Prediabetes, Diabetes and impact of healthy life-style KAP study, Jazan University

Layla Mohsen Ali Beidy, Amnah Khalid Hasan Zakri, Raniyah Ali Qaba Ahmed, Alaa Ahmad Hassan Allayl , Rafah Ghazi Ali Ja-rad , Rawabi Ahmad Mahdi Tawhari

Abstract— Diabetes plays role in the cause of morbidity through continued clinical consequence. Evidence from the existing study's findings shows the increasing trend of global diabetes epidemic need to raise alarm with its risky effects on health. Several factors associated with poor glycemic control should be known and managed. Objectives: to evaluate the level of Knowledge, attitude and practices towards prediabetes, diabetes and its complication and the effect of health lifestyle modification on these conditions among health science students in Jazan University. Methodology: a descriptive cross sectional study conducted in health science colleges (males and females) in Jazan University stratified random sampling method was used to select a representative sample of 342 students. Data regarding student's characteristics, knowledge about diabetes mellitus their attitude and practices regarding lifestyle modifications was collected through questionnaire data entered and analyzed on SPSS. Result: The response rate of study 97.9%, Data analyzed and shows: 87.2% of the participants had good knowledge, 12.5% had average knowledge and only 0.3% had poor knowledge regarding the diabetes, prediabetes and value of exercise, adequate body weight and a healthy diet. A majority of participants either had a strongly positive attitude 71.6% or a positive attitude 28.4% toward lifestyle modifications. 12% of the participants reported that they did not considering importance of healthy habits to improve their health; 47.1% were moderately keen to do, the rest 40.8% follow a controlled diet and monitor their body weight. The results show positive correlation of 0.294 p = 0.0001between knowledge level and attitude level; also significant positive correlation of 0.285 (p = 0 .003) between the knowledge level and practice level; another positive correlation of 0.173 p = 0.002 between the attitude level and practice level. Conclusion: the result of the study was generally good in term of knowledge, attitude and practice towards Prediabetes, diabetes and the impact of healthy lifestyle among health science students.

Index Terms— Diabetes mellitus, Prediabetes, Healthy lifestyle, Diet, Body weight , Exercise , Diabetes risk factor .

————————————— ◆ —————————————

1 INTRODUCTION

Diabetes mellitus (DM) is characterized by abnormal glucose metabolism and hyper-glycaemia due to disturbance in the metabolism of carbohydrate, fat, and protein that is caused by due to lose of insulin producing cells in the pancreas or decreased tissues sensitivity to insulin that results in increased level of glucose in the blood.

Diabetes Mellitus (DM) is a chronic disease and an emerging epidemic of the 21st Century which threatens to overwhelm the healthcare system in the near future, its prevalence is estimated to rise further to 5.5% in 2025.Globally, diabetes has been established as a prototypical chronic disease that has affected 347 million people in 2008 and 387 million in 2014.

Diabetes can play the vital role in the cause of morbidity and mortality through continued clinical consequence and mortality from the effect on kidney, cardiac functions, renal failure, visual impairment and blindness.

Previously, individual with diabetes mellitus where classified as insulin dependent diabetes mellitus (IDDM) (require insulin treatment) and non-insulin dependent diabetes mellitus (NIDDM) (require insulin only when not controlled with oral tablets). With this classification, it was difficult to correctly classify individuals with NIDDM being treated with insulin. This led to confusion and incorrect classification of a large number of patients with diabetes mellitus, complicating the epidemiologic evaluation and clinical management.

Type 1 Diabetes Mellitus Formerly called type I, IDDM or juvenile diabetes, type 1 diabetes mellitus is characterized by beta cell destruction caused by an autoimmune process, usually leading to absolute insulin deficiency, the onset is usually acute, developing over a period of a few days to weeks. Over 95 percent of persons with type 1 diabetes mellitus develop the disease before the age of 25, with an equal incidence in both sexes and an increased prevalence in the white population.

Type 2 Diabetes Mellitus Formerly called NIDDM, type II or adult-onset, Type 2 diabetes mellitus is characterized by insulin resistance in peripheral tissue and an insulin secretory defect of the beta cell. This is the most common form of diabetes mellitus. It accounts for 90% to 95% of all diabetes mellitus cases.

Several risk factors have been associated with type 2 diabetes and include: Family history of diabetes , Overweight , Unhealthy diet, Physical inactivity , Increasing age High blood pressure Ethnicity, Impaired glucose tolerance (IGT), History of gestational diabetes and Poor nutrition during pregnancy.

Impaired glucose tolerance (IGT) or Prediabetes is a category of higher than normal blood glucose, but below the threshold for diagnosing diabetes.

Changes in diet and physical activity related to rapid development and urbanization have led to sharp increases in the numbers of people developing diabetes.

Evidence from the existing findings shows the increasing trend of global diabetes epidemic need to raise alarm with its risky effects on health cost, health care resources, national health budgets, quality of life and life expectancy.

Following life-style changes, global prevalence of DM is increasing rapidly providing a worrying indication and major threat to global health. This consumes the nation's health care. Unless interventions are created through community aware-

ness; DM is predicted to be the world's main disablers and killers of the working age groups in the next 20 years.

physical inactivity and ready access to highly palatable processed foods are risks for developing diabetes .there is also a growing evidence that another aspect of our modern lifestyle, short sleep duration, is also contributing toward the "diabetes epidemic." The average sleep duration decreased from an estimated 9 hours in 1910 to 7 hours in 2003(1).

The driving force for this current worldwide epidemic of type 2 diabetes mellitus seems tube environmental. Urbanization, one of the factors most prevalent in the developing world, encourages sedentary lifestyle and lack of participation in physical activities. This can lead to obesity, a major factor in developing type 2 diabetes mellitus through insulin resistance .(2)
The prevalence is increasing in Arabian Gulf countries and Saudi Arabia is

people with diabetes in 2000 and 2030 The joint prevalence of diabetes and impaired glucose tolerance (IGT) in Saudi Arabia for people above 30 is 40%.

