

STATISTICAL ANALYSIS OF THE NEXUS
BETWEEN DIETARY HABITS AND
PRACTICES WITH CLINICAL OUTCOME IN
SAUDI PATIENTS WITH TYPE 2 DIABETES

WAQAS SAMI

DOCTOR OF PHILOSOPHY

UNIVERSITI MALAYSIA PAHANG



SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis, and, in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Doctor of Philosophy in Statistics.

(Supervisor's Signature)

Full Name : DR. MOHD RASHID BIN AB HAMID

Position : ASSOCIATE PROFESSOR

Date :



STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

(Student's Signature)

Full Name : WAQAS SAMI

ID Number : PSS15001

Date : March 8, 2019

STATISTICAL ANALYSIS OF THE NEXUS BETWEEN DIETARY HABITS
AND PRACTICES WITH CLINICAL OUTCOME IN SAUDI PATIENTS WITH
TYPE 2 DIABETES

WAQAS SAMI

Thesis submitted in fulfillment of the requirements
for the award of the degree of
Doctor of Philosophy

Faculty of Industrial Management
UNIVERSITI MALAYSIA PAHANG

MARCH 2019

ACKNOWLEDGEMENTS

First of all, I am thankful to Almighty ALLAH for giving me the courage and insight to complete this thesis in time.

I would like to express my sincere gratitude to my supervisor and mentor ASSOCIATE PROFESSOR DR. MOHD RASHID BIN AB HAMID for his continuous support, guidance, patience, motivation, and immense knowledge that helped me in timely completion of this thesis. He left no stone unturned in improving, changing and amending my work wherever it had any loophole from the minuscule level to the whole piece.

I would also like to thank Dr. Nadeem Shafique Butt (co-supervisor) for his insightful feedback, comments, and encouragement which incited me to widen my research from various perspectives.

Dr. Tahir Ansari (field supervisor) deserve my special thanks who very kindly helped me to embellish this thesis from the perspective of medical science. He helped me to maintain all the medical dimensions immaculately, preened it with all kinds of technicalities and provided me the beacon in improving questionnaires, methodology and the fieldwork from medical perspective.

Most importantly, my sincere apperception goes to Prof. Dr. Marko Sarstedt for providing endless support throughout my research.

Side by side it would be unjust if the words of thanks may not be jotted down for my wife Tayyaba Waqas who helped me a lot in shouldering my professional and family routine work and spared me to utilize most of the time in thesis writing. Finally, I want to mention those who do not need to be mentioned, because they are the very reason for my existence, the family; Sami Ullah Mahmood (father), Anjum Sami (mother), Nauman Sami (elder brother) and Areeba Sami (sister) for their endless concern, love and support throughout my Ph.D. journey.

My special thanks to my colleagues Dr. Kamran Afzal, Dr. Laeeq uz Zaman and Mr. Abid Hayat Khokhar (who helped in the editing of the thesis), Dr. Elsadig Yousef Mohammed (who translated all the questionnaires in the Arabic language), Dr. Ibrahim Adam (who helped in backward translation of all the questionnaires) and Dr. Shahid Anwar for this tremendous support in final submission of the thesis.

DEDICATION

To my beloved parents
Sami Ullah Mahmood and Anjum Sami
Without whom none of my success would be possible

and

My wife and kids
Tayyaba, Manha and Muhammad Ibrahim
Who were the motivation behind to pursue Ph.D.

ABSTRAK

Tabiat pemakanan dan gaya hidup tidak aktif merupakan faktor utama peningkatan mendadak kes kencing manis atau Diabetes Mellitus (DM) di Arab Saudi (KSA). Dengan kadar peningkatan pesat jumlah pesakit kencing manis di Arab Saudi, dianggarkan pada tahun 2022 kelaziman T2DM akan menjadi 44.1%. Komplikasi kencing manis, terutamanya kencing manis retinopati (DR) juga sedang meningkat pada kadar yang membimbangkan di KSA. Pada 2007, kelaziman DR adalah 31% dan ianya meningkat kepada 36.4% pada 2015. Hampir setiap suku tahun, sekitar 30 - 40% pesakit kencing manis telah datang ke klinik dengan masalah *dyslipidaemia*, komplikasi awal organ dan tahap HbA1c yang semakin tinggi. Kajian kepustakaan yang diterbitkan menunjukkan bahawa hubungan antara tabiat pemakanan dan amalan pesakit kencing manis jenis 2 tidak dikaji dengan sebaiknya di KSA. Tambahan itu, hanya sedikit kajian telah dijalankan bagi menangani isu kencing manis *dyslipidaemia* dan HbA1c yang tidak terkawal juga semakin meningkat di KSA. Di samping itu, terdapat bukti yang jelas dalam kesusasteraan tentang adanya model konsultasi pemakanan yang boleh digunakan untuk menjalankan penilaian diet kencing manis jenis 2. Oleh itu, objektif kajian ini adalah; untuk menilai tahap dasar pesakit kencing manis tentang Pengetahuan Diabetes Mellitus (DMK), Pengetahuan Pemakanan (DK), Tingkahlaku Pemakanan (DA), Amalan Pemakanan (DP), profil lipid dan HbA1c; untuk menguji secara empirik model konsultasi pemakanan dan, untuk mencari kelaziman DR dan perkaitannya dengan HbA1c. Pra-ujian dijalankan untuk menilai kesahan muka dan kesahan kandungan, manakala tujuan kajian rintis adalah untuk menilai kebolehpercayaan dan kesahihan soal selidik. Data untuk kajian utama telah dikutip dari 5 Februari hingga 24 April 2017 daripada 350 pesakit dengan menggunakan teknik pensampelan rawak sistematik melalui kaedah penyiasatan langsung. Ujian satu-sampel *Wilcoxon signed ranked*, ujian satu-sampel *chi-square*, ujian *Mann-Whitney U*, *Pearson chi-square*, *logistic regression* dan Pemodelan Kuasa Dua Terkecil Model Persamaan Struktur (SEM) telah digunakan untuk menguji hubungan-hubungan yang hipotesiskan. Analisis asas menunjukkan bahawa pesakit diabetes jenis 2 mempunyai DMK dan DK yang lemah, DA yang tidak sesuai, DP yang tidak sihat serta profil lipid dan HbA1c yang tidak terkawal. Skor-skor yang dihasilkan dari analisis asas telah digunakan dalam SEM. Model formatif telah digunakan dalam kajian ini. Keputusan penilaian terhadap model luaran menunjukkan bukti kesahan konvergen, tiada masalah multikolinearan, dan berat luaran bagi semua penunjuk adalah signifikan seperti yang ditunjukkan oleh nilai-*t* dan nilai-*p*. Penemuan terhadap model struktur menunjukkan wujud hubungan yang kuat di antara DMK, DK, DA, DP dan HbA1c. Selain itu, DMK (faktor berpengaruh) dengan ketaranya secara langsung mempengaruhi DK dan DP, manakala, ia juga mempunyai kesan tidak langsung yang signifikan terhadap HbA1c (pemboleh ubah hasil). Kelaziman DR didapati 28.3% dan mempunyai perkaitan yang signifikan terhadap HbA1c. Terdapat ketiadaan kesedaran terhadap pemakanan yang sihat, tabiat makan yang tidak baik dan kurangnya budaya senaman dalam masyarakat Arab. Ini telah menyebabkan diabetes terutamanya jenis 2 dan obesiti. Ianya memerlukan program tiga dimensi yang mempromosi senama pada usia muda dan pendidikan nutrisi tanpa mengira kawasan, jantina dan lapisan masyarakat. Kajian ini telah mencadangkan satu model konsultasi pemakanan yang telah terbukti, yang mana ianya boleh digunakan secara bersendirian atau disepadukan dengan model perundingan kencing manis yang ada untuk penjagaan kencing manis yang lebih berkesan. Penyedia kesihatan perlu memberi penekanan khusus kepada pesakit kencing manis melalui pemboleh ubah yang dikaji iaitu DMK, DK dan DA kerana faktor-faktor ini mempunyai pengaruh langsung dan tidak

langsung kepada DP dan HbA1c. Penemuan keseluruhan model konsultasi diet yang dicadangkan memudahkan paradigma penjagaan kesihatan baharu. Ringkasnya, penilaian pemakanan pesakit kencing manis pada peringkat awal dan secara berkala dapat membantu pengurangan komplikasi penyakit kencing manis, yang seterusnya meningkatkan kualiti kehidupan pesakit.

ABSTRACT

Dietary habits and sedentary lifestyle are the major factors for rapidly-rising incidence of Diabetes Mellitus (DM) in the Kingdom of Saudi Arabia (KSA). At this rapid rate of increase in the number of Saudi diabetics, it is expected that by the year 2022 the prevalence of T2DM would be 44.1%. Diabetes complications, especially Diabetic Retinopathy (DR) is also increasing at an alarming pace in KSA. In 2007, the prevalence of DR was 31% which in 2015 increased to 36.4%. It was observed that almost in every quarter-yearly around 30% - 40% of the diabetic patients were presenting in the clinics with dyslipidaemia, early end-organ complications and elevated HbA1c levels. It has been pointed out in the published literature that the relation between dietary habits and practices of type 2 diabetics have not been studied well in KSA. Moreover, diabetic dyslipidaemia and uncontrolled HbA1c is also on the rise in KSA with very few studies addressing this issue. In addition, there is a bleak evidence in the literature about the availability of dietary consultation model that can be used to carry out the dietary assessment of type 2 diabetics. Therefore, the objectives of this research were; to assess diabetic patient's baseline Diabetes Mellitus Knowledge (DMK), Dietary Knowledge (DK), Dietary Attitude (DA), Dietary Practices (DP), lipid profile and HbA1c; to empirically test the hypothesised dietary consultation model and, to find the prevalence of DR and its association with HbA1c. Pre-test was conducted to evaluate the face validity and content validity, whereas, the purpose of pilot study was to evaluate the questionnaires' reliability and validity. The data for main study was collected from 5th February to 24th April 2017 from 350 patients using systematic random sampling technique by direct investigation method. One-sample Wilcoxon signed ranked test, one-sample chi-square test, Mann-Whitney U test, Pearson chi-square, logistic regression and Partial Least Squares Structural Equation Modelling (SEM) was used to test the hypothesised relationships. Baseline analysis showed that type 2 diabetics had poor DMK and DK, inappropriate DA, unhealthy DP and uncontrolled lipid profile and HbA1c. Scores generated from baseline analysis were used in SEM. A formative model was used in this research. Results of outer model evaluation showed the evidence of convergent validity, no problem of multicollinearity, and outer weights of all indicators were significant as evident by t-values and p-values. Findings of structural model showed that there is a strength interrelationship between DMK, DK, DA, DP and HbA1c. Moreover, DMK (influential factor) was directly significantly predicting DK and DP, whereas, it had the highest significant indirect effect on HbA1c (outcome variable). The prevalence of DR was found to be 28.3% and had a significant association with HbA1c. There is great unawareness of healthy diet, poor eating habits and void of exercise-culture in Arab society. It breeds diabetes especially of type 2 and obesity. It demands a three-dimensional programme of promoting early age exercise and nutrition education irrespective of region, gender and stratum of society. The study proposed a validated dietary consultation model, this model can be used alone or integrated with any available diabetes consultation model for more effective diabetes care. Healthcare providers should pay special emphasis on diabetics DMK, DK and DA as these factors have a direct and indirect influence on DP and HbA1c. Findings of the overall proposed dietary consultation model facilitates a new healthcare paradigm. Conducting dietary assessment of diabetics at initial stage and periodically can help in overall reduction in diabetes complications, thus improving the quality of life of patients.

TABLE OF CONTENT

DECLARATION	
TITLE PAGE	
ACKNOWLEDGEMENTS	ii
DEDICATION	iii
ABSTRAK	iv
ABSTRACT	vi
TABLE OF CONTENT	vii
LIST OF TABLES	xv
LIST OF FIGURES	xviii
LIST OF SYMBOLS	xix
LIST OF ABBREVIATIONS	xx
CHAPTER 1 INTRODUCTION	1
1.1 Introduction to the Chapter	1
1.2 Research Background	1
1.3 Problem Statement	4
1.4 Research Justification	6
1.5 Theoretical Framework	7
1.6 Research Objectives	8
1.7 Research Questions in the context of Research Objectives	8
1.8 Research Scope	9
1.9 Research Significance	9
1.9.1 Addition to Theory	9

1.9.2	Addition to Current Body of Knowledge Related to Diabetes Management	9
1.9.3	Advantages to Basic Health Facility Centers in Saudi Arabia	10
1.10	Operational Definitions	10
1.10.1	Body Mass Index (BMI)	10
1.10.2	Glycated Haemoglobin (HbA1c)	11
1.10.3	Lipid Profile	11
1.10.4	Low Density Lipoprotein Cholesterol	11
1.10.5	High Density Lipoprotein Cholesterol	12
1.10.6	Total Cholesterol	12
1.10.7	Triglycerides	12
1.11	Summary of the Chapter	12
CHAPTER 2 LITERATURE REVIEW		14
2.1	Introduction to the Chapter	14
2.2	Introduction to Diabetes	14
2.3	Epidemiology of Diabetes	15
2.4	Relevant Definitions	16
2.4.1	Oral Glucose Tolerance Test (OGTT)	16
2.4.2	Impaired Fasting Glucose (IFG) and Impaired Glucose Tolerance (IGF)	16
2.4.3	Maturity Onset Diabetes of the Young (MODY)	16
2.5	Type 2 Diabetes Mellitus – Globally and in Saudi Arabia	17
2.6	Physical Activity and Lifestyle	19
2.7	Relation between Diet and Type 2 Diabetes Mellitus – History to Present	20
2.8	Type 2 Diabetes Complications	21
2.8.1	Diabetic Nephropathy	22

2.8.2	Cardiovascular Diseases	23
2.8.3	Diabetic Neuropathy	23
2.8.4	Diabetic Retinopathy	24
2.9	Food Guide Pyramid	25
2.10	Underpinning Theories	26
2.10.1	Health Belief Model	26
2.10.2	Theory of Planned Behaviour	27
2.10.3	The Trans-Theoretical Model	28
2.10.4	Social Cognitive Theory	28
2.10.5	Patient Empowerment Theory	28
2.10.6	Knowledge-Attitude-Practice Theory	32
2.10.7	Knowledge-Attitude-Practice-Outcome Framework	34
2.11	Development of Hypotheses	36
2.11.1	Diabetes Mellitus Knowledge of Type 2 Diabetics	36
2.11.2	Dietary Knowledge of Type 2 Diabetics	37
2.11.3	Dietary Attitude of Type 2 Diabetics	38
2.11.4	Dietary Practices of Type 2 Diabetics	40
2.11.5	Lipid Profile of Type 2 Diabetics	42
2.11.6	HbA1c of Type 2 Diabetics	43
2.11.7	Relationship between Diabetes Mellitus Knowledge, Dietary Knowledge, Dietary Attitude, Dietary Practices and HbA1c	44
2.11.8	Prevalence of DR and its relationship with HbA1c	53
2.12	Hypothesised Model	55
2.13	Summary of the Chapter	56
	CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY	58
3.1	Introduction to the Chapter	58

3.2	Pre-test (Phase 1)	58
	3.2.1 Face Validity	59
	3.2.2 Content Validity	59
3.3	Structural Equation Modelling	60
3.4	Instruments of Data Collection	60
	3.4.1 Patient Profile and Clinical Data Questionnaire	60
	3.4.2 Diabetes Mellitus Knowledge Questionnaire	61
	3.4.3 Dietary Knowledge Questionnaire	61
	3.4.4 Dietary Attitude Questionnaire	62
	3.4.5 Dietary Practices Questionnaire	63
3.5	Pilot Study – Phase 2	64
	3.5.1 Research Design for Pilot Study	64
	3.5.2 Inclusion and Exclusion Criteria for Pilot Study	64
	3.5.3 Study Setting and Sample Selection for Pilot Study	65
	3.5.4 Sample Size for Pilot Study	65
	3.5.5 Data Collection for Pilot Study	66
	3.5.6 Procedure for Drawing Blood Sample	66
	3.5.7 Ethical Considerations	67
	3.5.8 Data Analysis for Pilot Study	67
3.6	Validity and Reliability of Study Questionnaires	68
	3.6.1 Construct Validity	68
	3.6.2 Reliability	69
3.7	Methods for Data Analysis	70
	3.7.1 Logistic Regression Analysis	70
	3.7.2 Partial Least Squares Estimation Technique	71
	3.7.3 Detection of Outliers	73

