Original Article

Type-2 Diabetes among Investors Community in India

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ABSTRACT

Comorbidity and mortality are high among people with type-2 diabetes. Globally, diabetes is a major health issue, with a growing number of patients at risk of complications. A change in lifestyle is leading to an increase in diabetes prevalence. International Diabetic Federations (IDF) reports rank diabetes fourth among leading causes of death. Young adults are more likely to develop type-2 diabetes in Asia, where prevalence is on the rise. During the data collection period, most of the responses opined that diabetes is the mother of all the health related diseases. Concerning the relevance of the topic, we tried to focus the gap areas which are identified during the literature review. They are health related, psychological, and economic challenges which are encountered by the diabetic patients among the investor community in India. To address this issue, we tried to decode these challenges in the study areas. For this purpose, 187 responses were collected over six months by adopting snow ball sampling. This includes urban, rural, and semi-urban areas of Odisha. 37 variables were initially identified but finally after core group discussion and pilot study, the same being restricted to 30 only. This includes 13 for the health related sub variables, 11 for psychological variables, and rest were economic variables. For data analysis, perception score method and rank method used. The findings of the study are in case of health related challenges, sexual life, kidney issues, and foot ulcer are the major concern among the respondents. For the psychological challenges, feeling of more dependency on others, adverse comments of friends and relatives, depression, and anger are the main challenges. Similarly, for the economic challenges meeting medicine charges, consultation fees, and cost of healthy food are the major challenges.

GRAPHICAL ABSTRACT

Introduction

Type 2 diabetes is a condition that happens because of a problem in the way the body regulates and uses sugar as a fuel. That sugar also is called glucose. This long-term condition results in too much sugar circulating in the blood. Eventually, high blood sugar levels can lead to disorders of the circulatory, nervous, and immune systems. In type 2 diabetes, there are primarily two problems. The pancreas does not produce enough insulin-a hormone that regulates the movement of sugar into the cells and cells respond poorly to insulin and take in less sugar. Type 2 diabetes used to be known as adult-onset diabetes, but both type 1 and type 2 diabetes can begin during childhood and adulthood. Type 2 is more common in older adults. However, the increase in the number of children with obesity has led to more cases of type 2 diabetes in younger people. There is no cure for type 2 diabetes. Losing weight, eating well, and exercising can help manage the disease. If diet and exercise are not enough to control blood sugar, diabetes medications or insulin therapy may be recommended.

India is often referred to as the 'Diabetes Capital of the World', as it accounts for 17% of the total number of diabetes patients in the world. There are currently close to 80 million people with diabetes in India and this number is expected to increase to 135 million by 2045 according to the publications of mayo clinic.

Worldwide, non-communicable diseases like type-2 Diabetes are the most important public health problem along with economic development, life standard improvement, lifestyle and dietary changes, and urbanization [1]. Both developed and developing countries are experiencing an increase in diabetes prevalence. It is estimated that in 2025, there will be 300 million diabetic patients worldwide, from 110 million in 1994 [2]. Like any chronic disease, diabetes can cause several personal, familial, social, and financial problems, as well as an increased mortality rate. There are many problems which negatively impact the lives of patients with diabetes, such as high blood sugar, dietary and exercise restrictions, frequent insulin injections, musculoskeletal complications, physical disabilities, sexual dysfunction, and vascular disorders [3]. Likewise, there are many problems that affect the families, social and economic status of these patients, including job loss, frequent hospitalizations, higher medical care demands, indirect costs associated with early death, reduced social and familial interactions, and worsening lifestyles [4]. Several services are provided by the diabetes clinic such as a secondary level: diagnosis, treatment, patient care, referral to a diabetes centre, follow-up feedback and appropriate action, assessment of complications in accordance with clinical guidelines, and collection and retention of patient information in medical records [5]. The involved factors are not entirely understood, but numerous studies indicate that QoL is lower for diabetes patients than for healthy individuals. Among the variables that may interfere are the type of diabetes, insulin use, age, diabetes-related complications, social status, psychological factors, ethnicity, education level, knowledge of the disease, and the kind of assistance received from others [6].