Prediabetes (global prevalence of IGT 8.3%), typically defined as blood glucose concentration that is higher than normal but lower than diabetes thresholds, is a high-risk state for diabetes development. Indeed, the World Health Organization use the term intermediate hyperglycemia a stage used to describe a person with impaired blood glucose tolerance levels of fasting between 100 and 126 mg/dl of blood or whose 2-hour postprandial blood glucose was 140-200 mg/dl. Considerable number of these people in the prediabetic stage will go on to develop type 2 diabetes.(3)

A study conducted by Ibrahim A. Bani, in April 2015 about Prevalence, knowledge, attitude and practices of diabetes mellitus among Jazan population, kingdom of Saudi Arabia (KSA) shows increased prevalence of diabetes calls for urgent steps towards prevention and health promotion, programs designed to reduce its burden. (4)

Another Cross-Sectional study conducted by Kasuni N. et al, about Effect of Demographic Status and Lifestyle Habits on Glycaemic Levels in Apparently Healthy Subjects 2016, they found Among the subjects, 10.1% were identified Increasing age, higher income, positive familial history of diabetes, sedentary lifestyle, and short sleep at night have positive impact on glycaemic status in apparently healthy subjects, other study done by Yahya Hasan Hobani et al, in Jazan city 2015 A high percentage of participants i.e. 70% are pre diabetes, which is partly due to a more sedentary lifestyle and smoking and weight gain. 62% of participants reported no physical exercise in daily life(5).

A cross sectional study, conducted by Mohammed B. et al, in 18 July 2016, stated that the majority of T2DM patients had poor glycemic control, the study identified several factors associated with poor glycemic control. Effective and tailored interventions are needed to mitigate exposure to these risk factors. This would improve glycemic control and reduce the risks inherent to diabetes complications(6)

Several studies have reported that Physical activity is benefi-

cial to the prevention of many chronic diseases. A meta-analysis based on prospective studies found that various types of physical activity were beneficial to the prevention of diabetes, and the risk of diabetes decreased by 15% for 20 MET-hours/week increment of leisure-time physical activity, Furthermore, several randomized controlled trials reported that physical activity could improve insulin sensitivity and glucose tolerance and then delay the onset of diabetes in subjects with prediabetes .(7)(8)

S. Palaian and colleagues; evaluated the results of counseling selected hospitalized type 2 diabetic patients about their medications, disease, and lifestyle modifications in terms of knowledge, attitude, and practice outcomes. They concluded that patient counselling by clinical pharmacist improved knowledge scores, which did not lead to appropriate attitudes

or practices.(9)
Another longitudinal closed cohort study conducted by Brunisholz KD, et al. Instituted in 2016. about Risk of Type 2 Diabetes Mellitus among Patients with Confirmed and Unconfirmed Prediabetes relative to an at-risk group receiving care from primary care physicians over a 5-year period on Adult patients at-risk for diabetes. They found that Unconfirmed and confirmed prediabetes are strongly related to the development of T2DM as compared to patients with only risk factors for disease.(10)

Several well-designed trials have demonstrated that weight reduction can reduce diabetes risk However, with only lifestyle modification, even modest weight loss is difficult to achieve over time; therefore, optimal pharmacologic strategies for treating obesity are being developed. There was a study conducted by Davies, M J, et al. In UK 2017 about community-based primary prevention program for type 2 diabetes mellitus incorporating identification and lifestyle intervention for Prevention. They used A cluster randomized controlled trial. 3400 people at high risk of T2DM got an oral glucose tolerance test. 880 of them have PDM. There was a 26% reduced risk of T2DM in the intervention group. There were statistically significant improvements in glycated hemoglobin concentrations. They developed and validated a risk score for identifying those at high risk of undiagnosed PDM/T2DM, another randomized controlled trial study done by Elaina L. Marinik, Et al. At Department of Human Nutrition, Foods and Exercise in 2014. about effectiveness intervention trial for resistance training maintenance to improve glucose homeostasis in older prediabetic adults aged 50-69 years. Positive changes in glucose homeostasis and strength mediated by self-efficacy, self-regulation, adherence, and outcome expectancies (11)(12).

A study Conducted by Linda S. Geiss . et al, US,2009, about Diabetes Risk Reduction Behaviors Among U.S. Adults with Prediabetes This study has found Adoption of risk reduction behaviors among U.S. adults with prediabetes is suboptimal. Efforts to improve awareness of prediabetes, increase promotion of healthy behaviors, and improve availability of evidence-based lifestyle programs are needed to slow the growth in new cases of diabetes .(13)

A study carried out between August 2011 and January 2012 at the primary health clinics in Dammam suggests that diabetes education programs based on international standards of life-style behaviors are more eff ective when tailored to the cultures and religions of targeted groups. Saudi women may benefit from a T2D education program based on international standards and adapted to their cultural and religious contexts. physical health measures, diabetes knowledge, life satisfaction, and health related quality of life, diabetes knowledge in comparison with the usual care of T2DM in Saudi Arabia .(14)

Prevalence, Knowledge, Attitude and Practices of Diabetes Mellitus among Jazan Population, Kingdom of Saudi Arabia (KSA) the results show Increased prevalence of diabetes calls for urgent steps to- wards prevention and health promotion, programs designed to reduce its burden (15)

A descriptive, cross-sectional survey was comprised 250 patients and conducted in the Endocrine & Diabetes Clinic, from 1st June 2013 to 31st December 2013, Results revealed good attitude but poor knowledge and practices (behavior) towards diabetes. It concluded that there is a need for structured community programs to improve attitude and practices of diabetic patients to promote better compliance towards diet, exercise and drug regimen to prevent complications related to diabetes (16)

2 STUDY OBJECTIVES;

To assess Knowledge, Attitude and Practices towards prediabetes, diabetes, its complication and the effect of healthy lifestyle modification on prevention and management of these conditions among health science students.