3.7.4	Normality of Data	74
3.7.5	Common Method Bias	74
3.8	Reflective and Formative Measurement Models	74
3.8.1	Reflective and Formative Measurement Models	76
3.8.2	Assessing Convergent Validity	77
3.8.3	Assessing Collinearity Validity	77
3.8.4	Assessing the Significance and Relevance of Formative Indicator	78
3.8.5	Evaluation of Formative Structural Model	78
3.8.6	Assessing Structural Model for Collinearity Issues	79
3.8.7	Assessing the Significance and Relevance of Structural Model Relationships	80
3.8.8	Assessing the Level of R^2	80
3.8.9	Assessing the Level of f^2	81
3.8.10	Model Fit in PLS-SEM	81
3.9	Main Study – Phase 3	82
3.9.1	Study Design and Setting	82
3.9.2	Target Population	82
3.9.3	Sample Size	82
3.9.4	Sampling Technique	83
3.9.5	Data Collection	83
3.9.6	Screening of Diabetic Retinopathy	84
3.9.7	Data Analysis for Main Study	84
3.10	Summary of the Chapter	85
CHAPTER 4 DATA ANALYSIS AND FINDINGS		86
4.1	Introduction to the Chapter	86
4.2	Results of Pre-test	86

4.3	Results of Pilot Study	93
4.3.1	Descriptive Analysis for Sociodemographic Data	93
4.3.2	EFA for Dietary Attitude Questionnaire	95
4.3.3	Results of Reliability Analysis for Questionnaires	99
4.3.4	Conclusion of Psychometric Analysis	107
4.4	Results of Main Study	108
4.4.1	Descriptive Analysis for Sociodemographic Data	108
4.5	Hypotheses Testing	110
4.5.1	Hypothesis#1:Type 2 Diabetics’ Diabetes Mellitus Knowledge is Inadequate	110
4.5.2	Hypothesis#2:Type 2 Diabetics’ have Inadequate Dietary Knowledge	113
4.5.3	Hypothesis#3:The Dietary Attitude of Type 2 Diabetics’ is Inappropriate	116
4.5.4	Hypothesis#4:Type 2 Diabetics have Unhealthy Dietary Practices	122
4.5.5	Hypothesis#5:Lipid profile of type 2 diabetics’ is uncontrolled	133
4.5.6	Hypothesis#6:HbA1c of type 2 diabetics’ is uncontrolled	135
4.6	Structural Equation Modelling Analysis	135
4.6.1	Detection of Outliers	136
4.6.2	Normality of Data	136
4.6.3	Multicollinearity	136
4.6.4	Common Method Bias	137
4.7	Evaluation of Formative Measurement Model	137
4.7.1	Assessing Convergent Validity / Redundancy Analysis	138
4.7.2	Assessing Collinearity among Indicators and Constructs	146
4.7.3	Significance and Relevance of Formative Measurement Model Outer weights	147

4.7.4	Summary Analysis of Measurement Model (Outer Model)	148
4.8	Power Analysis	152
4.9	Evaluation of Formative Structural Model (Inner Model)	152
4.9.1	Examining Structural Model (Inner Model) for Collinearity Issue	152
4.9.2	Assessment of Significance and Relevance of Inner Model Relationships	153
4.9.3	Coefficient of Determination (R^2)	154
4.9.4	Effect Size (f^2)	155
4.9.5	Hypothesis Testing for Structural Equation Model	155
4.9.6	Total Effects	157
4.9.7	Model Fit Index	157
4.9.8	Summary Analysis of Structural Model (Inner Model)	158
4.10	Hypothesis # 13: Diabetic Retinopathy is Prevalent and is associated with HbA1c	158
4.11	Summary of the Chapter	160
 CHAPTER 5 DISCUSSIONS AND CONCLUSIONS		162
5.1	Introduction to the Chapter	162
5.2	Summary of Findings	162
5.3	Discussion on Findings	165
5.3.1	Research Question 1	165
5.3.2	Research Question 2	176
5.3.3	Research Question 3	181
5.3.4	Research Question 4	183
5.3.5	Research Question 5	186
5.3.6	Research Question 6	188
5.3.7	Research Question 7	191

5.4	Contribution of the Study	194
5.4.1	Contribution to Theory	194
5.4.2	Contribution to Practice	195
5.5	Recommendations	196
5.6	Limitations of the Study	199
5.7	Future Research	200
5.8	Concluding Remarks	201
	REFERENCES	203
	APPENDIX A	238
	APPENDIX B	280
	APPENDIX C	285
	APPENDIX D	289
	APPENDIX E	294

LIST OF TABLES

Table 1.1	Link between the RQs and the ROs	8
Table 1.2	BMI Criteria	11
Table 2.1	IDF Regions and Global Projections of the Number of People with Diabetes (20-79 years), 2013 and 2035	18
Table 2.2	Study Characteristics and Prevalence of Retinopathy by IDF Region	25
Table 3.1	Expert Panel List	59
Table 3.2	Systematic Random Sampling selection of patients for Pilot Study from each Primary Healthcare Center in Almajmaah City	65
Table 3.3	Various Criteria to choose between Reflective and Formative Models	75
Table 3.4	Sample Selection from each Primary Healthcare Center	83
Table 3.5	Systematic Random Sampling Selection of Patients for Main Study from each Primary Healthcare Center	83
Table 4.1	I-CVI's and Q-CVI of Diabetes Mellitus Knowledge Questionnaire	87
Table 4.2	I-CVI's and Q-CVI of Dietary Knowledge Questionnaire	88
Table 4.3a	I-CVI's and Q-CVI of Dietary Attitude Questionnaire (Section A)	89
Table 4.3b	I-CVI's and Q-CVI of Dietary Attitude Questionnaire (Section B)	89
Table 4.4	I-CVI's and Q-CVI of Dietary Practices Questionnaire	90
Table 4.5	Sociodemographic Characteristics of Patients	94
Table 4.6	Risk Factors Profile of Patients	94
Table 4.7	Anthropometric Measures and Biochemical Profile of Patients	95
Table 4.8	One-sample K-S Test	96
Table 4.9	Preliminary Analysis of all Items	97
Table 4.10	Rotated Component Matrix	98
Table 4.11	Loadings in which Variables Contribute to Factors	98
Table 4.12a	ICR and CITC for Diabetes Mellitus Knowledge Questionnaire	99
Table 4.12b	ICR and CITC for Diabetes Mellitus Knowledge Questionnaire	100
Table 4.13	ICR and CITC for Dietary Knowledge Questionnaire	101
Table 4.14a	ICR and CITC for Dietary Attitude Questionnaire (Section A)	102
Table 4.14b	ICR and CITC for Dietary Attitude Questionnaire (Section B)	103
Table 4.15a	ICR and CITC for Protein Group	103
Table 4.15b	ICR and CITC for Carbohydrate Group	104
Table 4.15c	ICR and CITC for Dairy Products Group	104
Table 4.15d	ICR and CITC for Lipids and Fats Group	104

Table 4.15e	ICR and CITC for Sweets and Bakery Group	105
Table 4.15f	ICR and CITC for Drinks Group	105
Table 4.15g	ICR and CITC for Fruits Group	105
Table 4.15h	ICR and CITC for Vegetables Group	106
Table 4.15i	ICR and CITC for Soup and Sauces Group	106
Table 4.16	Summary of Reliability Analysis	107
Table 4.17	Sociodemographic Characteristics of Patients (n = 350)	109
Table 4.18	Risk Factors Profile of Patients (n = 350)	110
Table 4.19	Diabetes Mellitus Knowledge Score (n = 350)	111
Table 4.20	Sub-groups of Diabetes Mellitus Knowledge (n = 350)	112
Table 4.21	Dietary Knowledge Score (n = 350)	114
Table 4.22	Sub-groups of Dietary Knowledge Score (n = 350)	115
Table 4.23	General Dietary Attitude of Type 2 Diabetics (Section A)	116
Table 4.24	Mean Scores of Sub-groups (n = 350) – Section A	118
Table 4.25	Omnibus Test of Model Coefficients	119
Table 4.26	Classification Table	119
Table 4.27a	Binary Logistic Regression Analysis using Backward Conditional Approach for Dietary Attitude of Type 2 Diabetics towards Specific Food items	119
Table 4.27b	Binary Logistic Regression Results of Non-Significant Food Items	121
Table 4.28	Average Use of Protein in Last 3 Months	123
Table 4.29	Average Use of Carbohydrates in Last 3 Months	124
Table 4.30	Average Use of Dairy Products in Last 3 Months	125
Table 4.31	Average Use of Lipids and Fats in Last 3 Months	126
Table 4.32	Average Use of Sweets and Bakery in Last 3 Months	127
Table 4.33	Average Use of Drinks in Last 3 Months	128
Table 4.34	Average Use of Fruits in Last 3 Months	129
Table 4.35	Average Use of Vegetables in Last 3 Months	130
Table 4.36	Average Use of Soup and Sauces in Last 3 Months	131
Table 4.37	Comparison of Type 2 Diabetics Median Consumption of Foods vs. Recommended Intake as per Food Guide Pyramid and ADA	132
Table 4.38	Lipid Profile of Patients (n = 350)	133
Table 4.39	Significance of Lipid Profile (n = 350)	134
Table 4.40	HbA1c (n = 350)	135
Table 4.41	Significance of HbA1c Level (n = 350)	135
Table 4.42	Collinearity Assessment through Tolerance and VIF	137

Table 4.43	Summary of Redundancy Analysis	146
Table 4.44	Outer Model VIF Values	146
Table 4.45	Formative Constructs Outer Weights Significance	148
Table 4.46	Collinearity Assessment among Predictor Variables	153
Table 4.47	Significance and Relevance of Inner Model Relationships	153
Table 4.48	Coefficient of Determination (R ²)	154
Table 4.49	R ² for Structural Model Relationships	154
Table 4.50	Effect Sizes for Structural Model Relationships	155
Table 4.51	Hypotheses Testing Results	155
Table 4.52	Significance and Testing of Total Effects	157
Table 4.53	Model Fit Index	157
Table 4.54	Omnibus Test of Model Coefficients	158
Table 4.55	Classification Table	159
Table 4.56	Association between DR and HbA1c using Binary Logistic Regression	159
Table 5.1	Summary of Hypotheses in the Context of ROs, RQs and Hypotheses	164

LIST OF FIGURES

Figure 1.1	Theoretical Framework of Study	7
Figure 2.1	Prevalence of People with Diabetes by Age and Sex (2014)	18
Figure 2.2	Prevalence of Diabetes in Adults by Age, 2014	19
Figure 2.3	Food Guide Pyramid showing Foods Groups and Optimum Daily Servings	26
Figure 2.4	Knowledge-Attitude-Practice Model by Schwartz (1976)	33
Figure 2.5	Knowledge-Attitude-Practice-Outcome Model by Wan (2014)	35
Figure 2.6	Hypothesised Dietary Consultation Model for Diabetes Care	56
Figure 3.1	Evaluation of Exploratory Factor Analysis by Burton & Mazerolle (2011)	69
Figure 3.2	Systematic Procedure for Applying PLS-SEM (Hair et al., 2016)	73
Figure 3.3	Validity Assessment of Formative Models (Hair et al., 2016)	76
Figure 3.4	Evaluation of Formative Structural Model (Hair et al., 2016)	79
Figure 4.1	Scree Plot	99
Figure 4.2	Redundanc Analysis for DMK Questionnaire	138
Figure 4.3	Redundanc Analysis for DK Questionnaire	139
Figure 4.4	Redundanc Analysis for DA Questionnaire	140
Figure 4.5	Redundanc Analysis for Protein Group	141
Figure 4.6	Redundanc Analysis for Carbohydrate Group	141
Figure 4.7	Redundancy Analysis for Dairy Products Group	142
Figure 4.8	Redundancy Analysis for Lipids and Fats Group	142
Figure 4.9	Redundancy Analysis for Sweets and Bakery Group	143
Figure 4.10	Redundancy Analysis for Drinks Group	144
Figure 4.11	Redundancy Analysis for Fruits Group	144
Figure 4.12	Redundancy Analysis for Soup and Sauces Group	145
Figure 4.13	Redundancy Analysis for Vegetables Group	145
Figure 4.14	Full Research Model with Outer Weights and p-values	150
Figure 4.15	Full Research Model with t-values	151

LIST OF SYMBOLS

β	Path Coefficient
β	Regression Coefficient
$1 - \beta$	Power of Study
R^2	Coefficient of Determination
f^2	Effect Size
t	Statistical Result of t-test
$<$	Less than
$>$	Greater than
d^2	Desired Precision
Z^2	Value from Standard Normal Distribution Corresponding to desired Confidence Interval
p	Expected True Proportion
$1 - p$	1-Expected True Proportion
χ^2	Chi-Square
SD	Standard Deviation
k	Size of Interval for Selection
N	Population Size
n	Sample Size

LIST OF ABBREVIATIONS

AACE	American Association of Clinical Endocrinologists
ADA	American Diabetes Association
AVE	Average Variance Extracted
BCCM	Behavioural Change Communication Material
BCa	Bias-Corrected and Accelerated
BED	Binge Eating Disorder
BMI	Body Mass Index
CB-SEM	Covariance-Based Structural Equation Modelling
CBIA-DM	Community Based Interactive Approach to Diabetes Mellitus
CDC	Centre for Disease Control and Prevention
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CHD	Coronary Heart Disease
CI	Confidence Interval
CITC	Corrected Item Total Correlation
CME	Continuous Medical Education
CVA	Cerebrovascular Accident
CVD	Cardiovascular Diseases
CVI	Content Validity Index
DA	Dietary Attitude
DAQ	Dietary Attitude Questionnaire
DCCT	Diabetes Control and Complications Trial
DK	Dietary Knowledge
DKQ	Dietary Knowledge Questionnaire
DM	Diabetes Mellitus
DMK	Diabetes Mellitus Knowledge
DMKQ	Diabetes Mellitus Knowledge Questionnaire
DME	Diabetes Mellitus Education
DN	Diabetic Nephropathy
DNP	Diabetic Neuropathy
DP	Dietary Practices

DPQ	Dietary Practices Questionnaire
DR	Diabetic Retinopathy
DRS	Diabetic Retinopathy Study
DZ	Dizygous
EFA	Exploratory Factor Analysis
ELISA	Enzyme-Linked Immunosorbent Assay
ESRD	End Stage Renal Disease
ETDRS	Early Treatment of Diabetic Retinopathy Study
FBS	Fasting Blood Sugar
FFQ	Food Frequency Questionnaire
GCC	Gulf Cooperation Council
GDM	Gestational Diabetes Mellitus
GFR	Glomerular Filtration Rate
GoF	Goodness of Fit
GSCA	Generalized Structured Component Analysis
HbA1c	Haemoglobin A1c
HBM	Health Belief Model
HDL-C	High Density Lipoprotein-Cholesterol
HGI	High Glycaemic Index
HGI	High Glycaemic Index
HRQoL	Health-Related Quality of Life
ICR	Internal Consistency Reliability
I-CVI	Item-Content Validity Index
IDF	International Diabetes Federation
IFG	Impaired Fasting Glucose
IGT	Impaired Glucose Tolerance
INO	International Nutritional Organization
KAP	Knowledge, Attitude, Practice
KAP-O	Knowledge, Attitude, Practice-Outcome
KMO	Kaiser Meyer Olkin
KSA	Kingdom of Saudi Arabia
K-S Test	Kolmogorov Smirnov Test
LDL-C	Low Density Lipoprotein-Cholesterol

LGI	Low Glycaemic Index
MCQ	Multiple Choice Question
MENA	Middle East and North America
MI	Myocardial Infarction
MODY	Maturity Onset Diabetes of the Young
MUFA	Monounsaturated Fatty Acids
MZ	Monozygous
NCHS	National Centre for Health Statistics
NEUSREL	Nonlinear Universal Structural Relational Modelling
NFI	Normed Fit Index
NHLBI	National Heart, Lung, and Blood Institute
NICE	National Institute for Health and Care Excellence
NPDR	Non-Proliferative Diabetic Retinopathy
OGTT	Oral Glucose Tolerance Test
OLS	Ordinary Least Square
PCA	Principal Component Analysis
PDR	Proliferative Diabetic Retinopathy
PLS-SEM	Partial Least Square Structural Equation Modelling
p-value	Probability Value
Q-CVI	Questionnaire-Content Validity Index
RMSEA	Root Mean Square Error of Approximation
RMSTheta	Root Mean Square Residual Covariance
RR	Relative Risk
SAED	Intelligent Mobile Diabetes Management and Education System
SAR	Saudi Riyal
SCT	Social Cognitive Theory
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Sciences
SRMR	Standardized Root Mean Square Residual
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
TC	Total Cholesterol