Many diabetes-related morbidities and deaths can be attributed to diabetes complications. Since diabetes is a chronic disease, regular assessments are necessary. This tool is vital for predicting a patient's health status and determining the best course of action for disease management. The regular evaluation of patients as a routine clinical practice could potentially improve communication between health care providers and their patients, thereby identifying complications and assisting them in receiving long-term care [7]. In addition to high rates of comorbidity and mortality, type 2 diabetes is a chronic illness [8]. An increasing number of patients are at risk of complications related to diabetes, which is a serious health problem worldwide [9].

Diabetes prevalence is rising due to changes in lifestyle [10-12]. Young adults are also more likely to suffer from type 2 diabetes in Asia due to a rise in prevalence [13]. There is a strong correlation between diabetes and the quality of life (QOL), which is viewed on a multifaceted basis, such as social, physical, and role

functioning, stress, anxiety about tomorrow, and emotional well-being [14]. Due to diabetes, most diabetics experience negative emotions such as frustration and loneliness [15]. Age, gender, complications of diabetes, treatment, and duration of diabetes are several demographic and psychosocial factors that affect QOL [16]. Several surveys have examined the psychosocial concept, which has shown that social support, self-care activities, diabetes awareness, sadness, worry, stress, and social support all affect quality of life [17, 18].

Ritalin intake for a long period may increase the number of atretic follicles and decrease corpora luteal, so subsequently results in reduction of growth of follicles and oocytes as well as inducing the atypical appearance of the cells in the luteinized cells [19]. Retinitis pigmentosa (RP) might lead to various mental disorders, especially obsessive compulsive disorder [20]. The results of the study showed were that an increase in the nurses knowledge can be reduce the number of medication errors. In conclusion, the number of medication errors among nurses should be mentioned [21]. Family-based care training by telenursing could be effective in reducing the emotional reactions in mothers of children with bone marrow transplantation [22]. Low self-efficacy can decrease cognitive and behavioural functioning, whereas increased self-efficacy leads to a change in treatment acceptance behaviour and subsequently, physical and mental health [23]. Although the positive rate of tear RT-PCR rate is not noticeable as nasopharyngeal swabs yet, COVID-19 transmission through the eyes is biologically plausible [24].

The present study is very much relevant considering the issues faced by the diabetic patients. More specially the women and old age patients who are dependents on their family members for taking them to hospitals for medical checkup and at the same time, challenges of availing and availability of infrastructure led medial facilities and qualified doctors in the study areas in addition to various psychological, economical, and health related challenges.

To understand various health related challenges faced by type-2 diabetes among investors community in India.
To know various psychological challenges faced by type-2 diabetes among investors community in India.
To study various economic challenges faced by type-2 diabetes among investors community in India.

Materials and Methods

The present study will restrict to the diabetic patients in the study areas. The respondents include both male and female respondents of various age groups. This includes respondents of rural, urban, and sub-urban investor community in selected study areas of Odisha. The period of study was for six months. The study covers the urban areas of Bhubaneswar, Cuttack, Rourkela, Sambalpur, Puri, and Berhampur. In the rural areas, it includes outskirt of Bhubaneswar such as Bhola, Kantabada, Chhatabar, Jhankuli, Pandarabada, and similarly the sub-urban areas includes Digapahandi, Mahanga, Paradeep, Chhatrapur, and Polosora.

The present study calculated a sample size of 1:10 to 1:4 (Rummel, 1970). A minimum sample size of four times the number of items is recommended in the present study, while a maximum sample size of ten times the number of items is recommended. The study considered 30 attributes. According to Rummel (1970) and Schwab (1980), one should expect a minimum sample size of 120 and a maximum sample size of 300 in this study, 187 responses were included.

Health related challenges faced by type-2 diabetics include loss of memory, sleeping problem, kidney issues, heart problems, and sexual problems along with others. Psychological challenges include depression, personality disorder, fear of death, and felling of more dependency on others with other related issues. Similarly, the economic challenges include meeting medicine charges, consultation fees of doctor, cost of healthy food, etc.