3 Study Methodology:

The study design was descriptive cross-sectional study , was conducted in health science colleges, Jazan University, during the academic year 2016\2017

1. College of medicine
2. College of pharmacy
3. College of applied medical science
4. College of nursing & allied health science
5. College of public health and tropical medicine

From 21 march to1 June 2017 (10 weeks) All students of health science colleges of Jazan university (males and females) student attending health science colleges of Jazan University 2016\2017,
The stratified random sampling method was used to select a representative sample of (n=342) students.

The sample size was calculated. Given a target population of 342 students, an expected of 50% of students with good knowledge, positive attitudes and good practices towards prediabetes, diabetes, and healthy life style (weight control, diet and physical activity), a 5%acceptable degree of error, 95% confidence level. The sample size was calculated
using the formula for single proportion:
The sample was stratified according to their specialty and

$$N = 3000 \quad n = \frac{Nz_{(\alpha)}^2 P(1-P)}{(N-1)d^2 + P(1-P)z_{(\alpha)}^2}$$

gender.

3420

Clusters of classes' were taken from each stratum randomly.
Probability proportional to size sampling (PPS) was used to determine the number of students in the different faculties.

4   Study Tools:

Survey was done by specially designed self-administered questionnaire distributed to the respondents.

5   Data Collection:

Data regarding student's characteristics, general knowledge about prediabetes , diabetes mellitus , types, risk factor and complications , their attitude and practices regarding healthy lifestyle s was collected through standardized questionnaire administered individually(16).

The questionnaires contained queries about Background characteristics (gender, age, height, weight) 12 questions to measure the general knowledge:
• having enough information about diabetes
• knowing the symptoms associated with diabetes
• having a person with diabetes in your family
• all ages are susceptible to diabetes
• knowing the types of diabetes
• type 1 diabetes is hereditary
• knowing the complications of diabetes in the near and long term
• know about pre-diabetes
• a large proportion of the society suffers from diabetes
• pre-diabetes factors
• pre-diabetes precedes diabetes type 2
• there is a treatment for pre-diabetes

8 questions to assess the attitude:
• Regular exercise is useful in the treatment of pre-diabetes
• Healthy food is useful in the treatment of pre-diabetes
• Reducing weight and maintaining optimal weight is beneficial in the treatment of pre-diabetes
• unhealthy food and lack of exercise lead to chronic diseases
• Healthy habits reduce the risk of pre-diabetes and type 2 diabetes
• adherence to the health lifestyle and medications reduces the risk of complications of diabetes
• Measuring blood sugar is necessary during the routine examination of people at risk of diabetes
• community has enough awareness about diabetes and pre-diabetes
• have checked blood sugar
• keen to a have good knowledge in field of food and public health
• exercise regularly
• keen to make your weight ideal
• Keen to eat healthy food

•considering changing in diet to improve the health

6 DATA ENTRY AND ANALYSIS:

Data was entered and analyzed on SPSS (Statistical Package for the Social Sciences) where they were analyzed by a statistician using descriptive statistics. Correlation and p-values were calculated to ascertain the statistical significance of key findings.

The results of the analysis were presented in frequency distribution tables. For the 12 questions on knowledge regarding prediabetes , diabetes and the benefits of exercise , healthy diet and weight control , participants who had 0 to 4 correct answers out of the 12 were assumed to have poor knowledge and labeled as 'poor knowledge' in the frequency distribution table. Participants who had 5 to 8 correct answers were assumed to have average knowledge and labeled as 'average knowledge'. Participants with 9 to 12 correct answers were assumed to have good knowledge being labeled as 'good knowledge'.

Similarly, for the 8 questions on their attitude regarding prevention and management of prediabetes and diabetes in term of healthy lifestyle modifications , score ranges of 0 to 2 , 3 to 5 and 6 to 8 were labeled as negative attitude, positive attitude and strongly positive attitude, respectively. For the Practice of healthy lifestyle habits questions, score ranges of 0-2, 3-4 and 5-6 were labeled as poor practices, average practices and good practices, respectively for the 3 practice of lifestyle modification questions.

7 ETHICAL CONSIDERATION:

Ethical approval for this study was obtained from the college of Medicine, Jazan University. Participants were told that they have the right to not participate in the study or to withdraw from the study if they wish at any time. The participant's privacy will be respected and data was kept confidentially and utilized for study purposes only. Participants were asked to read and sign a consent form. This was before the beginning of data collection.

8 RESULT:

The response rate of study 97.95%, Questionnaires from 335 respondents were collected and analyzed with the following results:

Table 1 shows the age group distribution of the participants with 18- 25 year old male (n=158, 47.2%) and female (n=177, 52.5%) which the majority of the participants fell in group B aged from 21 to 23   (n = 226, 67.5%) It also shows that a majority of the participants from College of applied medical science (n= 135, 40.3%) Other participant from College of medicine (n=47, 14%) College of pharmacy (n=49, 14.6%), College of nursing & allied health science (n=52, 15.5%), College of public health and tropical medicine (52, 15.5%) table 2.

majority of the participants have a normal weight according to BMI calculation   (n= 124, 38.0%) the rest are : under-

weight (n=120 ,36.8%),over weight (n= 56 ,17.2%) , obese (n= 26 ,8%) table 3

Knowledge about diabetes, prediabetes and importance of lifestyle modification in these conditions

Table 6 shows that 87.2% (n = 286) of the participants had good knowledge regarding diabetes in general , prediabetes and the benefits of healthy diet ,exercise and weight loss; 12.5% (n = 41) had average knowledge and only 0.3%(n = 1) had poor global knowledge regarding the diabetes , prediabetes and value of exercise, weight loss and a healthy diet.

Attitude towards diabetes, prediabetes and importance of lifestyle modification in these conditions

A majority of participants either had a strongly positive attitude (n = 239, 71.6%) or a positive attitude (n = 95, 28.4%) toward lifestyle modifications – a total of 334 (100%) with positive attitudes (Table 7, 8).