TG	Triglycerides
TPB	Theory of Planned Behaviour
UAE	United Arab Emirates
UK	United Kingdom
UKPDS	United Kingdom Prospective Diabetes Study
USA	United States of America
VIF	Variance Inflation Factor
VOO	Virgin Olive Oil
VTDR	Vision Threatening Diabetic Retinopathy
WESDR	Wisconsin Epidemiology Study of Diabetic Retinopathy
WHO	World Health Organization

REFERENCES

- Abahussain, N. A., & El-Zubier, A. G. (2005). Diabetes knowledge among self reported diabetic female teachers: Al-Khobar, Saudi Arabia. *Journal of Family and Community Medicine, 12*(1), 43.
- Abegunde, D. O., Mathers, C. D., Adam, T., Ortegon, M., & Strong, K. (2007). The burden and costs of chronic diseases in low-income and middle-income countries. *The Lancet, 370*(9603), 1929-1938.
- Abioye-Kuteyi, E., Ojofeitimi, E., Ijadunola, K., & Fasanu, A. (2004). Assessment of dietary knowledge, practices and control in type 2 diabetes in a Nigerian teaching hospital. *Nigerian journal of medicine: journal of the National Association of Resident Doctors of Nigeria, 14*(1), 58-64.
- Abolghasemi, R., & Sedaghat, M. (2015). The patient's attitude toward type 2 diabetes mellitus, a qualitative study. *Journal of religion and health, 54*(4), 1191-1205.
- Abou-Gamel, M., Jabri, G., Alsharif, A., Al-Rehaili, R., Al-Gabban, A., Alshabi, Y., Hodhiri, A. (2015). Level of Glycemic Control and Barriers of Good Compliance among Diabetic Patients in Al-Madina, Kingdom of Saudi Arabia. *British Journal of Medicine and Medical Research, 5*(6), 819.
- Agresti, A., & Kateri, M. (2011). *Categorical data analysis*: Springer.
- Ahmed, Khalil, S. N., & Al-Qahtani, M. A. (2016). Diabetic retinopathy and the associated risk factors in diabetes type 2 patients in Abha, Saudi Arabia. *Journal of Family and Community Medicine, 23*(1), 18.
- Aikman, S. N., Min, K. E., & Graham, D. (2006). Food attitudes, eating behavior, and the information underlying food attitudes. *Appetite, 47*(1), 111-114.
- Ajzen, I. (2011). *The theory of planned behaviour: reactions and reflections*: Taylor & Francis.
- Akbar, D. H., Mira, S. A., Zawawi, T. H., & Malibary, H. M. (2000). Subclinical diabetic neuropathy: a common complication in Saudi diabetics. *Saudi medical journal, 21*(5), 433-437.
- Akram, J., Aamir, A., Basit, A., Qureshi, M. S., Mehmood, T., Shahid, S. K., Omair, A. (2011). Prevalence of peripheral arterial disease in type 2 diabetics in Pakistan. *JPMA. The Journal of the Pakistan Medical Association, 61*(7), 644-648.
- Al-Aboudi, Suliman, I., Hassali, Azmi, M., Shafie, & Akmal, A. (2016). Knowledge, attitudes, and quality of life of type 2 diabetes patients in Riyadh, Saudi Arabia. *Journal of Pharmacy & Bioallied Sciences, 8*(3), 195.
- Al-Daghri, N. M., Al-Attas, O. S., Alokail, M. S., Alkharfy, K. M., Sabico, S. L. B., & Chrousos, G. P. (2010). Decreasing prevalence of the full metabolic syndrome but a persistently high prevalence of dyslipidemia among adult Arabs. *PloS one, 5*(8), e12159.

- Al-Hamdan, N., Kutbi, A., Choudhry, A., Nooh, R., Shoukri, M., & Mujib, S. (2005). WHO stepwise approach to NCD surveillance country-specific standard report Saudi Arabia. *Organization WH (ed.). WHO Stepwise Approach. WHO: Geneva.*
- Al-Hazzaa, H. M. (2006). Obesity and physical inactivity among Saudi children and youth: Challenges to future public health. *Journal of Family and Community Medicine, 13*(2), 53.
- Al-Kaabba, A. F., Al-Hamdan, N. A., El Tahir, A., Abdalla, A. M., Saeed, A. A., & Hamza, M. A. (2012). Prevalence and correlates of dyslipidemia among adults in Saudi Arabia: results from a national survey. *Open Journal of Endocrine and Metabolic Diseases, 2*(04), 89.
- Al-Kaabi, J., Al-Maskari, F., Saadi, H., Afandi, B., Parkar, H., & Nagelkerke, N. (2008). Assessment of dietary practice among diabetic patients in the United Arab Emirates. *Rev Diabet Stud, 5*(2), 110-115.
- Al-Khudairy, L., Stranges, S., Kumar, S., Al-Daghri, N., & Rees, K. (2013). Dietary Factors and Type 2 Diabetes in the Middle East: What Is the Evidence for an Association? A Systematic Review. *Nutrients, 5*(10), 3871-3897.
- Al-Maskari, F., El-Sadig, M., Al-Kaabi, J. M., Afandi, B., Nagelkerke, N., & Yeatts, K. B. (2013). Knowledge, attitude and practices of diabetic patients in the United Arab Emirates. *PloS one, 8*(1), e52857.
- Al-Nozha, Al-Khadra, A., Arafah, M. R., Al-Maatouq, M. A., Khalil, M. Z., Khan, N. B., Abdullah, M. (2005). Metabolic syndrome in Saudi Arabia. *Saudi medical journal, 26*(12), 1918-1925.
- Al-Nozha, Arafah, M. R., Al-Maatouq, M. A., Khalil, M. Z., Khan, N. B., Al-Marzouki, K., Al-Harthi, S. S. (2008). Hyperlipidemia in Saudi Arabia. *Saudi medical journal, 29*(2), 282-287.
- Al-Nozha, M. M., Al-Maatouq, M. A., Al-Mazrou, Y. Y., & Al-Harthi, S. S. (2004). Diabetes mellitus in Saudi Arabia. *Saudi medical journal, 25*(11), 1603 - 1610.
- Al-Quwaidhi, A. J., Pearce, M. S., Sobngwi, E., Critchley, J. A., & O'Flaherty, M. (2014). Comparison of type 2 diabetes prevalence estimates in Saudi Arabia from a validated Markov model against the International Diabetes Federation and other modelling studies. *Diabetes research and clinical practice, 103*(3), 496-503.
- Al-Rowais, N. A. (2014). Glycemic control in diabetic patients in King Khalid University Hospital (KKUH)–Riyadh–Saudi Arabia. *Saudi Pharmaceutical Journal, 22*(3), 203-206.
- Al-Shehri, A. M. (2014). Prevalence and pattern of lipid disorders in Saudi patients with angiographically documented coronary artery disease. *Journal of family & community medicine, 21*(3), 166.
- Al-Sinani, M., Min, Y., Ghebremeskel, K., & Qazaq, H. S. (2010). Effectiveness of and adherence to dietary and lifestyle counselling: effect on metabolic control in type 2 diabetic Omani patients. *Sultan Qaboos University Medical Journal, 10*(3), 341.

- Alabdulwahhab, K. M. (2016). Prevalence and risk factors of diabetic retinopathy in Saudi Diabetics in Majmaah City. *Australasian Medical Journal*, 9(12).
- Al Asmary, S. M., Al-Harbi, T., Tourkmani, A., Al Khashan, H., Al-Qahtani, H., & Mishriky, A. (2013). Impact of integrated care program on glycemic control and cardiovascular risk in adult patients with type 2 diabetes. *JCOM*, 20(8), 356-363.
- Al Baghli, N., Al Turki, K., Al Ghamdi, A., El Zubaier, A., Al Ameer, M., & Al Baghli, F. (2010). Control of diabetes mellitus in the Eastern province of Saudi Arabia: results of screening campaign.
- Al Shafae, M. A., Al-Shukaili, S., Rizvi, S. G. A., Al Farsi, Y., Khan, M. A., Ganguly, S. S., Al Adawi, S. (2008). Knowledge and perceptions of diabetes in a semi-urban Omani population. *BMC Public Health*, 8(1), 249.
- Alanazi, A. M., el-Fetoh, N. M. A., Alotaibi, H. K., Alanazi, K. A., Alotaibi, B. K., Alshammari, S. M., Alshammari, Z. Q. (2017). Survey of awareness of diabetes mellitus among the Arar population, Northern Border Region of Saudi Arabia. *Electronic physician*, 9(9), 5369.
- Alberti, K., Davidson, M. B., DeFronzo, R. A., Drash, A., Genuth, S., Harris, M. I., Lebovitz, H. (1998). Report of the expert committee on the diagnosis and classification of diabetes mellitus. *Diabetes Care*, 21, S5.
- Alhowaish, A. K. (2013). Economic costs of diabetes in Saudi Arabia. *Journal of Family and Community Medicine*, 20(1), 1.
- Allick, G., Bisschop, P. H., Ackermans, M. T., Endert, E., Meijer, A. J., Kuipers, F., Romijn, J. A. (2004). A low-carbohydrate/high-fat diet improves glucoregulation in type 2 diabetes mellitus by reducing postabsorptive glycogenolysis. *The Journal of Clinical Endocrinology & Metabolism*, 89(12), 6193-6197.
- Alotaibi, M. M., Istepanian, R., & Philip, N. (2016). A mobile diabetes management and educational system for type-2 diabetics in Saudi Arabia (SAED). *mHealth*, 2.
- Alqurashi, K. A., Aljabri, K. S., & Bokhari, S. A. (2011). Prevalence of diabetes mellitus in a Saudi community. *Annals of Saudi medicine*, 31(1), 19.
- Alssema, M., Schindhelm, R. K., Dekker, J. M., Diamant, M., Nijpels, G., Teerlink, T., Heine, R. J. (2008). Determinants of postprandial triglyceride and glucose responses after two consecutive fat-rich or carbohydrate-rich meals in normoglycemic women and in women with type 2 diabetes mellitus: the Hoorn Prandial Study. *Metabolism*, 57(9), 1262-1269.
- Alsulaiman, T. A., Al-Ajmi, H. A., Al-Qahtani, S. M., Fadlallah, I. M., Nawar, N. E., Shukerallah, R. E., Hassan, A. A. (2016). Control of type 2 diabetes in King Abdulaziz Housing City (Iskan) population, Saudi Arabia. *Journal of Family and Community Medicine*, 23(1), 1.

- Alsunni, A. A., Albaker, W. I., & Badar, A. (2014). Determinants of misconceptions about diabetes among Saudi diabetic patients attending diabetes clinic at a tertiary care hospital in Eastern Saudi Arabia. *Journal of family & community medicine, 21*(2), 93.
- Alsunni, A. A., & Badar, A. (2011). Energy drinks consumption pattern, perceived benefits and associated adverse effects amongst students of University of Dammam, Saudi Arabia. *J Ayub Med Coll Abbottabad, 23*(3), 3-9.
- Alvarenga, M. d. S., Scagliusi, F. B., & Philippi, S. T. (2012). Comparison of eating attitudes among university students from the five Brazilian regions. *Ciencia & saude coletiva, 17*(2), 435-444.
- Alwakeel, J., Isnani, A., Alsuwaida, A., AlHarbi, A., Shaikh, S., AlMohaya, S., & Al Ghonaim, M. (2011). Factors affecting the progression of diabetic nephropathy and its complications: a single-center experience in Saudi Arabia. *Annals of Saudi medicine, 31*(3), 236.
- Alzghoul, B. I., & Abdullah, N. A. C. (2015). Psychosocial theories and pain management practices: A review of empirical research. *Mediterranean Journal of Social Sciences, 6*(6 S2), 60.
- American Diabetes Association. (2018). *Standards of Medical Care in Diabetes*. USA. Assessed on (December 16, 2016). Retrieved from http://care.diabetesjournals.org/content/41/Supplement_1/S1
- Amini, M. (2012). A cross-sectional study on food patterns and adiposity among individuals with abnormal glucose homeostasis. *Archives of Iranian medicine, 15*(3), 131.
- Amorim, M. M. A., Ramos, N., Brito, M. J. M., & Gazzinelli, M. F. (2014). Identity representations of people with diabetes. *Qualitative health research, 24*(7), 913-922.
- Amos, A. F., McCarty, D. J., & Zimmet, P. (1997). The rising global burden of diabetes and its complications: estimates and projections to the year 2010. *Diabetic medicine, 14*(S5), S7-S85.
- Anderson, & Funnell, M. M. (2005). Patient empowerment: reflections on the challenge of fostering the adoption of a new paradigm. *Patient Education and Counseling, 57*(2), 153-157.
- Anderson, & Funnell, M. M. (2010). Patient empowerment: myths and misconceptions. *Patient Education and Counseling, 79*(3), 277-282.
- Anderson, R. J., Freedland, K. E., Clouse, R. E., & Lustman, P. J. (2001). The prevalence of comorbid depression in adults with diabetes. *Diabetes Care, 24*(6), 1069-1078.
- Anderson, R. M., & Funnell, M. M. (2000). Compliance and adherence are dysfunctional concepts in diabetes care. *The Diabetes Educator, 26*(4), 597-604.

- Angeles-Llerenas, A., Carbajal-Sánchez, N., Allen, B., Zamora-Muñoz, S., & Lazcano-Ponce, E. (2005). Gender, body mass index and socio-demographic variables associated with knowledge about type 2 diabetes mellitus among 13 293 Mexican students. *Acta diabetologica*, 42(1), 36-45.
- Arjamaa, O., & Nikinmaa, M. (2006). Oxygen-dependent diseases in the retina: role of hypoxia-inducible factors. *Experimental eye research*, 83(3), 473-483.
- Armor, D. J. (1973). Theta reliability and factor scaling. *Sociological methodology*, 5, 17-50.
- Arora, S. K., & McFarlane, S. I. (2005). The case for low carbohydrate diets in diabetes management. *Nutrition & metabolism*, 2(1), 16.
- Assy, N., Nasser, G., Kamayse, I., Nseir, W., Beniashvili, Z., Djibre, A., & Grosovski, M. (2008). Soft drink consumption linked with fatty liver in the absence of traditional risk factors. *Canadian Journal of Gastroenterology*, 22(10), 811.
- Aune, Dagfinn, Norat, T., Romundstad, P., & Vatten, L. J. (2013). Dairy products and the risk of type 2 diabetes: a systematic review and dose-response meta-analysis of cohort studies. *The American journal of clinical nutrition*, ajcn. 059030.
- Aune, Ursin, G., & Veierod, M. (2009). Meat consumption and the risk of type 2 diabetes: a systematic review and meta-analysis of cohort studies. *Diabetologia*, 52(11), 2277-2287.
- Averous, K., Erginay, A., Timsit, J., Haouchine, B., Gaudric, A., & Massin, P. (2006). Resolution of diabetic macular oedema following high altitude exercise. *Acta Ophthalmologica Scandinavica*, 84(6), 830-831.
- Axelsson, M. L., & Brinberg, D. (1992). The measurement and conceptualization of nutrition knowledge. *Journal of nutrition education*, 24(5), 239-246.
- Azadbakht, L., Mirmiran, P., Esmailzadeh, A., & Azizi, F. (2005). Dairy consumption is inversely associated with the prevalence of the metabolic syndrome in Tehranian adults. *The American journal of clinical nutrition*, 82(3), 523-530.
- Azizi, M., Aghaee, N., Ebrahimi, M., & Ranjbar, K. (2011). Nutrition knowledge, the attitude and practices of college students. *Facta Universitatis: Series Physical Education and Sport*, 9(3), 349-357.
- Babio, N., Balanza, R., Basulto, J., Bulló, M., & Salas-Salvadó, J. (2010). Dietary fibre: influence on body weight, glycemic control and plasma cholesterol profile. *Nutr Hosp*, 25(3), 327-340.
- Backman, D. R., Haddad, E. H., Lee, J. W., Johnston, P. K., & Hodgkin, G. E. (2002). Psychosocial predictors of healthful dietary behavior in adolescents. *Journal of nutrition education and behavior*, 34(4), 184-193.
- Bacon, L. D. (1999). *Using LISREL and PLS to measure customer satisfaction*. Paper presented at the Seventh Annual Sawtooth Software Conference, La Jolla CA.