Both primary and secondary data were used in this study. Research gaps were identified using secondary data. Sampling was conducted through

snow ball. A literature review and seven core group discussions with 6 members each were conducted to identify the challenges of type-II diabetes, 37 attributes were considered initially. However, after the core group discussions and pilot study, 30 final variables retained. 64 respondents were considered for the pilot study purpose in the study area. This study used a Likert-type five-point scale method to compute data along with analysis of variance, with scores of four for Completely Aware (CA), three for Aware (A), two for Neutral (N), one for Not Aware (NA), and zero for Completely Not Aware (CNA). Data under 3 parameters are computed using perception weights for the various challenges faced by diabetic patients. The final conclusion done with the help of rank method.

In Table 1, the demographic profile and clinical characteristics have been considered. Demographic profile includes age in year, gender, marital status, education status, living status, occupation, monthly family income, place of origin, diet, and social habits. Similarly, the clinical characteristics include types of diabetes, family history, Body Mass Index (BMI), glycated hemoglobin %, treatment of diabetes microvascular complications and duration of diabetic of the respondents.

Data analysis

With reference to Table 2, answering to the questions related to health related challenges, in case of UMDP, loss of sexual life is an important challenge, followed by loss of sight, chest pain, kidney diseases, heart attack, foot ulcer etc. In case of UFDP, loss of sexual life, foot ulcer, feeling weak, chest pain, sleeping problem and fatigue problems are main challenges. In case of RMDP, feeling weak, kidney issues, fatigue problem, loss of weight and sleeping problems are the serious concern.

For the RFDP, loss of weight, fatigue problem, kidney issues and loss of sexual life are the main challenges. For SMDP, loss of sexual life, kidney issues, sleeping problems, chest pain and feeling weak are the major challenges and for the SFDP, loss of sexual life, problem during long walk, loss of memory, loss of sight, foot ulcer and chest pain are the main challenges.

In average ranking of all the groups taken together, sexual life, kidney issues and foot ulcer are the major concern among the respondents.

The Figure 2 is based on the data of health related challenges with reference to Table 2. Figure 1 explains the various dynamics of type-2 diabetes.
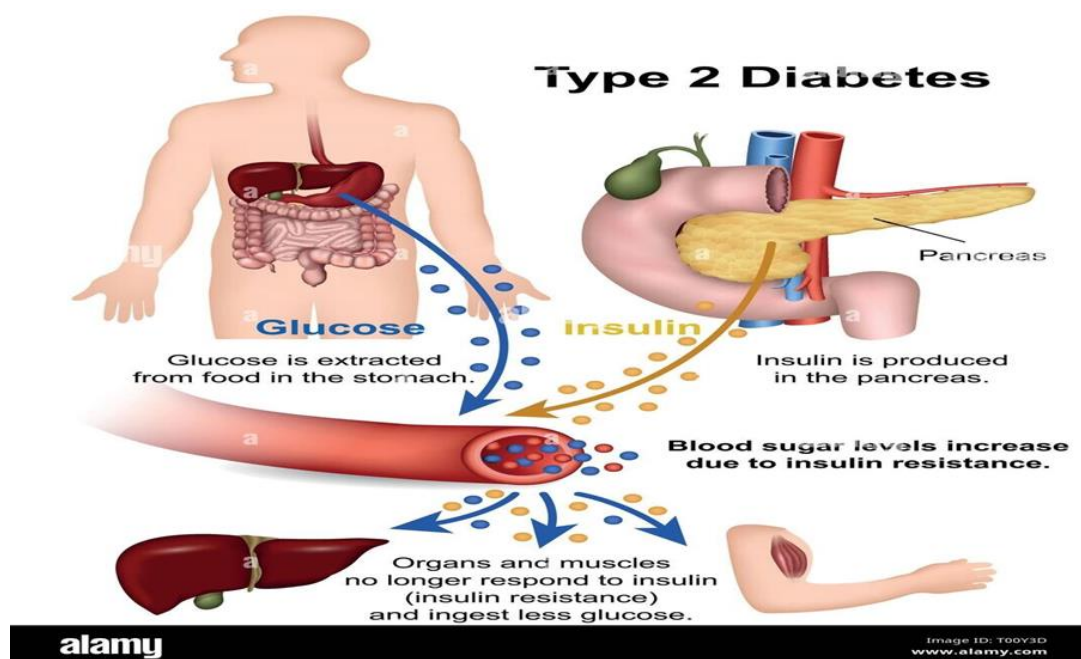