Practice of healthy lifestyle habits

Regarding healthy lifestyle practices, 12% (n = 40) of the participants reported that they did not considering importance of healthy habits to improve the health; of the 47.1% (n = 157) they are moderately keen to do, the rest (n = 136, 40.8%) follow a controlled and planned diet and monitor their body weight. Table9, 10 shows the distribution of participants according to their lifestyle modification practice score.

Correlation between knowledge, attitude and practice of lifestyle modification shows a positive Pearson correlation of 0. .294 (p = 0.0001) between the global knowledge level and attitude level; also, significant positive Pearson correlation of 0.285 (p = 0 .003) between the global knowledge level and practice level; and a, positive Pearson correlation of 0.173 (p = 0. 002) between the attitude level and practice level. Tables 11, 12"

9 RESULT ANALYSIS:

The study design used in this study was a descriptive cross sectional study, an efficient way of collecting information on knowledge, attitudes and practices regarding prediabetes, diabetes and importance of lifestyle modifications as preventive measure for these two conditions, at a specific period of time 17March to 2June 2017 from a reprehensive sample of health science students n=335 attending the 2016/20/2017 academic year at Jazan university.

This study design was appropriate for the information needed.

The mean age of the respondents was comparable to the Mean age was 21.62± 1.323 years , mean height of respondents 160.6±11.56 with mean weight og 57.80 ±17.040 , mean BMI 22.90±11.809

TABLE 1 shows the age group distribution of the participants with 18- 25 year old male and female within which the majority of the participants fell in group B (n = 226, 67.5%), including (n =112 ,33.4%) male , (n=114 , 34%) female .participants who fell into group A   (n=85 ,25.4%) ,including (n=34 ,10.1%) male (n=51 ,15.2%)female and the rest fell into

group C (n=24 ,7.2%) , it include (n=12, 3.6%) male ,(n=12 ,3.6%) female . total number of participants (n =335, 100%)

Student Specialty	STUDENT GENDER		TOTAL
	MALE	FEMALE	
Medicine	21	26	47
	6.3%	7.8%	14.0%
Pharmacy	24	25	49
	7.2%	7.5%	14.6%
Applied Medical Science	61	74	135
	18.2%	22.1%	40.3%
Nursing & Allied Health Science	26	26	52
	7.8%	7.8%	15.5%
Public Health and Tropical Medicine	26	26	52
	7.8%	7.8%	15.5%
Total	158	177	335
	47.2%	52.8%	100.0%

TABLE 1 THE AGE GROUP DISTRIBUTION OF THE PARTICIPANTS				
		STUDENT GENDER		Total
		MALE	FEMALE	
AGE GROUP	A (18-20)	34	51	85
		10.1%	15.2%	25.4%
	B (21-23)	112	114	226
		33.4%	34.0%	67.5%
	C (24-26)	12	12	24
		3.6%	3.6%	7.2%
	TOTAL	158	177	335
		47.2%	52.8%	100.0%

TABLE 2: shows that a majority of the participants from College of applied medical science (n= 135, 40.3%)it include (n=61,18.2%)male (n=74 ,22.1%)female. Other participant from College of medicine (n=47,14%) with (n=21,6.3%)male ,(n=26,7.8%) female. College of pharmacy (n=49,14.6%) including (n=24 ,7.2%)male (n=25, 7.5%)female , College of nursing & allied health science (n=52,15.5%) including (n=26 ,7.8%)male (n=26 ,7.8%)female , College of public health and tropical medicine (52,15.5%) with (n=26 ,7.8%) male (n=26 ,7.8%) female.

TABLE 3 ; Represent the distribution of different BMI category according to gender (52 ,16%) underweight (66 ,20.2%)with normal weight (27, 8.3%)over weight (11 ,3.4%)were obese with total of (156 , 47.9%). In female student (68, 20.9%) were under weight, (58, 17.8%) were normal, (29, 8.9%) were overweight (15, 4.6%) were obese with total of 170 52.1%
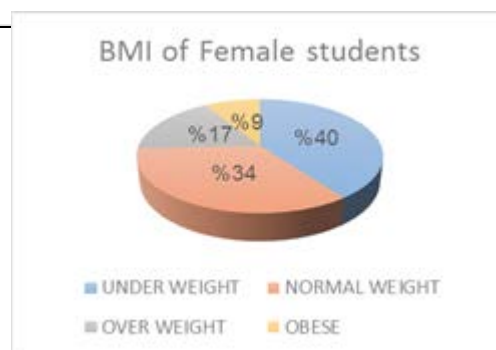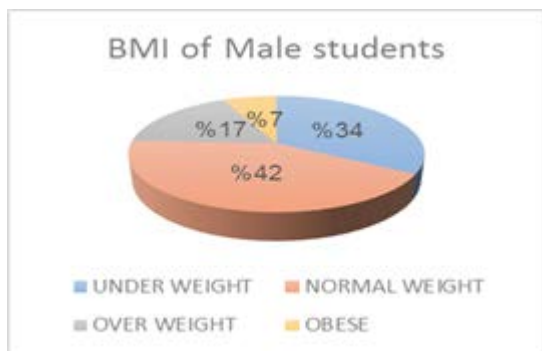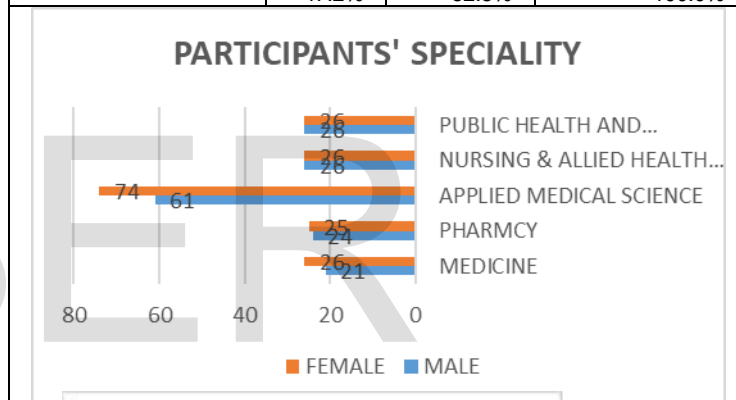