- Badedi, M., Solan, Y., Darraj, H., Sabai, A., Mahfouz, M., Alamodi, S., & Alsabaani, A. (2016). Factors Associated with Long-Term Control of Type 2 Diabetes Mellitus. *Journal of diabetes research*, 2016.
- Badran, & Laher, I. (2011). Obesity in Arabic-speaking countries. *Journal of Obesity*, 2011.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*: Macmillan.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual review of psychology*, 52(1), 1-26.
- Bandura, A. (2011). Social cognitive theory. *Handbook of social psychological theories*, 2012, 349-373.
- Bani, I. A. (2015). Prevalence, Knowledge, Attitude and Practices of Diabetes Mellitus among Jazan Population, Kingdom of Saudi Arabia (KSA). *Journal of Diabetes Mellitus*, 5(02), 115.
- Bantle, J. P., Wylie-Rosett, J., Albright, A. L., & Apovian, C. M. (2006). Nutrition recommendations and interventions for diabetes-2006: a position statement of the American Diabetes Association. *Diabetes Care*, 29(9), 2140.
- Bantle, J. P., Wylie-Rosett, J., Albright, A. L., Apovian, C. M., Clark, N. G., Franz, M. J., Mooradian, A. D. (2008). Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. *Diabetes Care*, 31, S61-S78.
- Baradaran, H., & Knill-Jones, R. (2004). Assessing the knowledge, attitudes and understanding of type 2 diabetes amongst ethnic groups in Glasgow, Scotland. *Practical Diabetes International*, 21(4), 143-148.
- Baranowski, T., Perry, C. L., & Parcel, G. S. (2002). How individuals, environments, and health behavior interact. *Health behavior and health education: Theory, research, and practice*, 3, 165-184.
- Barclay, D., Higgins, C., & Thompson, R. (1995). The partial least squares (PLS) approach to causal modeling: Personal computer adoption and use as an illustration. *Technology studies*, 2(2), 285-309.
- Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual differences*, 42(5), 815-824.
- Bassuk, S. S., & Manson, J. E. (2005). Epidemiological evidence for the role of physical activity in reducing risk of type 2 diabetes and cardiovascular disease. *Journal of applied physiology*, 99(3), 1193-1204.
- Bawazeer, N. A., & AlSobahi, N. A. (2013). Prevalence and side effects of energy drink consumption among medical students at Umm Al-Qura University, Saudi Arabia. *International Journal of Medical Students*, 1(3), 104-108.

- Beeney, L. J., Dunn, S. M., & Welch, G. (1994). Measurement of diabetes knowledge: the development of the DKN scales. *Handbook of psychology and diabetes*, 159-189.
- Bellisle, F. (2009). Infrequently asked questions about the Mediterranean diet. *Public health nutrition*, 12(9A), 1644-1647.
- Bentler, P., & Stein, J. (1992). Structural equation models in medical research. *Statistical Methods in Medical Research*, 1(2), 159-181.
- Berhe, K., Gebru, H., Kahsay, H., & Kahsay, A. (2014). Assessment of Diabetes Knowledge and its Associated Factors among Type 2 Diabetic Patients in Mekelle and Ayder Referral Hospitals, Ethiopia. *J Diabetes Metab*, 5(5), 1000378.
- Berkman, N. D. (2006). *Management of eating disorders*: Agency for Healthcare Research and Quality Rockville, Md.
- Bevington, B. (2009). *Talking with patients. A consultation handbook*. Bradford: Publishing, United Kingdom.
- Blakemore, S. J. (2001). *The Oxford Companion to the Body*. New York: Oxford University Press.
- Bland, J. M., & Altman, D. G. (1997). Statistics notes: Cronbach's alpha. *BMJ*, 314(7080), 572.
- Black, K. (2016). *Business Statistics: For Contemporary Decision Making: For Contemporary Decision Making*. Wiley Global Education.
- Bobby, D., & Vinodha, R. (2016). Dyslipidemia in type 2 diabetes mellitus—a major risk factor for cardiovascular morbidity. *International Journal of Medical Research and Review*, 4(08).
- Bollen, K. A. (1990). Overall fit in covariance structure models: Two types of sample size effects. *Psychological bulletin*, 107(2), 256.
- Boucher, B. (2011). Vitamin D insufficiency and diabetes risks. *Current drug targets*, 12(1), 61-87.
- Boulton, A. J., Vinik, A. I., Arezzo, J. C., Bril, V., Feldman, E. L., Freeman, R., Ziegler, D. (2005). Diabetic neuropathies a statement by the American Diabetes Association. *Diabetes Care*, 28(4), 956-962.
- Bowman, G. L., Shannon, J., Ho, E., Traber, M. G., Frei, B., Oken, B. S., Quinn, J. F. (2011). Reliability and validity of food frequency questionnaire and nutrient biomarkers in elders with and without mild cognitive impairment. *Alzheimer disease and associated disorders*, 25(1), 49.
- Brace, N., Snelgar, R., & Kemp, R. (2012). *SPSS for Psychologists*: Palgrave Macmillan.
- Brand, C. S. (2012). Management of retinal vascular diseases: a patient-centric approach. *Eye*, 26, S1-S16.

- Breen, C., Ryan, M., Gibney, M. J., & O'Shea, D. (2015). Diabetes-related nutrition knowledge and dietary intake among adults with type 2 diabetes. *British Journal of Nutrition*, 114(03), 439-447.
- Brekke, H. K., Sunesson, Å., Axelsen, M., & Lenner, R. (2004). Attitudes and barriers to dietary advice aimed at reducing risk of type 2 diabetes in first-degree relatives of patients with type 2 diabetes. *Journal of human nutrition and dietetics*, 17(6), 513-521.
- Brehm, B. J., Lattin, B. L., Summer, S. S., Boback, J. A., Gilchrist, G. M., Jandacek, R. J., & D'alessio, D. A. (2009). One-year comparison of a high-monounsaturated fat diet with a high-carbohydrate diet in type 2 diabetes. *Diabetes Care*, 32(2), 215-220.
- Brody, T. (1998). *Nutritional biochemistry*: Academic press.
- Brown, R., & Ogden, J. (2004). Children's eating attitudes and behaviour: a study of the modelling and control theories of parental influence. *Health education research*, 19(3), 261-271.
- Brown, J. B., Stewart, M., & Ryan, B. L. (2003). Outcomes of patient-provider interaction. *Handbook of health communication*, 141-161.
- Bruisten, S., Nilsson-Ihrfelt, E., Buhrman, M., & Ekselius, L. (2006). *TOXBASE. Emerg Med J. 2006 Aug; 23 (8): 614-7. PMID: 16858093 [PubMed-in process] 24: Team V, Markovic M. Internet advertising of artificial tanning in Australia.* Paper presented at the Oncol Nurs Forum.
- Bryant, F. B., & Yarnold, P. R. (1995). Principal-components analysis and exploratory and confirmatory factor analysis.
- Burns, N., & Grove, S. (1997). Selecting a research design. *The practice of nursing research: Conduct, critique, & utilization*, 3, 249-291.
- Burton, L. J., & Mazerolle, S. M. (2011). Survey instrument validity part I: Principles of survey instrument development and validation in athletic training education research. *Athletic Training Education Journal*, 6(1), 27-35.
- Buscemi, S., Nicolucci, A., Mattina, A., Rosafio, G., Massenti, F., Lucisano, G., Barile, A. (2013). Association of dietary patterns with insulin resistance and clinically silent carotid atherosclerosis in apparently healthy people. *European Journal of Clinical Nutrition*, 67(12), 1284-1290.
- Buttar, H. S., Li, T., & Ravi, N. (2005). Prevention of cardiovascular diseases: Role of exercise, dietary interventions, obesity and smoking cessation. *Experimental & Clinical Cardiology*, 10(4), 229.
- Caballero, B. (2005). A nutrition paradox—underweight and obesity in developing countries. *n engl j med*, 352(15), 1514-1516.

- Carr-Hill, R. A., Chalmers-Dixon, P., & Lin, J. (2005). *The public health observatory handbook of health inequalities measurement*: South East Public Health Observatory Oxford.
- Carson, J. A. S. (2003). Nutrition therapy for dyslipidemia. *Current diabetes reports*, 3(5), 397-403.
- Carter, P., Gray, L. J., Troughton, J., Khunti, K., & Davies, M. J. (2010). Fruit and vegetable intake and incidence of type 2 diabetes mellitus: systematic review and meta-analysis. *BMJ*, 341, c4229.
- Cassel, C., Hackl, P., & Westlund, A. H. (1999). Robustness of partial least-squares method for estimating latent variable quality structures. *Journal of applied statistics*, 26(4), 435-446.
- Centre for Disease Control and Prevention. (2008). *Diabetes*. Atlanta, USA. Assessed on (December 9, 2015). Retrieved from <http://www.cdc.gov/media/presskits/aahd/diabetes.pdf>
- Chan, Y., & Molassiotis, A. (1999). The relationship between diabetes knowledge and compliance among Chinese with non-insulin dependent diabetes mellitus in Hong Kong. *Journal of advanced nursing*, 30(2), 431-438.
- Chandalia, M., Garg, A., Lutjohann, D., Von B. K., Grundy, S. M., & Brinkley, L. J. (2000). Beneficial effects of high dietary fiber intake in patients with type 2 diabetes mellitus. *New England Journal of Medicine*, 342(19), 1392-1398.
- Charokopou, M., Sabater, F., Townsend, R., Roudaut, M., McEwan, P., & Verheggen, B. (2015). Methods applied in cost-effectiveness models for treatment strategies in type 2 diabetes mellitus and their use in Health Technology Assessments: a systematic review of the literature from 2008 to 2013. *Current medical research and opinion*, 1-12.
- Charter, R. A. (1999). Sample size requirements for precise estimates of reliability, generalizability, and validity coefficients. *Journal of Clinical and Experimental Neuropsychology*, 21(4), 559-566.
- Chin. (1998). Commentary: Issues and opinion on structural equation modeling: JSTOR.
- Chin, Woei, Y., Lai, Mei, P. S., Chia, & Chin, Y. (2017). The validity and reliability of the English version of the diabetes distress scale for type 2 diabetes patients in Malaysia. *BMC family practice*, 18(1), 25.
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research*, 295(2), 295-336.
- Chisholm, V., Atkinson, L., Donaldson, C., Noyes, K., Payne, A., & Kelnar, C. (2007). Predictors of treatment adherence in young children with type 1 diabetes. *Journal of advanced nursing*, 57(5), 482-493.

- Chiueve, S. E., Hu, F. B., Rimm, E. B., Joosten, M. M., Mukamal, K. J., & Hendriks, H. F. (2011). Changes in Alcohol Consumption and Subsequent Risk of Type 2 Diabetes in Men.
- Cho, N. H., Kim, T. H., Woo, S. J., Park, K. H., Lim, S., Cho, Y. M., Choi, S. H. (2013). Optimal HbA1c cutoff for detecting diabetic retinopathy. *Acta diabetologica*, 50(6), 837-842.
- Chobanian, A. V. (2003). Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee: Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*, 42, 1206-1252.
- Choi, H. K., Willett, W. C., Stampfer, M. J., Rimm, E., & Hu, F. B. (2005). Dairy consumption and risk of type 2 diabetes mellitus in men: a prospective study. *Archives of internal medicine*, 165(9), 997-1003.
- Chotisiri, Luckwirun, Yamarat, Khemika, Taneepanichskul, & Surasak. (2016). Exploring knowledge, attitudes, and practices toward older adults with hypertension in primary care. *Journal of multidisciplinary healthcare*, 9, 559.
- Cockram, C. (2000). The epidemiology of diabetes mellitus in the Asia-Pacific region. *Hong Kong Medical Journal*, 6(1), 43-52.
- Cochran, W. G. (1977). The estimation of sample size. *Sampling techniques*, 3, 72-90.
- Cockerham, W., Dingwall, R., & Quah, S. R. (2014). *The Wiley Blackwell encyclopedia of health, illness, behavior and society* [5 vols.]. Wiley-Blackwell.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. 2nd.
- Cohen, J. (1992). A power primer. *Psychological bulletin*, 112(1), 155.
- Coltman, Tim, Devinney, M. T., Midgley, F. D., & Venaik, S. (2008). Formative versus reflective measurement models: Two applications of formative measurement. *Journal of Business Research*, 61(12), 1250-1262.
- Connelly, L. (2008). Pilot studies. *Medsurg Nurs*, 17(6), 411-413.
- Contento, I. R. (2007). *Nutrition education: linking research, theory, and practice*: Jones & Bartlett Learning.
- Coon, K. A., Goldberg, J., Rogers, B. L., & Tucker, K. L. (2001). Relationships between use of television during meals and children's food consumption patterns. *Pediatrics*, 107(1), e7-e7.
- Dall, T., Nikolov, P., & Hogan, P. F. (2003). Economic costs of diabetes in the US in 2002. *Diabetes Care*, 26, 917-932.

- Danaei, G., Finucane, M. M., Lu, Y., Singh, G. M., Cowan, M. J., Paciorek, C. J., Stevens, G. A. (2011). National, regional, and global trends in fasting plasma glucose and diabetes prevalence since 1980: systematic analysis of health examination surveys and epidemiological studies with 370 country-years and 27 million participants. *The Lancet*, 378(9785), 31-40.
- Denness, C. (2013). What are consultation models for? *InnovAit*, 6(9), 592-599.
- Davies, R., Roderick, P., & Raftery, J. (2003). The evaluation of disease prevention and treatment using simulation models. *European Journal of Operational Research*, 150(1), 53-66.
- Daya, R., Bayat, Z., & Raal, F. (2017). Prevalence and pattern of dyslipidaemia in type 2 diabetes mellitus patients at a tertiary care hospital. *Journal of Endocrinology, Metabolism and Diabetes of South Africa*, 1-5.
- De Munter, J., Hu, F. B., Spiegelman, D., Franz, M., & van Dam, R. M. (2007). Whole grain, bran, and germ intake and risk of type 2 diabetes: a prospective cohort study and systematic review. *PLoS Med*, 4(8), e261.
- DeVellis, R. F. (2012). *Scale development: Theory and applications* (Vol. 26): Sage publications.
- DeVon, H. A., Block, M. E., Moyle-Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J., Kostas-Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing scholarship*, 39(2), 155-164.
- Diamantopoulos, A., & Winklhofer, H. M. (2001). Index construction with formative indicators: An alternative to scale development. *Journal of marketing research*, 38(2), 269-277.
- Djoussé, L., Gaziano, J. M., Buring, J. E., & Lee, I. M. (2011). Dietary omega-3 fatty acids and fish consumption and risk of type 2 diabetes. *The American journal of clinical nutrition*, 93(1), 143-150.
- Du, Z. D., Hu, L. T., Zhao, G. Q., Ma, Y., Zhou, Z. Y., & Jiang, T. (2011). Epidemiological characteristics and risk factors of diabetic retinopathy in type 2 diabetes mellitus in Shandong Peninsula of China. *International journal of ophthalmology*, 4(2), 202.
- Eagly, A. H., & Chaiken, S. (2007). The advantages of an inclusive definition of attitude. *Social cognition*, 25(5), 582-602.
- Ekman, K., & Walker, R. (2008). Knowledge, Attitudes and Practice (KAP) Survey Summary Report for the Duluth Lakeside Stormwater Reduction Project (LSRP).
- Ekore, R., Ajayi, I., & Ekore, J. (2008). Dietary management of diabetes: a practical approach for primary care physicians in Nigeria. *Diabetes*, 16, 13-14.
- El-Khawaga, G., & Abdel-Wahab, F. (2015). Knowledge, attitudes, practice and compliance of diabetic patients in Dakahlia, Egypt. *European Journal of Research in Medical Sciences*, 3(1).

- El-Qudah, J. M. (2016). Dietary knowledge Among Female Diabetic Patients in Amman, Jordan. *Current Research in Nutrition and Food Science Journal*, 4(2), 107-113.
- Elhadd, T. A., Al-Amoudi, A. A., & Alzahrani, A. S. (2007). Epidemiology, clinical and complications profile of diabetes in Saudi Arabia: a review. *Annals of Saudi medicine*, 27(4), 241.
- Elmazar, H. M., Essa, A. B., Ojurongbe, O., Oyesiji, K., Ojo, J., Odewale, G., Bolaji, O. (2014). Environmental and dietary factors affecting the progression of type 2 diabetic retinopathy in Aljabal Algharby, Libya.
- Esposito, K., & Giugliano, D. (2011). Increased consumption of green leafy vegetables, but not fruit, vegetables or fruit and vegetables combined, is associated with reduced incidence of type 2 diabetes. *Evidence Based Medicine*, 16(1), 27-28.
- Fabrigar, L. R., & Wegener, D. T. (2011). *Exploratory factor analysis*: Oxford University Press.
- Farrah, M. (2012). The impact of peer feedback on improving the writing skills among Hebron University students. *An-Najah University Journal for Research*, 26(1), 179-210.
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, 39(2), 175-191.
- Ferland, A., Brassard, P., Lemieux, S., Bergeron, J., Bogaty, P., Bertrand, F., Poirier, P. (2009). Impact of high-fat/low-carbohydrate, high-, low-glycaemic index or low-caloric meals on glucose regulation during aerobic exercise in Type 2 diabetes. *Diabetic medicine*, 26(6), 589-595.
- Field, A. (2009). *Discovering statistics using SPSS*: Sage publications.
- Finucane, M. M., Stevens, G. A., Cowan, M. J., Danaei, G., Lin, J. K., Paciorek, C. J., Bahalim, A. N. (2011). National, regional, and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9· 1 million participants. *The Lancet*, 377(9765), 557-567.
- Forbes, J. M., & Cooper, M. E. (2013). Mechanisms of diabetic complications. *Physiological reviews*, 93(1), 137-188.
- Forgat-Campagna, A., & Venkat Narayan, K. (2001). Type-2 diabetes in children: Exemplifies the growing problem of chronic diseases. *BMJ*, 322, 377-378.
- Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of marketing research*, 440-452.
- Foster, G. D., Wyatt, H. R., Hill, J. O., McGuckin, B. G., Brill, C., Mohammed, B. S., Klein, S. (2003). A randomized trial of a low-carbohydrate diet for obesity. *New England Journal of Medicine*, 348(21), 2082-2090.