Figure 1: Various implications of type-2 diabetes (Source: i Stock)

Table 1: Socio-demographic and clinical characteristics of the respondents

Particulars	Details	No. of respondents
Socio-demographic profile		
Age (year)	Below 30	14
	31-40	36
	41-50	42
	51-60	47
	Above 60	48
Gender	Male	116
	Female	71
	Others	0
Marital status	Married	73
	Unmarried	47
	Widowed	36
	Divorced	31
Education status	Literate	146
	Illiterate	41
Living status	With family	132
	Alone	36
	Live in relationship	19
Occupation	Business	83
	Job	37
	House wives	56
	Not working	11
Monthly family income	Below Rs20,000	22
	Below Rs50,000	54
	Below Rs1,00,000	49
	Above Rs1,00,000	51
Place of origin	Rural	42
	Semi urban	57
	Urban	88
Diet	Vegetarian	122
	Mixed	65
Social habits	Tobacco	53
	Smoking	46
	Alcohol consumption	31
	No habits	57
Clinical Characteristics of the respondents		
Type of diabetes	Type-1	32
	Type-2 Diabetes	143
	Not known	12
Family history of diabetes	Yes	121
	No	34
	Not aware	32
Body Mass Index (BMI) (Kg/m2)	<25	124
	>_25	63
Glycated hemoglobin %	<7	34
	>7	153
Treatment of diabetes	Oral hypoglycemic (OH)	36
	Insulin	47
	Combination of OH and Insulin	104
Microvascular complications	Retinopathy	41
	Neuropathy	53
	Nephropathy	64
	No complications	29
Duration	< 5 years	39
	>5 years	148

Source: Primary data

Table 2: Health related Challenges

Variables	Overall rank						
	UMDP	UFDP	RMDP	RFDP	SMDP	SFDP	Average rank
Feeling weak	11	3	1	4	5	3	5.4
Sleeping problem	10	5	5	2	3	7	6.4
Loss of weight	12	2	4	1	7	2	5.6
Fatigue problem	7	6	3	1	9	3	5.8
Heart attack	5	9	4	4	8	5	7
Chest pain	3	4	7	4	4	4	5.2
Kidney issues	4	7	2	1	2	8	4.8
Foot ulcer	6	2	6	5	3	4	5.2
Loss of sight	2	10	1	4	7	4	5.6
Leads to hearing issues	13	10	8	3	8	6	9.6
Loss of sexual life	1	1	1	1	1	1	1
Problem during long walk	8	7	5	4	6	2	6.4
Loss of memory	9	8	1	5	9	3	7

Source: Annexure A, B, C, D, and E.

UMDP-Urban male diabetic patients, UFDP-Urban female diabetic patients.

RMDP-Rural male diabetic patients, RFDP- Rural female diabetic patients.

SMDP-Sub-urban male diabetic patients, SFDP-Sub-urban female diabetic patients.
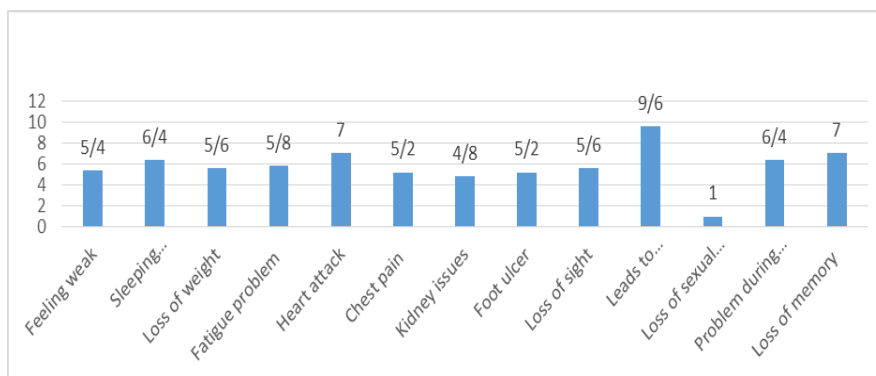
Figure 2: Average rank of health related challenges (Source: Table 2)