PARTICIPANTS' SPECIALITY

BMI of Male students

BMI of Female students

Table3 : BMI Category In Both Student Gender			
BMI Category	Student Gender		Total
	Male	Female	
Under Weight	52	68	120
	16.0%	20.9%	36.8%
Normal	66	58	124
	20.2%	17.8%	38.0%
Over Weight	27	29	56
	8.3%	8.9%	17.2%
Obese	11	15	26
	3.4%	4.6%	8.0%
Total	156	170	326
	47.9%	52.1%	100.0%

Table 5:shows that (n = 286, 87.2%) of the participants , (n=44 , 13.4%)from medical students ,(n=41 , 12.5%)from pharmcy students ,(n= 117 , 35.7%) from applied medical science students ,(n=44, 13.4%) from nursing & allied health science students and (n=40 , 40%) from public health and tropical medicine students had good knowledge regarding diabetes in general , prediabetes and the benefits of healthy diet ,exercise and weight loss; while (n = 41 , 12.5%)of participants, (n=3, 0.9%) from medical students, (n=8, 2.4%) from pharmacy students, (n= 12 , 3.7%) from applied medical science students, (n=7 , 2.1%) from nursing & allied health science students and (n= 10 ,3%) %) from public health and tropical medicine students had average knowledge and only(n = 1, 0.3%)had poor global knowledge are from public health and tropical medicine students regarding the diabetes , prediabetes and value of exercise, weight loss and a healthy diet.

Table 5 :Knowledge Score Distribution In Student Speciality						
	Student Speciality					Total
	Medicine	Pharmcy	Applied Medical	Nursing & Allied Health	Public Health And	
Poor Knowledge	0	0	0	0	1	1
	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
Average Knowledge	3	8	12	7	10	40
	0.9%	2.4%	3.7%	2.1%	3.0%	12.2%
Good Knowledge	44	41	117	44	40	286
	13.4%	12.5%	35.7%	13.4%	12.2%	87.2%
Total	47	49	130	51	51	328
	14.3%	14.9%	39.6%	15.5%	15.5%	100.0%

TABLE 6 : KNOWLEDGE_SCORE DISTTIBUTION STUDENT GENDER			
KNOWLEDGE_SCORE	STUDENT GENDER		Total
	MALE	FEMALE	
POOR KNOWLEDGE	0	1	1
	0.0%	0.3%	0.3%
AVERAGE KNOWLEDGE	15	26	41
	4.6%	7.9%	12.5%
GOOD KNOWLEDGE	139	147	286
	42.4%	44.8%	87.2%
Total	154	174	328
	47.0%	53.0%	100.0%

The TABLE 6 : shows distribution student gender about knowledge of diabetes & pre diabetes and importance lifestyle modification , we recognized that most of students about (n=147 , 44.8%) female and (n=139 , 42.4%) male and total of them (n=286 , 87.2%) had a good knowledge regarding diabetes in general , prediabetes and the benefits of healthy diet ,exercise and weight loss, while some of them about (n=26 , 7.9%) female and (n=15 , 4.6%) male had average level of knowledge and the total (n= 41 ,12.5 %) and about (n=1 , 0.3%) female had poor knowledge. The knowledge regarding diabetes in general , prediabetes and the benefits of healthy diet ,exercise and weight loss are better among female (n=174 , 53.0%) than male (n=154 , 47.0%) which total of them (n=328 , 100 %) .
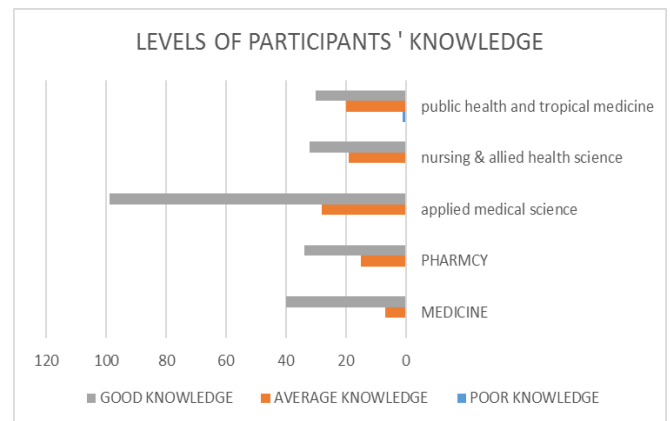
A majority of participants (n = 239, 71.6%) had a strongly positive attitude toward lifestyle modifications,   (n =36 , 10.8%) of them are medical students, (n = 36 , 10.8%) are pharmacy students, while (n= 9 , 27.2%) of them are applied medical science students, (n=40 ,12%) are nursing & allied health science students, (n= 36 , 10.8%) are public health and tropical medicine students. And the rest   (n = 95, 28.4%) with positive attitudes toward lifestyle modifications, (n=11 , 3.3%) are medical students, (n =13 , 3.9%) are pharmacy students,

while (n= 44 , 13.2%) of them are applied medical science students, (n=11 , 3.3%) are nursing & allied health science students, and the rest (n= 16 ,4.8%) are public health and tropical medicine students. None of the participants had poor attitude toward lifestyle modifications – a total of 334 (100%) The attitude score in both student gender refer to , most of students about (n=117,35.0%) female and (n=122, 36.5%) male ,had a strongly positive attitude toward lifestyle modifications and total of them(n=239, 71.6%) , and rest of them (n=59, 17.7%) female and (n=36, 10.8%) male had positive attitudes toward lifestyle modifications which their total is (n=95, 28,4%) . None of the both gender had poor attitude towards lifestyle modifications. The attitude towards lifestyle modifications are better among female (n=176, 52.7%) than male (n=158, 47.3%)

