	198	48.9	4.57±2.013

The knowledge score was out of 15 questions, with a minimum score of 0 and maximum score of 30. The mean knowledge score was 20.47 (± 3.49) which shows that participants had moderate level of knowledge towards T2DM. The attitude score was created using the Likert scale based on 15 questions, with a minimum score of 15 and a maximum of 75. The mean score for attitude score was 61.06 (± 5.48) which shows that participants had high level of attitude towards T2DM. The practice score was out of 10 questions, with a maximum score of 10 and the minimum is 0. The mean practice score was 4.57 (± 2.01) which shows that participants had a low level of practice towards T2DM.

4. Discussion

In this study, participant's total knowledge about T2DM indicated that they had moderate level of knowledge. In other words, although on average, participants are familiar with T2DM, causation, diets, symptoms, diagnosis, control and management, risk factors, prevention of T2DM, but still there is a lot of room for improvement. Given the results of the present study, the knowledge mean score of 20.47 (± 3.49) was categorized as moderate.

Looking at the correct responses to each question, it was easy to identify and locate some of the knowledge gaps among participants, as shown from the presented study results such as inadequate or in correct knowledge on types of DM, the role of insulin in T2DM, the complications of T2DM and smoking as a risk factor for T2DM. The study results presented a better knowledge about symptoms of T2DM than did the study that was conducted by Asmawaw et al., (2015). This discrepancy might be due to socio-cultural differences between the study populations.

Unlike most studies from developing countries which reported poor knowledge of diabetes among the general public, the present study shows that the overall mean score of participant's knowledge was 20.47 (± 3.49), that the participants had moderate level of knowledge towards T2DM. The results of the present study were similar to previous studies showing that the level of knowledge among the general public, is comparatively better, with the majority (>75%) having either moderate or good knowledge (Mohan et al., 2005; Al-Maskari et al., 2013; Demaio et al., 2013; Islam et al., 2014; Herath et al., 2017). This could be because of the similarity in the study design used, which are institution-based studies or increased awareness and campaigns regarding diabetes in these countries.

Knowledge is the greatest weapon in the fight against diabetes mellitus (Al-Naggar et al., 2017). Extensive knowledge, attitude and good practice could be the means to control and avoid diabetes related consequences and cost-effective measures in low- and middle- income countries (LMICs) (Gautam et al., 2015). Participants who had heard about T2DM had 4.4 times increase in their diabetes knowledge level as compared to subjects who had not heard of it previously. The findings were supported by the finding conducted in Bangladesh that revealed that respondents who get information regarding diabetes scored significantly higher than the group who did not get any information (Mumu et al., 2014; Kassahun & Mekonen, 2017).

Looking at the interpretation of the results based on the attitude toward T2DM among participants in South Tarawa, the study results revealed that the level of the participants' attitude towards T2DM was high; findings showed the participants' overall mean attitude score was 61.06 (SD=5.48). This means that a large number of people in Kiribati have very positive attitude towards T2DM. Observing the responses on this section, the majority of the participants responded positively to the attitude related questions on T2DM. Even though the attitude was good or positive among the participants, there are still a few gaps identified which need to be improved. Observing the number of each individual response on the attitude related questions of T2DM, the study identified three of the attitude gaps that were scored low with both 'strongly agree' and 'agree' with those responses. For instance, more than half (56.8%) of the respondents said that they were feeling embarrassed about having diabetes, and 44.9% of the participants saying that it is not difficult to adjust to having diabetes, and lastly, there were still some respondents, (35.7%) stating that adding extra salt and sugar in their diet did not matter to them. However, the rest

of the questions were scored higher, i.e. between 87.5% and 97.8%, showing a significant positive attitude towards T2DM. The present study revealed that people in South Tarawa have a positive or high level attitude toward T2DM. These findings agree with the findings of a study conducted in India and Saudi Arabia (Haval et al., 2012; Al-Aboudi et al., 2016), but contrasts with an Emirate study that reported that many of the subjects had a negative attitude (Al-Maskari et al., 2013). It seemed that participants understood how to prevent T2DM and know how to take good care of themselves with the disease and this could be highly attributed to increased awareness on diabetes.

The above findings are encouraging to know that they have positive attitudes towards T2DM. These findings do not mean that with good attitude, individuals cannot easily put it into practice towards T2DM, but this positive view will allow the individuals to think of preventing themselves from the disease is better. Positive attitude towards diabetes management and support from friends and family were associated with adequate diabetes management (Shawton et al., 2016).

The improvement of knowledge and attitude about T2DM is only a tool towards that ultimate goal, which is the improvement of T2DM related practices. It is essential to identify that high level of knowledge and attitude and practice towards the prevention of T2DM. It is common in the literature that with good knowledge and positive attitude, there is always a lack in converting or not transferring those to actual practice (Saleh et al., 2012; Herath et al., 2017).

When it comes to the overall assessment of practice and T2DM on the part of the respondents, the result of the present study was low levels of attitude (4.57, SD= ± 2.013). It means that people of Kiribati have poor attitude towards T2DM, which requires a big effort to try and address it to promote the health of every individual from contracting such a disease. Observing the responses from the participants, it clearly shows that people of Kiribati have overwhelmingly poor practice towards T2DM in terms of attending regular clinic and lifestyle such as weight control, smoking and drinking. Smoking is accountable for NCDs related death (WHO, 2017; Gautam et al., 2015). There were 236 or 58.3% who did not take food timely, and 214 or 52.8% of the participants did add extra salt to their diet. About 231 or 57% of the respondents did not eat fruit, and 210 or 51.9% did not eat vegetables.

4.1 Limitations of the Study

This study had several limitations that should be taken into consideration when interpreting the results of the present study. First, the results of this study cannot be generalized to all populations in Kiribati as it was cross sectional. The participants for this study were recruited from the outpatients only and therefore the results may not be truly representative of the general public. In addition, the setting where the study was conducted is in public health clinics, where there might be bias in their knowledge about T2DM as they are exposed to information on T2DM at the clinics through pamphlets and posters available at the clinic or education may be readily accessible. Due to time limitation, reliability test was not done in the pilot study.

5. Conclusion

In this study, it was discovered that participants aged 18 years and above had a moderate level of knowledge, with a high level of attitude and a low level of practice with regard to T2DM suggesting a gap between the three. Therefore, it should become a priority for policy makers to enhance the knowledge and attitude of this nondiabetic group through strategies and programs so that it has a positive impact on their practice. The study provides a baseline information on the KAP of the non-diabetic population of Kiribati. This depicts the need for urgent educational campaigns with a prioritized focus on the non-diabetics to prevent diabetes, its management and complications. T2DM and its complications can largely be prevented if appropriate and timely measures are taken. Given that the study found a reasonable gap between knowledge and practice, overcoming that is very important when formulating and implementing certain strategies by which positive attitudes can be converted into beneficial practices. Knowledge and practice of the general population can be improved by structured programmes. Therefore, various issues need to be addressed to close the gaps between KAP towards T2DM. Education of vulnerable communities can become a cost-effective public health strategy. A large-scale awareness program has to be created through the use of mass media to spread the message of diabetes to the general population. It is essential for the health care professionals to take appropriate measures to increase awareness regarding the risk factors, causes, symptoms, treatment, management and complication of T2DM. Studies can be carried out in future to compare the KAP of the diabetic and nondiabetic population to identify gaps.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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