Table 3: Psychological challenges

Variables	Overall rank						
	UMDP	UFDP	RMDP	RFDP	SMDP	SFDP	Average rank
Depression	10	3	1	2	2	2	4
Anger	7	6	4	1	5	4	5.4
Loneliness	11	2	6	6	3	7	7
Personality disorder	4	7	2	7	6	7	6.6
Uncertainty of the future	9	6	4	6	4	6	7
Feeling of social distance	5	8	5	5	9	3	7
Feeling of more dependency on others	2	1	2	3	1	1	2
Fear of death	8	4	3	4	4	8	6.2
Feeling of guilty for inability to do physical activities	6	9	3	4	8	6	7.2
Putting weight due to lack of physical activities	3	6	4	2	7	5	5.4
Adverse comments from friends and relatives for the extra weight	1	5	2	2	3	2	3

Source: *Annexure A, B, C, D, and E.*

UMDP-Urban male diabetic patients, UFDP-Urban female diabetic patients.

RMDP-Rural male diabetic patients, RFDP-Rural female diabetic patients.

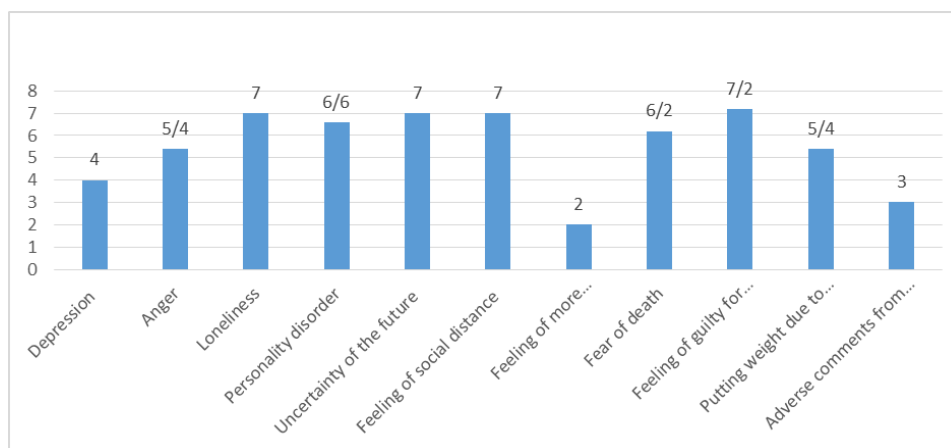*SMDP-Sub-urban male diabetic patients, SFDP-Sub-urban female diabetic patients.*

Figure 3: Average rank related to psychological challenges (Source: Table 3)

Based on Table 3, related to various psychological challenges, for UFDP, feeling of more dependency on others, loneliness, depression, fear of death, adverse comments of friends, and relatives for putting the extra weight are the major challenges. For the UMDP, adverse comments from friends and relatives, feeling of more dependency on others, putting weight due to lack of exercise, personality disorders are the main challenges. Similarly, for the RFDP. Anger, adverse comments, putting extra weight, depression, and feeling more dependency on others are the core challenges.

In case of RMDP, depression, personality disorder, feeling of more dependency on others, fear of death are main psychological challenges. For the SFDP, feeling of more dependency on others, adverse comments, feeling of social distance, depression are the main challenges. Accordingly, for the SMDP, feeling of more dependency on others, depression, loneliness, and uncertainty of future are the major challenges.

In the average rank, feeling of more dependency on others, adverse comments of friends and relatives, depression, and anger are the main challenges.

The Figure 3 is based on the data of health related challenges with reference to Table 3.

In Table 4, responding questions related to economic challenges, in case of SFDP meeting doctor consultation fees, cost of healthy food, meeting medicine charges along with others are the major challenges. For the SMDP, meeting medicine charges, doctor's consultation fees, cost of healthy food along with others are core challenges. In case of RFDP, cost of health food, meeting consultation fees, and medicine expenses are the main challenges.