- Franz, M. J., Bantle, J. P., Beebe, C. A., Brunzell, J. D., Chiasson, J.-L., Garg, A., Mooradian, A. D. (2002). Evidence-based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications. *Diabetes Care*, 25(1), 148-198.
- Franz, M. J., Powers, M. A., Leontos, C., Holzmeister, L. A., Kulkarni, K., Monk, A., Gradwell, E. (2010). The evidence for medical nutrition therapy for type 1 and type 2 diabetes in adults. *Journal of the American Dietetic Association*, 110(12), 1852-1889.
- Freire, P. (1993). *Pedagogy of the oppressed: New revised 20th-anniversary edition*. New York: Continuum.
- Friedewald, W. T., Levy, R. I., & Fredrickson, D. S. (1972). Estimation of the concentration of low-density lipoprotein cholesterol in plasma, without use of the preparative ultracentrifuge. *Clinical chemistry*, 18(6), 499-502.
- Fu, Nga, S., Wong, Ho, C. K., Chin, Yee, W., & Luk, W. (2016). Association of more negative attitude towards commencing insulin with lower glycosylated hemoglobin (HbA1c) level: a survey on insulin-naïve type 2 diabetes mellitus Chinese patients. *Journal of Diabetes & Metabolic Disorders*, 15(1), 3.
- Funatsu, H., Yamashita, H., Noma, H., Mimura, T., Nakamura, S., Sakata, K., & Hori, S. (2005). Aqueous humor levels of cytokines are related to vitreous levels and progression of diabetic retinopathy in diabetic patients. *Graefes Archive for Clinical and Experimental Ophthalmology*, 243(1), 3-8.
- Funnell, & Anderson, R. M. (2004). Empowerment and self-management of diabetes. *Clinical diabetes*, 22(3), 123-127.
- Funnell, Anderson, R. M., Arnold, M. S., Barr, P. A., Donnelly, M., Johnson, P. D., White, N. H. (1991). Empowerment: an idea whose time has come in diabetes education. *The Diabetes Educator*, 17(1), 37-41.
- Funnell, Tang, T. S., & Anderson, R. M. (2007). From DSME to DSMS: developing empowerment-based diabetes self-management support. *Diabetes Spectrum*, 20(4), 221-226.
- Gadi, R., & Samaha, F. F. (2007). Dyslipidemia in type 2 diabetes mellitus. *Current diabetes reports*, 7(3), 228-234.
- Gæde, P., Lund-Andersen, H., Parving, H.-H., & Pedersen, O. (2008). Effect of a multifactorial intervention on mortality in type 2 diabetes. *New England Journal of Medicine*, 358(6), 580-591.
- Garcia, A. A., Villagomez, E. T., Brown, S. A., Kouzekanani, K., & Hanis, C. L. (2001). The starr county diabetes education study development of the Spanish-language diabetes knowledge questionnaire. *Diabetes Care*, 24(1), 16-21.
- Gardiner, H. M., Pasquini, L., Wolfenden, J., Kulinskaya, E., Li, W., & Henein, M. (2006). Increased periconceptual maternal glycated haemoglobin in diabetic mothers reduces fetal long axis cardiac function. *Heart*, 92(8), 1125-1130.

- George, D. (2003). *SPSS for windows step by step: A simple study guide and reference, 17.0 update, 10/e*: Pearson Education India.
- Girois, S. B., Kumanyika, S. K., Morabia, A., & Mauger, E. (2001). A comparison of knowledge and attitudes about diet and health among 35-to 75-year-old adults in the United States and Geneva, Switzerland. *American Journal of Public Health, 91*(3), 418.
- Glanz, K., Rimer, B. K., & Viswanath, K. (2008). *Health behavior and health education: theory, research, and practice*: John Wiley & Sons.
- Goff, D. C., Gerstein, H. C., Ginsberg, H. N., Cushman, W. C., Margolis, K. L., Byington, R. P., Simons-Morton, D. G. (2007). Prevention of cardiovascular disease in persons with type 2 diabetes mellitus: current knowledge and rationale for the Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial. *The American journal of cardiology, 99*(12), S4-S20.
- Goodman, L. A. (1971). The analysis of multidimensional contingency tables: Stepwise procedures and direct estimation methods for building models for multiple classifications. *Technometrics, 13*(1), 33-61.
- Gross, J. L., Zelmanovitz, T., Moulin, C. C., De Mello, V., Perassolo, M., Leitão, C., Azevedo, M. J. (2002). Effect of a Chicken-Based Diet on Renal Function and Lipid Profile in Patients With Type 2 Diabetes A randomized crossover trial. *Diabetes Care, 25*(4), 645-651.
- Green, E. C., & Murphy, E. (2014). Health belief model. *The Wiley Blackwell encyclopedia of health, illness, behavior, and society, 766-769*.
- Guerrero, R. T. L., Chong, M., Novotny, R., Wilkens, L. R., Badowski, G., Blas-Laguana, M., & Murphy, S. (2015). Relative validity and reliability of a quantitative food frequency questionnaire for adults in Guam. *Food & nutrition research, 59*.
- Gul, N. (2010). Knowledge, attitudes and practices of type 2 diabetic patients. *J Ayub Med Coll Abbottabad, 22*(3), 128-131.
- Haas, L., Maryniuk, M., Beck, J., Cox, C. E., Duker, P., Edwards, L., Kolb, L. (2012). National standards for diabetes self-management education and support. *The Diabetes Educator, 38*(5), 619-629.
- Ha, J. F., & Longnecker, N. (2010). Doctor-patient communication: a review. *The Ochsner Journal, 10*(1), 38-43.
- Habib, S. S. (2006). Frequency distribution of atherogenic dyslipidemia in Saudi type 2 diabetic patients. *Pak J Physiol, 2*(2), 20-23.
- Hadi, A. S., Imon, A., & Werner, M. (2009). Detection of outliers. *Wiley Interdisciplinary Reviews: Computational Statistics, 1*(1), 57-70.

- Haffner, S. M., Lehto, S., Rönnemaa, T., Pyörälä, K., & Laakso, M. (1998). Mortality from coronary heart disease in subjects with type 2 diabetes and in nondiabetic subjects with and without prior myocardial infarction. *New England Journal of Medicine*, 339(4), 229-234.
- Haimoto, H., Sasakabe, T., Wakai, K., & Umegaki, H. (2009). Effects of a low-carbohydrate diet on glycemic control in outpatients with severe type 2 diabetes. *Nutrition & metabolism*, 6(1), 1-5.
- Hair, Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (Vol. 6): Pearson Prentice Hall Upper Saddle River, NJ.
- Hair, Hult, G. T. M., Ringle, C., & Sarstedt, M. (2013). *A primer on partial least squares structural equation modeling (PLS-SEM)*: Sage Publications.
- Hair, Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*: Sage Publications.
- Hair, Sarstedt, M., Hopkins, L., & G. Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European Business Review*, 26(2), 106-121.
- Hair, Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the academy of marketing science*, 40(3), 414-433.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.
- Haladyna, T. M. (2012). *Developing and validating multiple-choice test items*: Routledge.
- Halawa, M. R., Karawagh, A., Zeidan, A., Mahmoud, A. E. D. H., Sakr, M., & Hegazy, A. (2010). Prevalence of painful diabetic peripheral neuropathy among patients suffering from diabetes mellitus in Saudi Arabia. *Current medical research and opinion*, 26(2), 337-343.
- Halim, N. H. B. A., & Yusof, M. (2015). Study of Dietary Habits and Nutritional Knowledge among Physical and Health Education (Phe) Students in Uitm Shah Alam.
- Hamad, A. D. (2013). Relationship between Diabetes Mellitus and Food Balance in the Kingdom of Saudi Arabia. *Journal of Agricultural Science and Technology. B*, 3(8B), 591.
- Hamad, A. D. (2015). Diabetes Mellitus and Food Balance in the Kingdom of Saudi Arabia. *Cal*, 7(3247), 3247.
- Hamed, M. B. (2016). The effect of dietary knowledge on the control of type 2 diabetes mellitus in Sudan. *International Journal of Sudan Research*, 6(1).

- Hamer, M., & Chida, Y. (2007). Intake of fruit, vegetables, and antioxidants and risk of type 2 diabetes: systematic review and meta-analysis. *Journal of hypertension*, 25(12), 2361-2369.
- Harding, A. H., Sargeant, L. A., Welch, A., Oakes, S., Luben, R. N., Bingham, S., Wareham, N. J. (2001). Fat consumption and HbA1c levels. *Diabetes Care*, 24(11), 1911-1916.
- Harding, A. H., Wareham, N. J., Bingham, S. A., Khaw, K., Luben, R., Welch, A., & Forouhi, N. G. (2008). Plasma vitamin C level, fruit and vegetable consumption, and the risk of new-onset type 2 diabetes mellitus: the European prospective investigation of cancer–Norfolk prospective study. *Archives of internal medicine*, 168(14), 1493-1499.
- Hartayu, T. S., Mohamed, I., & Suryawati, S. (2012). Improving of type 2 diabetic patients' knowledge, attitude and practice towards diabetes self-care by implementing community-based interactive approach-diabetes mellitus strategy. *BMC research notes*, 5(1), 315.
- Hearnshaw, H., & Lindenmeyer, A. (2006). What do we mean by adherence to treatment and advice for living with diabetes? A review of the literature on definitions and measurements. *Diabetic medicine*, 23(7), 720-728.
- Henderson, D. J. (1997). *Consciousness-raising as a feminist nursing action*: Sage, London.
- Henseler, J. (2017). Bridging Design and Behavioral Research With Variance-Based Structural Equation Modeling. *Journal of Advertising*, 1-15.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing *New challenges to international marketing* (pp. 277-319): Emerald Group Publishing Limited.
- Henshaw, L. (2006). Empowerment, diabetes and the National Service Framework: A systematic review. *Journal of Diabetes Nursing*, 10(4), 128.
- Hill, R. (1998). What sample size is “enough” in internet survey research. *Interpersonal Computing and Technology: An electronic journal for the 21st century*, 6(3-4), 1-12.
- Höck, M., & Ringle, C. M. (2006). *Strategic networks in the software industry: An empirical analysis of the value continuum*. Paper presented at the IFSAM VIIIth World Congress.
- Holman, R. R., Paul, S. K., Bethel, M. A., Matthews, D. R., & Neil, H. A. W. (2008). 10-year follow-up of intensive glucose control in type 2 diabetes. *New England Journal of Medicine*, 359(15), 1577-1589.
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Articles*, 2.

- Hosmer Jr, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). *Applied logistic regression* (Vol. 398): John Wiley & Sons.
- Hoyle, R. H. (1995). *Structural equation modeling: Concepts, issues, and applications*: Sage Publications.
- Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, 6(1), 1-55.
- Hudgins, L. C., Baday, A., Hellerstein, M. K., Parker, T. S., Levine, D. M., Seidman, C. E., Hirsch, J. (2008). The effect of dietary carbohydrate on genes for fatty acid synthase and inflammatory cytokines in adipose tissues from lean and obese subjects. *The Journal of nutritional biochemistry*, 19(4), 237-245.
- Huizinga, M. M., Carlisle, A. J., Cavanaugh, K. L., Davis, D. L., Gregory, R. P., Schlundt, D. G., & Rothman, R. L. (2009). Literacy, numeracy, and portion-size estimation skills. *American journal of preventive medicine*, 36(4), 324-328.
- Hwang, H., Malhotra, N. K., Kim, Y., Tomiuk, M. A., & Hong, S. (2010). A comparative study on parameter recovery of three approaches to structural equation modeling. *Journal of marketing research*, 47(4), 699-712.
- Ibrahim, N. K. R., Iftikhar, R., Murad, M., Fida, H., Abalkhaeil, B., & Al Ahmadi, J. (2014). Energy drinks consumption amongst medical students and interns from three colleges in Jeddah, Saudi Arabia. *Journal of Food and Nutrition Research*, 2(4), 174-179.
- International Diabetes Federation. (2017). *Diabetes Atlas* (8th ed.). Belgium. Assessed on (October 31, 2018). Retrieved from <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas.html>
- International Diabetes Federation. (2014). *Diabetes in Saudi Arabia*. Belgium. Assessed on (December 24, 2015). Retrieved from <https://www.idf.org/membership/mena/saudi-arabia>.
- International Diabetes Federation. (2013). *Diabetes Atlas* (6th ed.). Belgium. Assessed on (December 8, 2015). Retrieved from <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/19-atlas-6th-edition.html>
- Imai, S., Fukui, M., Ozasa, N., Ozeki, T., Kurokawa, M., Komatsu, T., & Kajiyama, S. (2013). Eating vegetables before carbohydrates improves postprandial glucose excursions. *Diabetic medicine*, 30(3), 370-372.
- Isaac, S., & Michael, W. (1997). *Handbook in Research and Evaluation*, (San Diego: Educational and Industrial Testing Services).
- Israel, G. D. (1992). Determining sample size. Fact Sheet PEOD-6.
- Islam, S. M. S., Niessen, L. W., Seissler, J., Ferrari, U., Biswas, T., Islam, A., & Lechner, A. (2015). Diabetes knowledge and glycemic control among patients with type 2 diabetes in Bangladesh. *SpringerPlus*, 4(1), 1-7.

- Jahner, S., Leimeister, J. M., Knebel, U., & Krcmar, H. (2008). *A cross-cultural comparison of perceived strategic importance of RFID for CIOs in Germany and Italy*. Paper presented at the Hawaii International Conference on System Sciences, Proceedings of the 41st Annual.
- Jakicic, J. M., & Otto, A. D. (2005). Physical activity considerations for the treatment and prevention of obesity. *The American journal of clinical nutrition*, 82(1), 226S-229S.
- Jamison, D. T., Breman, J. G., Measham, A. R., Alleyne, G., Claeson, M., Evans, D. B., Narayan, K. V. (2006). *Diabetes: The Pandemic and Potential Solutions*.
- Janz, & Becker, M. H. (1984). The health belief model: A decade later. *Health education quarterly*, 11(1), 1-47.
- Janz, Champion, V., & Strecher, V. (2002). The health belief model. Health behavior and health education: theory, research, and practice. Edited by: Glanz K, Rimer BK, Lewis FM. 2002: San Francisco: Jossey-Bass.
- Jarvis, C. B., MacKenzie, S. B., & Podsakoff, P. M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of consumer research*, 30(2), 199-218.
- Javed, A., Mehmood, A., Victor, S., & Haque, Z. (2014). Attitudes and Behaviour of Adult Pakistani Diabetic Population towards their Disease. *Journal of Dow University of Health Sciences*, 8(3).
- Jenkins, D. J., Kendall, C. W., Augustin, L. S., Mitchell, S., Sahye-Pudaruth, S., Mejia, S. B., Bashyam, B. (2012). Effect of legumes as part of a low glycemic index diet on glycemic control and cardiovascular risk factors in type 2 diabetes mellitus: a randomized controlled trial. *Archives of internal medicine*, 172(21), 1653-1660.
- Jellinger, P., Smith, D., Mehta, A., Ganda, O., Handelsman, Y., Rodbard, H., & Seibel, J. (2012). American Association of Clinical Endocrinologists' guidelines for management of dyslipidemia and prevention of atherosclerosis. *Endocrine practice*, 18(Supplement 1), 1-78.
- Jiang, R., Manson, J. E., Stampfer, M. J., Liu, S., Willett, W. C., & Hu, F. B. (2002). Nut and peanut butter consumption and risk of type 2 diabetes in women. *Jama*, 288(20), 2554-2560.
- Johanson, G. A., & Brooks, G. P. (2009). Initial scale development: sample size for pilot studies. *Educational and Psychological Measurement*.
- Jones, P. S., & Meleis, A. I. (1993). Health is empowerment. *Advances in nursing science*, 15(3), 1-14.
- Joosten, M. M., Chiuve, S. E., Mukamal, K. J., Hu, F. B., Hendriks, H. F., & Rimm, E. B. (2011). Changes in alcohol consumption and subsequent risk of type 2 diabetes in men. *Diabetes*, 60(1), 74-79.