– a total of 334 (100%). Table7,8
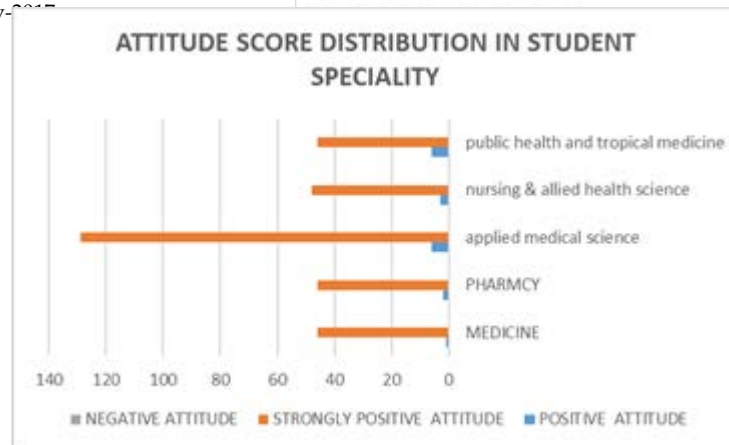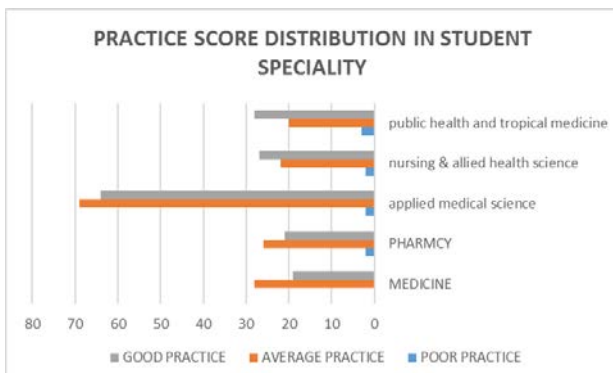
ATTITUDE SCORE DISTRIBUTION IN STUDENT SPECIALITY

TABLE 9 , 10 Regarding healthy lifestyle practices, (n = 40 , 12%) of the participants ,(n = 3 , 0.9%) are medical students, (n=5 , 1.5) are pharmacy students ,(n= 14, 4.2%) are applied medical science students ,(n = 9 , 2.7%) are nursing & allied health science students (n =9 , 2.7%) are public health and tropical medicine students. They reported that they did not considering importance of healthy habits to improve the health. ; While (n = 157, 47.1%) of the participants , (n =28 , 8.4%) are medical students, (n =26 , 7.8) are pharmacy students, (n =64 , 19.2%) are applied medical science students, (n =21 , 6.3%) are nursing & allied health science students, (n =18 , 5.4%) are public health and tropical medicine students .They are moderately keen to do , the rest (n = 136, 40.8%) of the participants,(n =16 , 4.8%) are medical students, (n = 18 , 5.4%) are pharmacy students, (n =57 , 17.1%) are applied medical science students, (n =21 , 6.3 %) are nursing & allied health science students, (n =24 , 7.2%) are public health and tropical medicine students . They follow a controlled and planned diet and monitor their body weight. the distribution of participants according to their lifestyle modification practice score. Throughout practice assessment in both student gender , we recognized that some of students about (n=72, 21.6%) female and (n=64, 19.2%) male have good practices which is their total (n= 136, 40.8%) , and other of students about (n=80,24.0 %) female and (n=77,23.1 %) male Which have average practices and the total of them (n=157 ,47.1%) , and few of students about (n=24, 7.2%)female and (n=16, 4.8%) male have poor practices and the total of them (n=40, 12.0%). Regarding healthy lifestyle practices was found to be better among female which total of them (n=176, 52.9%) when compared to male (n=157, 47.1%).

Table 7 : Attitude Score Distribution In Student Speciality						
Attitude Score	Student Speciality					
	Medicine	Pharmcy	Applied Medical Science	Nursing & Allied Health Science	Public Health And Tropical Medicine	Total
Positive Attitude	11	13	44	11	16	95
	3.3%	3.9%	13.2%	3.3%	4.8%	28.4%
Strongly positive Attitude	36	36	91	40	36	239
	10.8%	10.8%	27.2%	12.0%	10.8%	71.6%
Negative Attitude	0	0	0	0	0	0
Total	47	49	135	51	52	334
	14.1%	14.7%	40.4%	15.3%	15.6%	100.0%

Table 8 : Attitude Score Distribution In Both Student Gender			
Attitude Score	Student Gender		Total
	Male	Female	
Positve Attitude	36	59	95
	10.8%	17.7%	28.4%
Strongly Positive Attitude	122	117	239
	36.5%	35.0%	71.6%
Negative Attitude	0	0	0
Total	158	176	334
	47.3%	52.7%	100.0%

The Correlation between knowledge, attitude and practice of lifestyle modification

shows a positive Pearson correlation of 0. .294 (p = 0.0001) between the global knowledge level and attitude level; also , significant positive Pearson correlation of 0.285 (p = 0 .003) between the global knowledge level and practice level; and a, positive Pearson correlation of 0.173 (p = 0. 002) between the attitude level and practice level. As there is evidence in the literature that good knowledge can be translated into healthy lifestyle practices by promoting behavior change TABLE 11, 12

TABLE 9 : PRACTICE SCORE DISTRIBUTION IN STUDENT SPECIALITY						
PRACTICE SCORE	STUDENT SPECIALITY					Total
	MEDICINE	PHARMCY	applied medical science	nursing & allied health science	public health and tropical medicine	
POOR PRACTICE	3	5	14	9	9	40
	0.9%	1.5%	4.2%	2.7%	2.7%	12.0%
AVERAGE PRACTICE	28	26	64	21	18	157
	8.4%	7.8%	19.2%	6.3%	5.4%	47.1%
GOOD PRACTICE	16	18	57	21	24	136
	4.8%	5.4%	17.1%	6.3%	7.2%	40.8%
Total	47	49	135	51	51	333
	14.1%	14.7%	40.5%	15.3%	15.3%	100.0%

| TABLE 11 Correlation between knowledge level and attitude		KNOWLEDGE SCORE	ATTITUDE SCORE
KNOWLEDGE SCORE	Pearson Correlation	1	.294**
	Sig. (2-tailed)		.0001
ATTITUDE SCORE	Pearson Correlation	.285**	1
	Sig. (2-tailed)	.003	
**. Correlation is significant at the 0.01 level (2-tailed).			