For RMDP, meeting medicine charges, cost of healthy foods and meeting consultation fees are the challenging area. Similarly, for the UMDP, meeting medicine charges, cost of healthy foods are the core challenges along with others. In case of UFDP, meeting occultation fees and cost of healthy food are the major challenges.

Table 4. Economic Challenges

Variables	Overall rank						
	UMDP	UFDP	RMDP	RFDP	SMDP	SFDP	Average rank
Meeting doctor consultation charges	3	1	2	1	2	1	2
Meeting medicine charges	1	2	1	1	1	3	1.8
Meeting lab test charges for diagnosis	6	2	3	2	3	3	3.8
Purchase of blood glucose strips and meters	4	3	4	2	4	3	4
Cost of healthy food	2	1	2	1	2	2	2
Missing work from diabetes complication	5	4	5	3	5	4	5.2

Source: Annexure A, B, C, D, and E.
UMDP-Urban male diabetic patients, UFDP-Urban female diabetic patients.
RMDP-Rural male diabetic patients, RFDP-Rural female diabetic patients
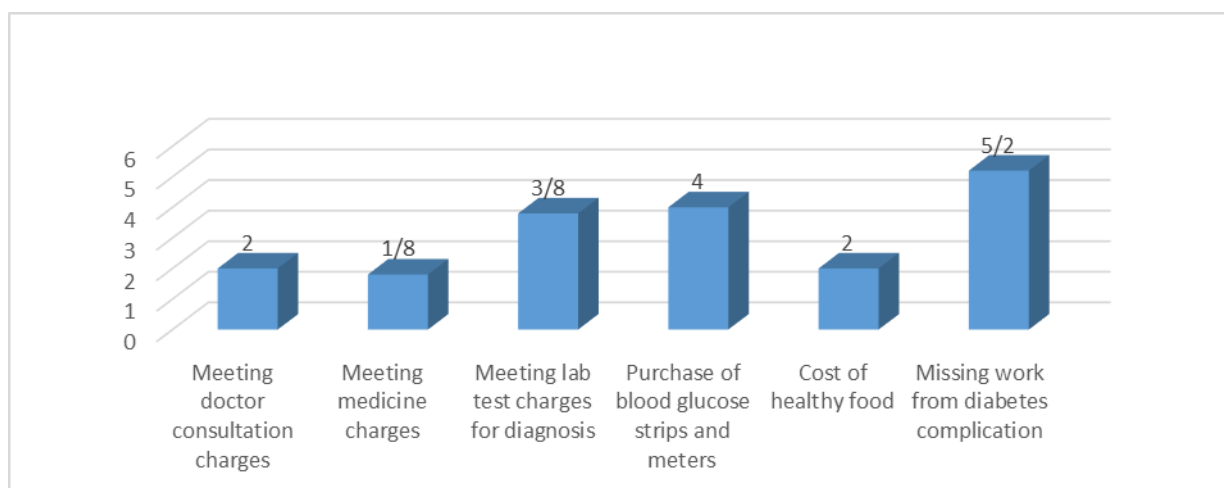*SMDP-Sub-urban male diabetic patients, SFDP-Sub-urban female diabetic patients.*

Figure 4: Average rank related to Economic Challenges (Source: Table 4)

The Figure 4 is based on the data of health related challenges with reference to Table 4.

Conclusion

The purpose of the study was to know various challenges faced by the type-2 diabetes patients among investors community in India. The same being addressed with the help of three parameters considered for the study such as health related challenges, psychological challenges, and economic challenges. The findings based on the health related challenges indicates that most of the respondents having loss of sex life, kidney issues, foot ulcer, and chest pain. For the psychological challenges, it was observed that feeling more dependency on others, adverse comments from family and relatives, and depression are the contributing factors. Similarly, for the economic challenges viewpoint, meeting doctor's consultation fees, meeting medicine charges, and cost of healthy food are the major findings. At the same time when any member of family suffers diabetes, it not only affects that person it directly or indirectly leads to lot of complications to entire family. Normally the impact of such diseases are such that it derails the life style of the patient along with other family members. During the survey, it was experienced that the difficulties that are being encountered by the family members along with the patients. There is no second thought that health related challenges are being faced by the diabetic patient, but the other associated challenges are also being experienced by the family members. In case of psychological and economic challenges, this is not only major challenges for the patients; this is equal challenge for other members of family especially in case of dependent family members of the diabetic patients. It is thus more important the diabetic patients should take all the necessary precautions to control this diabetes so that the various challenges can be addressed automatically. Especially various side effects can be reduced to a great extent. It is also important that the family members should behave cordially with the patients to overcome these challenges.