- Joshi, S., & Joshi, P. (2009). Management of Type 2 diabetes: treating targets and strategies: CPD. *South African Family Practice*, 51(1), 5-9.
- Julious, S. A. (2005). Sample size of 12 per group rule of thumb for a pilot study. *Pharmaceutical Statistics*, 4(4), 287-291.
- Kamunge, Cahill, Zipp, Parasher, Kadirvelu, & Aamir. (2015). Knowledge, attitudes and practices of registered nurses regarding the spread of nosocomial infections and the impact of organizational support. *Antimicrobial Resistance and Infection Control*, 4(S1), P60.
- Keane, W. F., Brenner, B. M., De Zeeuw, D., Grunfeld, J. P., McGill, J., Mitch, W. E., Snapinn, S. M. (2003). The risk of developing end-stage renal disease in patients with type 2 diabetes and nephropathy: the RENAAL study. *Kidney international*, 63(4), 1499-1507.
- Kearney, P., Blackwell, L., Collins, R., Keech, A., Simes, J., Peto, R., Baigent, C. (2008). Efficacy of cholesterol-lowering therapy in 18,686 people with diabetes in 14 randomised trials of statins: a meta-analysis. *Lancet*, 371(9607), 117-125.
- Kelishadi, R., Rabiei, K., Khosravi, A., Famouri, F., Sadeghi, M., Rouhafza, H., & Shirani, S. (2001). Assessment of physical activity of adolescents in Isfahan.
- Kempen, O. C. B., Leske MC. (2004). The prevalence of diabetic retinopathy among adults in the United States. *Archives of ophthalmology*, 122(4), 552.
- Khan, & Khan, S. A. (2000). Level of knowledge and self-care in diabetics in a community hospital in Najran. *Annals of Saudi medicine*, 20(3/4), 300-301.
- Khan, Sobki, S., & Khan, S. (2007). Association between glycaemic control and serum lipids profile in type 2 diabetic patients: HbA1c predicts dyslipidaemia. *Clinical and experimental medicine*, 7(1), 24-29.
- Khatib, O. (2004). Noncommunicable diseases: risk factors and regional strategies for prevention and care.
- Khattab, M., Khader, Y. S., Al-Khawaldeh, A., & Ajlouni, K. (2010). Factors associated with poor glycemic control among patients with type 2 diabetes. *Journal of diabetes and its complications*, 24(2), 84-89.
- Kheir, N., Greer, W., Yousif, A., Al Geed, H., & Al Okkah, R. (2011). Knowledge, attitude and practices of Qatari patients with type 2 diabetes mellitus. *International journal of pharmacy practice*, 19(3), 185-191.
- Kigaru, D. M. D., Loechl, C., Moleah, T., Macharia-Mutie, C., & Ndungu, Z. W. (2015). Nutrition knowledge, attitude and practices among urban primary school children in Nairobi City, Kenya: a KAP study. *BMC Nutrition*, 1(1), 44.
- Kim, K. H. (2003). A study of the dietary habits, the nutritional knowledge and the consumption patterns of convenience foods of university students in the Gwangju area. *Korean Journal of Community Nutrition*, 8(2), 181-191.

- King, H., Aubert, R. E., & Herman, W. H. (1998). Global burden of diabetes, 1995–2025: prevalence, numerical estimates, and projections. *Diabetes Care*, *21*(9), 1414-1431.
- King, P., Peacock, I., & Donnelly, R. (1999). The UK Prospective Diabetes Study (UKPDS): clinical and therapeutic implications for type 2 diabetes. *British journal of clinical pharmacology*, *48*(5), 643-648.
- Kinyua, L. W. (2013). *Association Of Nutrition Knowledge And Attitude With Dietary Practices And Nutritional Status Of Female Undergraduate Students Attending University Colleges Within Nairobi Metropolis*. University of Nairobi.
- Kline. (2015). *Principles and practice of structural equation modeling*: Guilford publications.
- Kline, R., Petscher, Y., & Schatschneider, C. (2013). 6 Exploratory and Confirmatory Factor Analysis. *Applied quantitative analysis in education and the social sciences*, 171.
- Knowler, W., & Barrett-Connor, E. (2002). Diabetes Prevention Program Research Group, Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med*, *346*, 393-403.
- Krawagh, A. M., Alzahrani, A. M., & Naser, T. A. (2012). Diabetes Complications and their Relation to Glycemic Control among Patients Attending Diabetic Clinic at King Khalid National Guard Hospital in Jeddah, Saudi Arabia. *Saudi Journal of Internal Medicine*, *1*(1), 29-33.
- Kriska, A. M., Saremi, A., Hanson, R. L., Bennett, P. H., Kobes, S., Williams, D. E., & Knowler, W. C. (2003). Physical activity, obesity, and the incidence of type 2 diabetes in a high-risk population. *American journal of epidemiology*, *158*(7), 669-675.
- Kuhail, M. E. (2013). *Assessment of Dietary Habits on Risk Profiles and Complications among Type 2 Diabetic Patients at Al-Remal Clinic in Gaza Strip* (Masters), Al-Azhar University Deanship of postgraduate Studies and scientific Research Pharmacy College
- Lanting, L. C., Joung, I. M., Vogel, I., Bootsma, A. H., Lamberts, S., & Mackenbach, J. P. (2008). Ethnic differences in outcomes of diabetes care and the role of self-management behavior. *Patient Education and Counseling*, *72*(1), 146-154.
- Launiala, A. (2009). How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi. *Anthropology Matters*, *11*(1).
- Laverack, G. (2009). *Public health: power, empowerment and professional practice*: Palgrave Macmillan.

- Lee, K. L., Yoon, E. H., Lee, H. M., Hwang, H. S., & Park, H. K. (2012). Relationship between food-frequency and glycated hemoglobin in Korean diabetics: using data from the 4th Korea National Health and Nutrition Examination Survey. *Korean journal of family medicine*, 33(5), 280-286.
- Lee, S. Y., & Song, X. Y. (2012). *Basic and advanced Bayesian structural equation modeling: With applications in the medical and behavioral sciences*: John Wiley & Sons.
- Lemeshow, S., & Hosmer, D. W. (1982). A review of goodness of fit statistics for use in the development of logistic regression models. *American journal of epidemiology*, 115(1), 92-106.
- Ley, S. H., Hamdy, O., Mohan, V., & Hu, F. B. (2014). Prevention and management of type 2 diabetes: dietary components and nutritional strategies. *The Lancet*, 383(9933), 1999-2007.
- Liu, S., Choi, H. K., Ford, E., Song, Y., Klevak, A., Buring, J. E., & Manson, J. E. (2006). A prospective study of dairy intake and the risk of type 2 diabetes in women. *Diabetes Care*, 29(7), 1579-1584.
- Lohmöller, J. B. (1989). Predictive vs. Structural Modeling: PLS vs. ML *Latent Variable Path Modeling with Partial Least Squares* (pp. 199-226): Springer.
- Lorenzo-Seva, U., & Ferrando, P. J. (2012). TETRA-COM: A comprehensive SPSS program for estimating the tetrachoric correlation. *Behavior research methods*, 44(4), 1191-1196.
- Lou, Q., Chen, Y., Guo, X., Yuan, L., Chen, T., Wang, C., Dai, X. (2014). Diabetes Attitude Scale: validation in type-2 diabetes patients in multiple centers in China. *PloS one*, 9(5), e96473.
- Łuczyński, Włodzimierz, Głowińska-Olszewska, Barbara, Bossowski, & Artur. (2016). Empowerment in the Treatment of Diabetes and Obesity. *Journal of diabetes research*, 2016.
- Ludwig, D. S., Peterson, K. E., & Gortmaker, S. L. (2001). Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *The Lancet*, 357(9255), 505-508.
- Lumey, L., & Van Popell, F. W. (1994). The Dutch famine of 1944–45: mortality and morbidity in past and present generations. *Social History of Medicine*, 7(2), 229-246.
- Magurová, D., Majerníková, L., Hloch, S., Tozan, H., & Goztepe, K. (2012). Knowledge of Diabetes in Patients with Type 2 Diabetes on insulin Therapy from Eastern Slovakia. *Diabetologia Croatica*, 41(3), 95-102.
- Majed Isleem, E. A., & Aljeesh, Y. (2015). Evaluation of Diabetic Foot Management in the Gaza Strip. *International Journal of Diabetes Research*, 4(4), 73-79.

- Malik, V. S., Popkin, B. M., Bray, G. A., Després, J. P., & Hu, F. B. (2010). Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk. *Circulation*, *121*(11), 1356-1364.
- Malik, V. S., Popkin, B. M., Bray, G. A., Després, J. P., Willett, W. C., & Hu, F. B. (2010). Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes a meta-analysis. *Diabetes Care*, *33*(11), 2477-2483.
- Mann, C. (2003). Observational research methods. Research design II: cohort, cross sectional, and case-control studies. *Emergency Medicine Journal*, *20*(1), 54-60.
- Martha, M., Anderson, R., & Funnell, M. (2004). Using the empowerment approach to help patients change behavior. *Clin Diabetes J*, *22*(3), 123-127.
- Mateos-Aparicio, G. (2011). Partial least squares (PLS) methods: Origins, evolution, and application to social sciences. *Communications in Statistics-Theory and Methods*, *40*(13), 2305-2317.
- Matfin., a. P. C. M. (2004). *Disorders of blood flow in the systemic circulation*. (7 ed.): Lippincott Williams & Wilkins. .
- Mattos, C. B., Viana, L. V., Paula, T. P., Sarmiento, R. A., Almeida, J. C., Gross, J. L., & Azevedo, M. J. (2015). Increased Protein Intake Is Associated With Uncontrolled Blood Pressure by 24-Hour Ambulatory Blood Pressure Monitoring in Patients With Type 2 Diabetes. *Journal of the American College of Nutrition*, *34*(3), 232-239.
- Mayo Foundation for Medical Education and Research. (2015). *Type 1 diabetes Risk Factors*. Minnesota, USA. Assessed on (December 19, 2015). Retrieved from <http://www.mayoclinic.org/diseases-conditions/type-1-diabetes/basics/risk-factors/con-20019573>
- McCrary, M. A., & Campbell, W. W. (2011). Effects of eating frequency, snacking, and breakfast skipping on energy regulation: symposium overview. *The Journal of nutrition*, *141*(1), 144-147.
- McKinnon, G. (2014). The contribution of three components of nutrition knowledge to socio-economic differences in food purchasing choices. *Public health nutrition*, *17*(08), 1814-1824.
- Menotti, A., Puddu, P., Lanti, M., Kromhout, D., Blackburn, H., & Nissinen, A. (2003). Twenty-five-year coronary mortality trends in the seven countries study using the accelerated failure time model. *European journal of epidemiology*, *18*(2), 113-122.
- Miao, Z., Li, C., Chen, Y., Zhao, S., Wang, Y., Wang, Z., Sun, R. (2008). Dietary and lifestyle changes associated with high prevalence of hyperuricemia and gout in the Shandong coastal cities of Eastern China. *The Journal of rheumatology*, *35*(9), 1859-1864.

- Midhet, F. M., Al-Mohaimed, A. A., & Sharaf, F. K. (2010). Lifestyle related risk factors of type 2 diabetes mellitus in Saudi Arabia. *Saudi medical journal*, 31(7), 768-774.
- Miller, M., Stone, N. J., Ballantyne, C., Bittner, V., Criqui, M. H., Ginsberg, H. N., Kris-Etherton, P. M. (2011). Triglycerides and cardiovascular disease a scientific statement from the American Heart Association. *Circulation*, 123(20), 2292-2333.
- Mirmiran, P., Azadbakht, L., & Azizi, F. (2007). Dietary behaviour of Tehranian adolescents does not accord with their nutritional knowledge. *Public health nutrition*, 10(09), 897-901.
- Mitwalli, A. H., Al-Swailem, A. R., Aziz, K., Paul, T. T., Aswad, S., Shaheen, F. A., & Alam, A. A. (1997). Etiology of end-stage renal disease in two regions of Saudi Arabia. *Saudi Journal of Kidney Diseases and Transplantation*, 8(1), 16.
- Mizoue, T., Yamaji, T., Tabata, S., Yamaguchi, K., Ogawa, S., Mineshita, M., & Kono, S. (2006). Dietary patterns and glucose tolerance abnormalities in Japanese men. *The Journal of nutrition*, 136(5), 1352-1358.
- Mohamed, B. A., Almajwal, A. M., Saeed, A. A., & Bani, I. A. (2013). Dietary practices among patients with type 2 diabetes in Riyadh, Saudi Arabia. *J Food AGRic Environ*, 11(2), 110-114.
- Mohammadi, Shooka, Karim, A. N., Talib, Ruzita, Reza. (2015). Knowledge, Attitude and Practices on Diabetes Among Type 2 Diabetic Patients in Iran: A Cross-Sectional Study. *Science*, 3(4), 520-524.
- Mohieldein, Hassan, A., Alzohairy, A. M., Hasan, & Marghoob. (2011). Awareness of diabetes mellitus among Saudi non-diabetic population in Al-Qassim region, Saudi Arabia. *Journal of Diabetes and Endocrinology*, 2(2), 14-19.
- Mohieldein, A. H., Alzohairy, M., & Hasan, M. (2011). Risk estimation of type 2 diabetes and dietary habits among adult Saudi Non-diabetics in Central Saudi Arabia. *Global journal of health science*, 3(2), p123.
- Monnier, L., Grimaldi, A., Charbonnel, B., Iannascoli, F., Lery, T., Garofano, A., & Childs, M. (2004). Management of French patients with type 2 diabetes mellitus in medical general practice: report of the Mediab observatory. *Diabetes & metabolism*, 30(1), 35-42.
- Montano, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. *Health behavior: Theory, research and practice*.
- Mooi, E., Sarstedt, M., & Mooi-Reci, I. (2017). *Market Research: The Process, Data, and Methods Using Stata*: Springer.
- Mooradian, A. D. (2009). Dyslipidemia in type 2 diabetes mellitus. *Nature clinical practice Endocrinology & metabolism*, 5(3), 150-159.

- Mufunda, Esther, Wikby, Kerstin, Björn, A., & Hjelm, K. (2012). Level and determinants of diabetes knowledge in patients with diabetes in Zimbabwe: a cross-sectional study. *Pan African Medical Journal*, 13(78).
- Naccashian, Z. (2014). The impact of diabetes self-management education on glucose management and empowerment in ethnic Armenians with type 2 diabetes. *The Diabetes Educator*, 40(5), 638-647.
- Naeem, A. (2003). The role of culture and religion in the management of diabetes: a study of Kashmiri men in Leeds. *The journal of the Royal Society for the Promotion of Health*, 123(2), 110-116.
- Naeem, Z. (2015). Burden of diabetes mellitus in Saudi Arabia. *International journal of health sciences*, 9(3), V.
- Nair, Sreejith Sasidharan, Hanumantappa, R., Hiremath, S., Gurushantwamy, Siraj, M. A., & Raghunath, P. (2014). Knowledge, attitude, and practice of hand hygiene among medical and nursing students at a tertiary health care centre in Raichur, India. *ISRN preventive medicine*, 2014.
- Nanri, A., Mizoue, T., Noda, M., Takahashi, Y., Kato, M., Inoue, M., & Tsugane, S. (2010). Rice intake and type 2 diabetes in Japanese men and women: the Japan Public Health Center-based Prospective Study. *The American journal of clinical nutrition*, ajcn. 29512.
- Narayan, K. V., Zhang, P., Kanaya, A. M., Williams, D. E., Engelgau, M. M., Imperatore, G., & Ramachandran, A. (2006). Diabetes: the pandemic and potential solutions.
- Nasser, J. (2007). Evaluation of diabetes care in a primary care setting. *Bahrain Med Bull*, 29(2), 45-49.
- Neuendorf, K. A. (2016). *The content analysis guidebook*: Sage publications.
- Ng, Hui, S., Waseem, Noora, A., Kadirvelu, & Amudha. (2012). Reality vs illusion: knowledge, attitude and practice among diabetic patients. *International Journal of Collaborative Research on Internal Medicine & Public Health*, 4(5).
- Ng, S. W., Zaghoul, S., Ali, H., Harrison, G., & Popkin, B. M. (2011). The prevalence and trends of overweight, obesity and nutrition-related non-communicable diseases in the Arabian Gulf States. *Obesity Reviews*, 12(1), 1-13.
- National Institute for Health and Care Excellence. (2015). *Type 2 diabetes in adults: management*. UK. Assessed on (January, 2015). Retrieved from <https://www.nice.org.uk/guidance/ng28/resources/type-2-diabetes-in-adults-management-pdf-1837338615493>
- Nielsen. (1998). Peripheral neuropathy, hypertension, foot ulcers and amputations among Saudi Arabian patients with type 2 diabetes. *Diabetes research and clinical practice*, 41(1), 63-69.
- Nielsen, J. (1999). Diabetes in the Arab world: prevalence and risk factors. *Practical Diabetes*, 16(3), 82-86.