TABLE 12 Correlation between knowledge level practice		KNOWLEDGE SCORE	PRACTICE SCORE	
KNOWLEDGE SCORE	Pearson Correlation	1	.173**	
	Sig. (2-tailed)		.002	
PRACTICE SCORE	Pearson Correlation	.173**	111	
	Sig. (2-tailed)	.002		
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 10 : Practice Score Distribution In Both Student Gender			
Practice Score	Student Gender		Total
	Male	Female	
Poor Practice	16	24	40
	4.8%	7.2%	12.0%
Average Practice	77	80	157
	23.1%	24.0%	47.1%
Good Practice	64	72	136
	19.2%	21.6%	40.8%
Total	157	176	333
	47.1%	52.9%	100.0%

Finally we ask the participants if There is a need for more awareness programs regarding healthy lifestyle and the result

PRACTICE SCORE DISTRIBUTION IN STUDENT SPECIALITY

There is a need for more awareness programs regarding healthy lifestyle
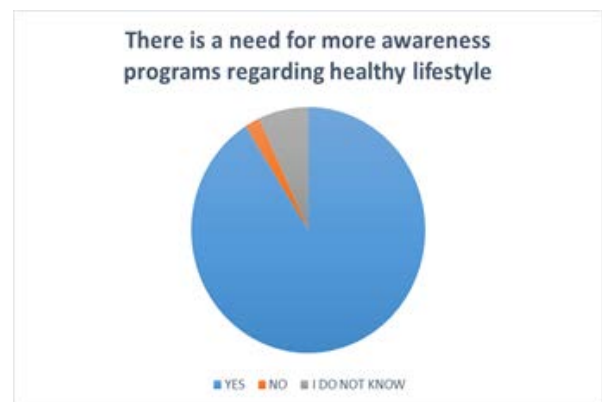
10   DISCUSSION:

The goal of our study was to assess the Knowledge, Attitude and Practices (KAP) towards prediabetes, diabetes, its complication and the effect of healthy lifestyle modification on prevention and management of these conditions among health

science students- Jazan University. The results from previous studies in Sweden and China provide evidence that high knowledge regarding changes in lifestyle is very effective in preventing diabetes.

The high prevalence of overweight (17.2%) and obesity 8%) amongst the participants is similar to the findings in 2009 by another South African study which found that 23% of women were overweight and 41.6% were obese compared with 14.6% and 7.5% of men, respectively, in their study.15 Obesity is a major risk factor for type 2 diabetes mellitus and the sedentary lifestyle and lack of physical activity amongst the participants seem to contribute to the high proportion of overweight and obese persons in this study.

In terms of attitude assessment, the 71.6% of participants with strongly positive attitudes toward lifestyle modification and the 28.6% with positive attitudes positive attitudes in this study. This is also reflected in other studies, in which the majority of respondents had positive attitudes towards lifestyle modifications.

The present study result in that 87.2% (n = 286) of the participants had good knowledge regarding diabetes in general , prediabetes and the benefits of healthy diet ,exercise and weight loss; 12.5% (n = 41) had average knowledge and only 0.3%(n = 1) had poor global knowledge regarding the diabetes , prediabetes and value of exercise, weight loss and a healthy diet Other study shows that participants' general awareness of diabetes symptoms, risk factors and complications were satisfactory.(20)

Practice of healthy lifestyle habits Regarding healthy lifestyle practices, 12% (n = 40) of the participants reported that they did not considering importance of healthy habits to improve the health; of the 47.1% (n = 157) they are moderately keen to do , the rest (n = 136, 40.8%) follow a controlled and planned diet and monitor their body weight. Analysis of one study showed that most patients had satisfactory practice, and that the majority had reported regular routine follow up, diet, exercise, and sugar monitoring etc. for controlling DM. These comply with the findings of Mashige, K. P., et. Al (21)

Similar study also performed in Pakistan found high KAP score 65 % among

health worker . In the present study , more than 87% of the study participants were

knowledgeable 71.6% .had strongly positive attitude , 47.1% moderate healthy lifestyle practice towards diabetes mellitus & importance of healthy lifestyle modifications . The over all KAP score equals 68% .The scores seemed higher than previous studies, This adequate   knowledge may be attributed to the level of education of participants having community members with this gap

necessitate being seen carefully because of their crucial role in diabetes prevention .

4   CONCLUSION

In conclusion, the result of the study was generally good in term of knowledge, attitude and practice towards Prediabetes, diabetes and the impact of healthy lifestyle on both conditions among health science students. The majority of students were

aware of it and have a positive attitude which could potentially reform the future of diabetes in the community

WE RECOMMEND: Community based KAP study to measure the overall knowledge attitude and practice regarding Prediabetes diabetes and important healthy lifestyle habits on prevention and management of these two conditions , a large prospective trial enforcing the modification of known risk factors for the development of DM to show the significance of such intervention in reducing the prevalence of DM in KSA , also an educational program to emphasize the importance of exercise and healthy diet and weight control to prevent diabetes and diabetes related complication in already diabetic people

5   LIMITATIONS

The study was conducted only among health science students which not truly represented the overall knowledge and practice regarding diabetes and healthy lifestyle
We used a cross sectional study design which only allowed us to obtain a snap shot information we could not establish the causality of research finding , also Interpretation of the results from this study. Since lifestyle behaviors were self-reported, one cannot rule out informational bias

REFERENCES

[1]   Gangwisch JE, Heymsfield SB, Boden-Albala B, Buijs RM, Kreier F, Pickering TG, et al. Sleep duration as a risk factor for diabetes incidence in a large U.S. sample. Sleep. 2007;30(12):1667–73.