- Niemeijer-Kanters, S., Banga, J., & Erkelens, D. (2001). Dyslipidemia in diabetes mellitus. *Nederlands tijdschrift voor geneeskunde*, 145(16), 769-774.
- Noohu Abdulla Khan, N., VV Venkatachalam, V., Alavudeen, S. S., CK Dhanapal, D., Sam Daniel Pauliah, S., & Al Akhali, K. M. (2014). Glycemic control objective achieved and role of certain factors on type 2 diabetes mellitus patients in Southwestern region, Saudi Arabia. *Journal of Pharmacy Research*, 8(1), 45-48.
- Nseir, W., Nassar, F., & Assy, N. (2010). Soft drinks consumption and nonalcoholic fatty liver disease. *World journal of gastroenterology: WJG*, 16(21), 2579.
- Ntaate, C. (2015). *Dietary knowledge, attitude and practices of diabetic patients at Nsambya Hospital Kampala, Uganda*. Stellenbosch: University of Stellenbosch.
- Nunnally, J. C., & Bernstein, I. (1994). The assessment of reliability. *Psychometric theory*, 3(1), 248-292.
- Nye, C., Kim, J., Kalhan, S. C., & Hanson, R. W. (2008). Reassessing triglyceride synthesis in adipose tissue. *Trends in Endocrinology & Metabolism*, 19(10), 356-361.
- Obirikorang, Y., Obirikorang, C., Anto, E. O., Acheampong, E., Batu, E. N., Stella, A. D., Brenya, P. K. (2016). Knowledge of complications of diabetes mellitus among patients visiting the diabetes clinic at Sampa Government Hospital, Ghana: a descriptive study. *BMC Public Health*, 16(1), 637.
- Odenigbo, M., & Inya-Osuu, J. (2012). Knowledge, Attitudes and Practices of People with Type 2 Diabetes Mellitus in a Tertiary Health Care Centre, Umuahia, Nigeria. *Journal of Diabetes and Metabolism*, 3, 187-191.
- Okonta, H. I., Ikombele, J. B., & Ogunbanjo, G. A. (2014). Knowledge, attitude and practice regarding lifestyle modification in type 2 diabetic patients. *African journal of primary health care & family medicine*, 6(1), 1-6.
- Oliveira, Cristina, K., de, S., Zanetti, Maria, & Lúcia. (2011). Knowledge and attitudes of patients with diabetes mellitus in a primary health care system. *Revista da Escola de Enfermagem da USP*, 45(4), 862-868.
- Omondi, D., Walingo, M. K., Mbagaya, G., & Othuon, L. (2011). Predicting dietary practice behavior among type 2 diabetics using the theory of planned behavior and mixed methods design.
- Ortiz, G., Salica, J. P., Chuluyan, E. H., & Gallo, J. E. (2014). Diabetic retinopathy: could the alpha-1 antitrypsin be a therapeutic option? *Biological research*, 47(1), 1.
- Osman, A., & Al Nozha, M. (2000). Risk factors of coronary artery disease in different regions of Saudi Arabia.
- Ouyang, C. M. (2017). Dietary education for patients with type 2 diabetes: failure or success? *Diabetes Management*, 7(5), 377-382.

- Owsley, C., McGwin, G., Lee, D. J., Lam, B. L., Friedman, D. S., Gower, E. W., Saaddine, J. (2015). Diabetes eye screening in urban settings serving minority populations: detection of diabetic retinopathy and other ocular findings using telemedicine. *JAMA ophthalmology*, 133(2), 174-181.
- Özmen, B., Güçlü, F., Kafesçiler, S., Özmen, D., & Hekimsoy, Z. (2007). The relationship between glycosylated haemoglobin and diabetic retinopathy in patients with type 2 diabetes. *Turk Jem*, 11, 10-15.
- Pallant, J. (2011). *SPSS Survival Manual; A step by step guide to data analysis using SPSS* (4 edn), Everbest Printing Co: China.
- Panagiotakos, D. B., Tzima, N., Pitsavos, C., Chrysohoou, C., Papakonstantinou, E., Zampelas, A., & Stefanadis, C. (2005). The relationship between dietary habits, blood glucose and insulin levels among people without cardiovascular disease and type 2 diabetes; the ATTICA study. *The Review of Diabetic Studies*, 2(4), 208.
- Parimalakrishnan, Dussa, & Sahay. (2015a). Assessment of diabetes knowledge using diabetes knowledge questionnaire among people with type 2 diabetes mellitus. *Asian J Pharm Clin Res*, 8(2), 254-256.
- Parimalakrishnan, Dussa, K., & Sahay, R. (2015b). Assessment of diabetes knowledge using diabetes knowledge questionnaire among people with type 2 diabetes mellitus. *Asian Journal of Pharmaceutical and Clinical Research*, 8(2).
- Parmenter, K., & Wardle, J. (1999). Development of a general nutrition knowledge questionnaire for adults. *European Journal of Clinical Nutrition*, 53(4), 298-308.
- Parsian, N., & Dunning, T. A. (2009). Developing and validating a questionnaire to measure spirituality: A psychometric process. *Global journal of health science*, 1(1), 2.
- Pastors, J. G., Warshaw, H., Daly, A., Franz, M., & Kulkarni, K. (2002). The evidence for the effectiveness of medical nutrition therapy in diabetes management. *Diabetes Care*, 25(3), 608-613.
- Pawlikowska, T., Leach, J., Lavalley, P., Charlton, R., & Piercy, J. (2007). Consultation models. *Learning to consult*. Abingdon: Radcliffe Publishing, 178-215.
- Patel, A. (2008). Intensive blood glucose control and vascular outcomes in patients with type 2 diabetes. *New England Journal of Medicine*, 358, 2560-2572.
- Pearce, K. L., Noakes, M., Keogh, J., & Clifton, P. M. (2008). Effect of carbohydrate distribution on postprandial glucose peaks with the use of continuous glucose monitoring in type 2 diabetes. *The American journal of clinical nutrition*, 87(3), 638-644.
- Peat, J., & Barton, B. (2008). *Medical statistics: A guide to data analysis and critical appraisal*: John Wiley & Sons.
- Pett, M. A., Lackey, N. R., & Sullivan, J. J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research*: Sage.

- Pinidiyapathirage, M., Kasturiratne, A., Ranawaka, U., Gunasekara, D., Wijekoon, N., Medagoda, K., Warnakulasuriya, T. (2013). The burden of diabetes mellitus and impaired fasting glucose in an urban population of Sri Lanka. *Diabetic medicine*, 30(3), 326-332.
- Pittas, A. G., Lau, J., Hu, F. B., & Dawson-Hughes, B. (2007). The role of vitamin D and calcium in type 2 diabetes. A systematic review and meta-analysis. *The Journal of Clinical Endocrinology & Metabolism*, 92(6), 2017-2029.
- Podsakoff, M. P., MacKenzie, B. S., Lee, J. Y., & Podsakoff, P. N. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology*, 88(5), 879.
- Polit, D. F., & Beck, C. T. (2006). The content validity index: are you sure you know what's being reported? Critique and recommendations. *Research in nursing & health*, 29(5), 489-497.
- Pontieri, F. M., & Bachion, M. M. (2010). Beliefs of diabetic patients about nutritional therapy and its influence on their compliance with treatment. *Ciencia & saude coletiva*, 15(1), 151-160.
- Preedy, V. R., & Watson, R. R. (2010). Dietary Habits *Handbook of Disease Burdens and Quality of Life Measures* (pp. 4189-4189). New York, NY: Springer New York.
- Primanda, Y., Kritpracha, C., & Thaniwattananon, P. (2011). Dietary Behaviors among Patients with Type 2 Diabetes Mellitus in Yogyakarta, Indonesia. *Nurse Media Journal of Nursing*, 1(2), 211-223.
- Prochaska, J. O. (2013). Transtheoretical model of behavior change. In *Encyclopedia of behavioral medicine* (pp. 1997-2000). Springer, New York, NY.
- Qi, L., Van Dam, R. M., Rexrode, K., & Hu, F. B. (2007). Heme iron from diet as a risk factor for coronary heart disease in women with type 2 diabetes. *Diabetes Care*, 30(1), 101-106.
- Raj, C. P., & Angadi, M. (2010). Hospital-based KAP study on diabetes in Bijapur, Karnataka. *Indian J Med Spec*, 1(2), 80-83.
- Raman, R., Rani, P. K., Kulothungan, V., & Sharma, T. (2009). Diagonal ear lobe crease in diabetic south Indian population: is it associated with Diabetic Retinopathy?. Sankara Nethralaya Diabetic Retinopathy Epidemiology And Molecular-genetics Study (SN-DREAMS, Report no. 3). *BMC ophthalmology*, 9(1), 11.
- Raman, R., Verma, A., Pal, S. S., Gupta, A., Vaitheeswaran, K., & Sharma, T. (2011). Influence of glycosylated hemoglobin on sight-threatening diabetic retinopathy: A population-based study. *Diabetes research and clinical practice*, 92(2), 168-173.
- Ramayah, T., Yeap, J. A., Ahmad, N. H., Halim, H. A., & Rahman, S. A. (2017). Testing a Confirmatory model of Facebook Usage in SmartPLS using Consistent PLS. *International Journal of Business and Innovation*, 3(2), 1-14.

- Raskin, P., Donofrio, P., Rosenthal, N., Hewitt, D., Jordan, D., Xiang, J., Group, C.-S. (2004). Topiramate vs placebo in painful diabetic neuropathy Analgesic and metabolic effects. *Neurology*, 63(5), 865-873.
- Ravipati, G., Aronow, W. S., Ahn, C., Sujata, K., Saulle, L. N., & Weiss, M. B. (2006). Association of hemoglobin A 1c level with the severity of coronary artery disease in patients with diabetes mellitus. *The American journal of cardiology*, 97(7), 968-969.
- Reddy, K. S. (2002). Cardiovascular diseases in the developing countries: dimensions, determinants, dynamics and directions for public health action. *Public health nutrition*, 5(1a), 231-237.
- Reiner, Miriam, Niermann, Christina, Krapf, F., & Woll, A. (2015). Stress: personal matter or family affair? Intra-and inter-individual relationships between stress, physical activity, sedentary behavior, and nutrition. *International Journal of Child, Youth and Family Studies*, 6(1), 68-92.
- Remuzzi, G., Schieppati, A., & Ruggenenti, P. (2002). Nephropathy in patients with type 2 diabetes. *New England Journal of Medicine*, 346(15), 1145-1151.
- Ringle, C. M., Wende, S., & Will, A. (2005). SmartPLS 2.0 (beta): Hamburg.
- Ringle, C. M., Wende, Sven, & Becker, Jan-Michael. (2015). SmartPLS 3. Bönningstedt: SmartPLS.
- Risérus, U., Willett, W. C., & Hu, F. B. (2009). Dietary fats and prevention of type 2 diabetes. *Progress in lipid research*, 48(1), 44-51.
- Rissanen, T., Voutilainen, S., Nyssönen, K., Lakka, T. A., & Salonen, J. T. (2000). Fish Oil-Derived Fatty Acids, Docosahexaenoic Acid and Docosapentaenoic Acid, and the Risk of Acute Coronary Events The Kuopio Ischaemic Heart Disease Risk Factor Study. *Circulation*, 102(22), 2677-2679.
- Heaf, J. (2017). Current trends in European renal epidemiology. *Clinical kidney journal*, 10(2), 149-153.
- Rivellese, A., Boemi, M., Cavalot, F., Costagliola, L., De Feo, P., Miccoli, R., Zavaroni, I. (2008). Dietary habits in type II diabetes mellitus: how is adherence to dietary recommendations? *European Journal of Clinical Nutrition*, 62(5), 660-664.
- Rizkalla, S. W. (2014). Glycemic index: is it a predictor of metabolic and vascular disorders? *Current Opinion in Clinical Nutrition & Metabolic Care*, 17(4), 373-378.
- Robert, P., Regina M. Hardison, M.S., Sheryl F. Kelsey, Suzanne H. Goldberg, Bethesda, Mark E. Molitch,. (2009). A randomized trial of therapies for type 2 diabetes and coronary artery disease. *The New England journal of medicine*, 360(24), 2503.

- Rodriguez-Poncelas, A., Miravet-Jiménez, S., Casellas, A., Barrot-De La Puente, J. F., Franch-Nadal, J., López-Simarro, F., Mundet-Tudurí, X. (2015). Prevalence of diabetic retinopathy in individuals with type 2 diabetes who had recorded diabetic retinopathy from retinal photographs in Catalonia (Spain). *British Journal of Ophthalmology*, *99*(12), 1628-1633.
- Rohani, H., Malekahmadi, M., Eslami, A. A., Ghaderi, A., Bidkhor, M., Raei, M., & Zinat-Motlagh, S. F. (2016). Predicting dietary behavior of type 2 diabetics: Application of the theory of planned behavior and perceived risk of diabetes complications construct. *Chronic Diseases Journal*, *3*(2), 71-78.
- Roininen, K., Tuorila, H., Zandstra, E., De Graaf, C., Vehkalahti, K., Stubenitsky, K., & Mela, D. (2001). Differences in health and taste attitudes and reported behaviour among Finnish, Dutch and British consumers: a cross-national validation of the Health and Taste Attitude Scales (HTAS). *Appetite*, *37*(1), 33-45.
- Rossiter, J. R. (2002). The C-OAR-SE procedure for scale development in marketing. *International journal of research in marketing*, *19*(4), 305-335.
- Rothman, R. L., Housam, R., Weiss, H., Davis, D., Gregory, R., Gebretsadik, T., Elasy, T. A. (2006). Patient understanding of food labels: the role of literacy and numeracy. *American journal of preventive medicine*, *31*(5), 391-398.
- Rotimi, C., Daniel, H., Zhou, J., Obisesan, A., Chen, G., Chen, Y., Agyenim-Boateng, K. (2003). Prevalence and determinants of diabetic retinopathy and cataracts in West African type 2 diabetes patients. *Ethnicity and Disease*, *13*(2; SUPP/2), S2-110.
- Rozin, P., Fischler, C., Imada, S., Sarubin, A., & Wrzesniewski, A. (1999). Attitudes to food and the role of food in life in the USA, Japan, Flemish Belgium and France: Possible implications for the diet–health debate. *Appetite*, *33*(2), 163-180.
- Rubio, D. M., Berg-Weger, M., Tebb, S. S., Lee, E. S., & Rauch, S. (2003). Objectifying content validity: Conducting a content validity study in social work research. *Social work research*, *27*(2), 94-104.
- Ruta, L., Magliano, D., LeMesurier, R., Taylor, H., Zimmet, P., & Shaw, J. (2013). Prevalence of diabetic retinopathy in Type 2 diabetes in developing and developed countries. *Diabetic medicine*, *30*(4), 387-398.
- Saleh, F., Ara, F., & Afnan, F. (2016). Assessment of Gap between Knowledge and Practices among Type 2 Diabetes Mellitus Patients at a Tertiary-Care Hospital in Bangladesh. *Advances in Public Health*, 2016.
- Saleh, F., Mumu, S. J., Ara, F., Ali, L., Hossain, S., & Ahmed, K. R. (2012). Knowledge, attitude and practice of type 2 diabetic patients regarding obesity: study in a tertiary care hospital in Bangladesh. *Journal of Public Health in Africa*, *3*(1), 8.
- Sarant, LM. (2015, February 25). Saudi Arabia's looming diabetes disaster. <http://www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2015.35>.