[2]   Joshi S, Joshi P. Management of Type 2 diabetes: Treatment targets and strategies. South African Fam Pract. 2009;51(1):5–9.

[3]   Diabetes Atlas | International Diabetes Federation [Internet]. [cited 2017 Apr 20]. Available from: http://www.idf.org/diabetesatlas/5e/the-global-burden

[4]   Bani IA. Prevalence, Knowledge, Attitude and Practices of Diabetes Mellitus among Jazan Population, Kingdom of Saudi Arabia (KSA). J Diabetes Mellit [Internet].2000;5(5):115–22.Availablefrom:
http://www.scirp.org/journal/jdm%5Cnhttp://dx.doi.org/10.4236/jdm.2015.52014%5Cnhttp://creativecommons.org/licenses/by/4.0/

[5]   Hobani YH, Mathew S, Samsam HA. Diabetes Mellitus, Hypertension & Associated Factor's among students of Jazan in the Kingdom of Saudi Arabia. Int J Appl Sci Biotechnol [Internet]. 2015 Dec 30 [cited 2017 Apr 20];3(4):708. Available   from: http://www.nepjol.info/index.php/IJASBT/article/view/13921

[6]   Badedi M, Solan Y, Darraj H, Sabai A, Mahfouz M, Alamodi S, et al. Factors Associated with Long-Term Control of Type 2 Diabetes Mellitus. 2016;2016.

[7]   Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA NDDPPRG. Reduction in the incidence of type 2 diabetes with lifestyle in-

tervention or metformin. N Engl J Med. 2006;346(6):393–403.

[8]   Aune D, Norat T, Leitzmann M, Tonstad S, Vatten LJ. Physical activity and the risk of type 2 diabetes: A systematic review and dose-response meta-analysis. Eur J Epidemiol [Internet]. 2015 Jul 20 [cited 2017 Apr 20];30(7):529–42. Available from: http://link.springer.com/10.1007/s10654-015-0056-z

[9]   S. P, L.D. A, P.G.M. R, P.R. S, N.M. N, N.P. N. Knowledge, attitude, and practice outcomes: Evaluating the impact of counseling in hospitalized diabetic patients in India. P T [Internet]. 2006;31(7):383–92. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed7& NEWS=N&AN=2006368250

[10]   Brunisholz KD, Joy EA, Hashibe M, Gren LH, Savitz LA, Hamilton S, et al. Incidental risk of type 2 diabetes mellitus among patients with confirmed and unconfirmed prediabetes. PLoS One. 2016;11(7):1–9.

[11]   11Webb DR, Khunti K, Srinivasan B, Gray LJ, Taub N, Campbell S, et al. Rationale and design of the ADDITION-Leicester study, a systematic screening programme and Randomised Controlled Trial of multi-factorial cardiovascular risk intervention in people with Type 2 Diabetes Mellitus detected by screening. Trials. 2010;11:1–12.

[12]   12.   Marinik EL, Kelleher S, Savla J, Winett RA, Davy BM. The Resist Diabetes trial: Rationale, design, and methods of a hybrid efficacy/effectiveness intervention trial for resistance training maintenance to improve glucose homeostasis in older prediabetic adults. Contemp Clin Trials [Internet]. 2014 [cited   2017   Apr   21];37(1):19–32.   Available   from: http://www.sciencedirect.com/science/article/pii/S1551714413001778

[13]   13.   Geiss LS, James C, Gregg EW, Albright A, Williamson DF, Cowie CC. Diabetes Risk Reduction Behaviors Among U.S. Adults with Prediabetes. Am J Prev Med [Internet]. 2010 [cited 2017 Apr 21];38(4):403–9. Available from: http://www.sciencedirect.com/science/article/pii/S0749379710000097

[14]   Al-Bannay HR, Jongbloed LE, Jarus T, Alabdulwahab SS, Khoja TA, Dean E, et al. Outcomes of a type 2 diabetes education program adapted to the cultural contexts of saudi women. A pilot study. Saudi Med J [Internet]. 2015;36(7):869–73.   Available   from: http://smj.psmmc.med.sa/index.php/smj/article/download/smj.2015.7.11 681/7438%5Cnhttp://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=referenc e&D=emed13&NEWS=N&AN=2015178836%5Cnhttps://www.scopus.com /inward/record.url?eid=2-s2.0-84935469092&partnerID=40&md5=a2795e

[15]   Bani IA. Prevalence, Knowledge, Attitude and Practices of Diabetes Mellitus among Jazan Population, Kingdom of Saudi Arabia (KSA). J Diabetes Mellit [Internet]. 2000;5(5):115–22.

[16]   U. M. and U. Z., "Knowledge, attitude and practice (KAP) survey of type 2 diabetes mellitus," Pakistan J. Med. Heal. Sci., vol. 9, no. 1, pp. 351–355, 2015

[17]   Choudhury SD, Das SK and Hazra A. Surveyof knowledge-attitude-practice concerning

[18]   insulin use in adult diabetic patients in eastern India. Indian J Pharmacol 2014; 46(4): 425-429.

[19]   21. Mashige KP, Notshweleka A, Moodley S, Rahmtoola FH, Sayed SB, Singh S, Sardiwalla Z. An assessment of the level of diabetic patients' knowledge of diabetes mellitus, its complications and management in Durban, South Africa. African Vision Eye Health 2008; 67(3): 95-105