- Sarant, L. (2015). Savoca, M., & Miller, C. (2001). Food selection and eating patterns: themes found among people with type 2 diabetes mellitus. *Journal of nutrition education, 33*(4), 224-233.
- Schwartz, N. E. (1976). Nutrition knowledge, attitudes and practices of Canadian public health nurses. *Journal of nutrition education, 8*(1), 28-31.
- Seidell, J. C. (1998). Dietary fat and obesity: an epidemiologic perspective. *The American journal of clinical nutrition, 67*(3), 546S-550S.
- Seifert, S. M., Schaechter, J. L., Hershorin, E. R., & Lipshultz, S. E. (2011). Health effects of energy drinks on children, adolescents, and young adults. *Pediatrics, 127*(3), 511-528.
- Selvin, E., Coresh, J., Golden, S. H., Brancati, F. L., Folsom, A. R., & Steffes, M. W. (2005). Glycemic control and coronary heart disease risk in persons with and without diabetes: the atherosclerosis risk in communities study. *Archives of internal medicine, 165*(16), 1910-1916.
- Shadman, Z., Khoshniat, M., Poorsoltan, N., Akhoundan, M., Omidvar, M., Larijani, B., & Hoseini, S. (2013). Association of high carbohydrate versus high fat diet with glycated hemoglobin in high calorie consuming type 2 diabetics. *Journal of diabetes and metabolic disorders, 12*(1), 1.
- Shah, V., Kamdar, P., & Shah, N. (2009). Assessing the knowledge, attitudes and practice of type 2 diabetes among patients of Saurashtra region, Gujarat. *International journal of diabetes in developing countries, 29*(3), 118.
- Shai, I., Schwarzfuchs, D., Henkin, Y., Shahar, D. R., Witkow, S., Greenberg, I., Vardi, H. (2008). Weight loss with a low-carbohydrate, Mediterranean, or low-fat diet. *New England Journal of Medicine, 359*(3), 229-241.
- Shamsi, N., Shehab, Z., AlNahash, Z., AlMuhanadi, S., Alnasir, F., Shamsi, N., Alnasir, F. (2013). Factors Influencing Dietary Practice Among Type 2 Diabetic Patients in Bahrain. *Bahrain Medical Bulletin* 2011.
- Shaw, J. E., Sicree, R. A., & Zimmet, P. Z. (2010). Global estimates of the prevalence of diabetes for 2010 and 2030. *Diabetes research and clinical practice, 87*(1), 4-14.
- Sheard, N. F., Clark, N. G., Brand-Miller, J. C., Franz, M. J., Pi-Sunyer, F. X., Mayer-Davis, E., Geil, P. (2004). Dietary carbohydrate (amount and type) in the prevention and management of diabetes. *Diabetes Care, 27*(9), 2266-2271.
- Shikur, D. B. (2016). *Dietary pattern of type 2 diabetes mellitus patients on follow up in public hospitals addis ababa, Ethiopia*. Addis Ababa University.
- Shrestha, N., Yadav, S., Joshi, A., Patel, B., Shrestha, J., & Bharkher, D. (2015). Diabetes knowledge and associated factors among diabetes patients in central Nepal. *International Journal of Collaborative Research on Internal Medicine & Public Health*.

- Sindhu, L. (2014). How much do diabetic patients know about diabetes mellitus? *Indian Journal of Forensic and Community Medicine*, 1(1), 7-11.
- Sivaprasad, S., Gupta, B., Crosby-Nwaobi, R., & Evans, J. (2012). Prevalence of diabetic retinopathy in various ethnic groups: a worldwide perspective. *Survey of ophthalmology*, 57(4), 347-370.
- Soedamah-Muthu, S. S., Chaturvedi, N., Toeller, M., Ferriss, B., Reboldi, P., Michel, G., Fuller, J. H. (2004). Risk factors for coronary heart disease in type 1 diabetic patients in Europe. *Diabetes Care*, 27(2), 530-537.
- Sonia Jebalalitha, S., Aras, R., & Jayaseelan, J. (2016). Knowledge on Diabetic Diet and Exercise Among Type 2 Diabetic Patients. *International Journal of Scientific Research*, 4(9).
- Sprague, D. (2005). Consultation skills for nurse practitioners. *Independent Nurse*, 2005 (6).
- Stevenson, A. (Ed.). (2010). Oxford dictionary of English. Oxford University Press, USA.
- Stone, N. J. (2006). Successful control of dyslipidemia in patients with metabolic syndrome: focus on lifestyle changes. *Clinical cornerstone*, 8, S15-S20.
- Stratton, I. M., Adler, A. I., Neil, H. A. W., Matthews, D. R., Manley, S. E., Cull, C. A., Holman, R. R. (2000). Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ*, 321(7258), 405-412.
- Strychar, I., Elisha, B., & Schmitz, N. (2012). Type 2 diabetes self-management: role of diet self-efficacy. *Canadian journal of diabetes*, 36(6), 337-344.
- Sun, Y., You, Wen, Almeida, F., Estabrooks, P., & Davy, B. (2017). The effectiveness and cost of lifestyle interventions including nutrition education for diabetes prevention: a systematic review and meta-analysis. *Journal of the Academy of Nutrition and Dietetics*, 117(3), 404-421. e436.
- Supriya, V., & Ramaswami, L. (2013). Knowledge, attitude and dietary practices of track and field athletic men and women aged 18-22 years. *International Journal of Innovative Research and Development*, 2(11).
- Tabachnick, & Fidell. (2007). Using Multivariate Statistics. Pearson Education. Boston, MA.
- Tabachnick, B. G., & Fidell, L. S. (2007). Using multivariate statistics, 5th. Needham Height, MA: Allyn & Bacon.
- Tarrant, C., Stokes, T., & Colman, A. M. (2004). Models of the medical consultation: opportunities and limitations of a game theory perspective. *BMJ Quality & Safety*, 13(6), 461-466.

- Tanaka, Shiro, Yoshimura, Y., Kawasaki, R., Kamada, C., Tanaka, S., Akanuma, Y. (2013). Fruit intake and incident diabetic retinopathy with type 2 diabetes. *Epidemiology*, 24(2), 204-211.
- Tavakoli, H. R., Dini-Talatappeh, H., Rahmati-Najarkolaei, F., & Fesharaki, M. G. (2016). Efficacy of HBM-Based Dietary Education Intervention on Knowledge, Attitude, and Behavior in Medical Students. *Iranian Red Crescent Medical Journal*, 18(11).
- Thomas, R. L., Dunstan, F. D., Luzio, S. D., Chowdhury, S. R., North, R. V., Hale, S. L., Owens, D. R. (2015). Prevalence of diabetic retinopathy within a national diabetic retinopathy screening service. *British Journal of Ophthalmology*, 99(1), 64-68.
- Timlin, M. T., & Pereira, M. A. (2007). Breakfast frequency and quality in the etiology of adult obesity and chronic diseases. *Nutrition Reviews*, 65(6), 268.
- Tol, A., Alhani, F., Shojaezadeh, D., Sharifirad, G., & Moazam, N. (2015). An empowering approach to promote the quality of life and self-management among type 2 diabetic patients. *Journal of education and health promotion*, 4.
- Tol, A., Baghbanian, A., Mohebbi, B., Shojaezadeh, D., Azam, K., Shahmirzadi, S. E., & Asfia, A. (2013). Empowerment assessment and influential factors among patients with type 2 diabetes. *Journal of Diabetes & Metabolic Disorders*, 12(1), 6.
- Tol, A., Shojaezadeh, D., Sharifirad, G., Alhani, F., & Tehrani, M. M. (2012). Determination of empowerment score in type 2 diabetes patients and its related factors. *Journal of the Pakistan Medical Association*, 62(1), 16.
- Tones, K., & Tilford, S. (2001). *Health promotion: effectiveness, efficiency and equity*: Nelson Thornes.
- Tong, X., Dong, J., Wu, Z., Li, W., & Qin, L. (2011). Dairy consumption and risk of type 2 diabetes mellitus: a meta-analysis of cohort studies. *European Journal of Clinical Nutrition*, 65(9), 1027-1031.
- Toy, B., & Day, S. (2013). Non-mydratic fundus camera screening for diabetic retinopathy in a Northern California safety-net setting. *Investigative Ophthalmology & Visual Science*, 54(15), 1552-1552.
- Trochim, W. M., & Donnelly, J. P. (2001). Research methods knowledge base.
- Tucker, D. M., & Palmer, A. J. (2011). The cost-effectiveness of interventions in diabetes: a review of published economic evaluations in the UK setting, with an eye on the future. *primary care diabetes*, 5(1), 9-17.
- Tuomilehto, J., Lindström, J., Eriksson, J. G., Valle, T. T., Hämäläinen, H., Ilanne-Parikka, P., Rastas, M. (2001). Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *New England Journal of Medicine*, 344(18), 1343-1350.

- Turnbull, F., Abraira, C., Anderson, R., Byington, R., Chalmers, J., Duckworth, W., Moritz, T. (2009). Intensive glucose control and macrovascular outcomes in type 2 diabetes. *Diabetologia*, 52(11), 2288-2298.
- Tsang, S., Royse, C. F., & Terkawi, A. S. (2017). Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi journal of anaesthesia*, 11(Suppl 1), S80.
- United States Department of Agriculture. (1992). The food guide pyramid. Retrieved from https://www.cnpp.usda.gov/sites/default/files/archived_projects/FGPPamphlet.pdf
- Vaag, A. A. (2006). Glycemic control and prevention of microvascular and macrovascular disease in the Steno 2 study. *Endocrine practice*, 12(Supplement 1), 89-92.
- Van Dam, R. M., Rimm, E. B., Willett, W. C., Stampfer, M. J., & Hu, F. B. (2002). Dietary patterns and risk for type 2 diabetes mellitus in US men. *Annals of internal medicine*, 136(3), 201-209.
- Van Dam, R. M., Willett, W. C., Rimm, E. B., Stampfer, M. J., & Hu, F. B. (2002). Dietary fat and meat intake in relation to risk of type 2 diabetes in men. *Diabetes Care*, 25(3), 417-424.
- Vasan, R. S., Massaro, J. M., Wilson, P. W., Seshadri, S., Wolf, P. A., Levy, D., & D'agostino, R. B. (2002). Antecedent blood pressure and risk of cardiovascular disease. *Circulation*, 105(1), 48-53.
- Villegas, R., Shu, X. O., Gao, Y. T., Yang, G., Elasy, T., Li, H., & Zheng, W. (2008). Vegetable but not fruit consumption reduces the risk of type 2 diabetes in Chinese women. *The Journal of nutrition*, 138(3), 574-580.
- Wahome, E. M. (2012). *Nutritional knowledge, status and dietary practices: a case study of Diabetes type II patients Kikuyu Mission hospital diabetic clinic*. University of Nairobi, Kenya.
- Waithaka, L. G. (2011). *Nutritional knowledge, attitudes and practices in management of type 2 diabetes among adults in Nakuru provincial hospital*.
- Wallin, A., Di Giuseppe, D., Orsini, N., Patel, P. S., Forouhi, N. G., & Wolk, A. (2012). Fish Consumption, Dietary Long-Chain n-3 Fatty Acids, and Risk of Type 2 Diabetes Systematic review and meta-analysis of prospective studies. *Diabetes Care*, 35(4), 918-929.
- Wan, T., Rav-Marathe, K., & Marathe, S. (2016). A Systematic Review of Kap-O Framework for Diabetes. *Medical Research Archives*, 3(9). Retrieved from <http://journals.ke-i.org/index.php/mra/article/view/483>.
- Wan, T. T. (2014). A transdisciplinary approach to health policy research and evaluation. *International journal of public policy*, 10(4-5), 161-177.
- Wardle, J., Parmenter, K., & Waller, J. (2000). Nutrition knowledge and food intake. *Appetite*, 34(3), 269-275.

- Weinstein, M. C., O'Brien, B., Hornberger, J., Jackson, J., Johannesson, M., McCabe, C., & Luce, B. R. (2003). Principles of Good Practice for Decision Analytic Modeling in Health-Care Evaluation: Report of the ISPOR Task Force on Good Research Practices – Modeling Studies. *Value in Health*, 6(1), 9-17.
- Weinstein, M. C., Toy, E. L., Sandberg, E. A., Neumann, P. J., Evans, J. S., Kuntz, K. M., Hammitt, J. K. (2001). Modeling for health care and other policy decisions: uses, roles, and validity. *Value in Health*, 4(5), 348-361.
- Whipple, K. (2015). *Attendance at type 1 diabetes camp improves nutrition knowledge in children and adolescents*: University of Rhode Island.
- Whiting, D. R., Guariguata, L., Weil, C., & Shaw, J. (2011). IDF diabetes atlas: global estimates of the prevalence of diabetes for 2011 and 2030. *Diabetes research and clinical practice*, 94(3), 311-321.
- Wiggins, B. C. (2000). Detecting and Dealing with Outliers in Univariate and Multivariate Contexts.
- Wild, S., Roglic, G., Green, A., Sicree, R., & King, H. (2004). Global prevalence of diabetes estimates for the year 2000 and projections for 2030. *Diabetes Care*, 27(5), 1047-1053.
- Willett, W., Koplan, J. P., Nugent, R., Dusenbury, C., Puska, P., & Gaziano, T. A. (2006). Prevention of chronic disease by means of diet and lifestyle changes.
- Williams, G. C., Rodin, G. C., Ryan, R. M., Grolnick, W. S., & Deci, E. L. (1998). Autonomous regulation and long-term medication adherence in adult outpatients. *Health Psychology*, 17(3), 269.
- Wold, H. (1975). *Path models with latent variables: The NIPALS approach*: Acad. Press.
- Wolever, T., Jenkins, D., Vuksan, V., Jenkins, A., Buckley, G., Wong, G., & Josse, R. (1992). Beneficial effect of a low glycaemic index diet in type 2 diabetes. *Diabetic medicine*, 9(5), 451-458.
- Wong. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, 24(1), 1-32.
- Wong, Eiin, J., Parnell, R. W., Black, E. K., & Skidmore, P. M. (2012). Reliability and relative validity of a food frequency questionnaire to assess food group intakes in New Zealand adolescents. *Nutrition journal*, 11(1), 1.
- Wong, K. (2010). Handling small survey sample size and skewed dataset with partial least square path modelling. *Vue: The Magazine of the Marketing Research and Intelligence Association*, November, 20-23.
- World Health Organization. (2004). Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet (London, England)*, 363(9403), 157.

- World Health Organization. (2005). *Stepwise Approach to NCD Surveillance, Country-Specific Standard Report, Saudi Arabia*. Saudi Arabia. Assessed on (January 30, 2016). Retrieved from http://www.who.int/chp/steps/2005_SaudiArabia_STEPS_Report_EN.pdf
- World Health Organization. (2005). *Global prevalence of diabetes mellitus and its complications*. Geneva, Switzerland. Assessed on (January 12, 2016). Retrieved from <http://www.who.int/blindness/Prevention%20of%20Blindness%20from%20Diabetes%20Mellitus-with-cover-small.pdf>
- World Health Organization. (2000). *Obesity: preventing and managing the global epidemic*: World Health Organization.
- Worsley, A. (2002). Nutrition knowledge and food consumption: can nutrition knowledge change food behaviour? *Asia Pacific journal of clinical nutrition*, 11(s3).
- Yaktine, A. L., & Stallings, V. A. (2007). *Nutrition standards for foods in schools: leading the way toward healthier youth*: National Academies Press.
- Yau, J. W., Rogers, S. L., Kawasaki, R., Lamoureux, E. L., Kowalski, J. W., Bek, T., Grauslund, J. (2012). Global prevalence and major risk factors of diabetic retinopathy. *Diabetes Care*, DC_111909.
- Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology*, 9(2), 79-94.
- Your Guide to Lowering Your Cholesterol with TLC (Therapeutic Lifestyle Changes). (2006). National Heart, Blood Institute (Ed.), *National Institutes of Health, US Department of Health and Human Services, Bethesda, MD*.
- Yun, W. J. (2010). Relationship between Glycemic Control and Diabetic Retinopathy. *Journal of the Korean Geriatrics Society*, 14(4), 234-241.
- Yurdugül, H. (2008). Minimum sample size for Cronbach's coefficient alpha: a Monte-Carlo study. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 35(35).
- Zhang, X., Saaddine, J. B., Chou, C. F., Cotch, M. F., Cheng, Y. J., Geiss, L. S., Klein, R. (2010). Prevalence of diabetic retinopathy in the United States, 2005-2008. *Jama*, 304(6), 649-656.
- Zheng, Y., He, M., & Congdon, N. (2012). The worldwide epidemic of diabetic retinopathy. *Indian journal of ophthalmology*, 60(5), 428.
- Zou, W., Ni, L., Lu, Q., Zou, C., Zhao, M., Xu. (2016). Diabetes Onset at 31–45 Years of Age is Associated with an Increased Risk of Diabetic Retinopathy in Type 2 Diabetes. *Scientific reports*, 6, 38113.