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Authors' Contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

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References

[1]. Unwin N., Alberti K.G.M.M. Chronic non-communicable diseases. *Annals of Tropical Medicine & Parasitology*, 2006, **100**:455 [Crossref], [Google Scholar], [Publisher]

[2]. Mohtasham-Amiri Z., Barzigar A., Kolamroudi H.R., Hoseini S., Rezvani S., Shakib R.J., Shakib A.J., Prevalence, awareness and control of diabetes in urban area of north of Iran, 2009, *International Journal of Diabetes in Developing Countries*, 2015, **35**:346 [Crossref], [Google Scholar], [Publisher]

[3]. Gregg E.W., Beckles G.L., Williamson D.F., Leveille S.G., Langlois J.A., Engelgau M.M., Narayan K.M., Diabetes and physical disability among older US adults, *Diabetes Care*, 2000, **23**:1272 [Crossref], [Google Scholar], [Publisher]

[4]. Olson R.S., An update in diabetes management, *Rehabilitation Nursing*, 2000, **25**:177 [Crossref], [Google Scholar], [Publisher]

[5]. Azizi F., Gouya M., Vazirian P., Dolatshahi P., Habibian S., The diabetes prevention and control programme of the Islamic Republic of Iran, *EMHJ - Eastern Mediterranean Health Journal,* 2003, **9**:1114 [Google Scholar], [Publisher]

[6]. Kiadaliri A.A., Najafi B., Mirmalek-Sani M., Quality of life in people with diabetes: a systematic review of studies in Iran, *Journal of Diabetes & Metabolic Disorders*, 2013, **12**:54 [Crossref], [Google Scholar], [Publisher]

[7]. Prajapati V.B., Blake R., Acharya L.D., Seshadri S., Assessment of quality of life in type II diabetic patients using the modified diabetes quality of life (MDQoL)-17 questionnaire, *Brazilian Journal of Pharmaceutical Sciences*, 2017, **53** [Crossref], [Google Scholar], [Publisher]

[8]. American Diabetes Association. Standards of medical care in diabetes, *Diabetes Care*, 2011, **34**:11 [Crossref], [Publisher]

[9]. Abolfotouh M.A., Salam M., Alturaif D., Suliman W., Al-Essa N.A., Al-Issa H., Predictors of QOL and glycemic control among saudi adults with diabetes, *International Journal of Medicine and Medical Sciences*, 2013, **46**:1360 [Google Scholar], [Publisher]

[10]. Al-Lawati J.A., Al-Riyami A.M., Mohammed A.J., Jousilahti P., Increasing prevalence of Type-2 Diabetes in Oman, *Diabet Med.*, 2002, **19**:954 [Crossref], [Google Scholar], [Publisher]

[11]. Wild S., Roglic G., Green A., Sicree R., King H., Global prevalence of diabetes: estimates for the year 2000 and projections for 2030, *Diabetes Care*, 2004, **27**:1047 [Crossref], [Google Scholar], [Publisher]

[12]. Cherrington A.D., 2005 Presidential Address: Diabetes: past, present, and future, *Diabetes Care*, 2006, **29**:2158 [Crossref], [Google Scholar], [Publisher]

[13]. Zimmet P., Alberti K.G., Shaw J., Global and societal implications of the diabetes epidemic, *Nature*, 2001, **414**:782 [Crossref], [Google Scholar], [Publisher]

[14]. Fayers P.M., Machin D. Quality of Life: The Assessment, Analysis and Reporting of Patient-reported Outcomes, 3rd Edition. John Wiley & Sons; 2016 [Publisher]

[15]. Polonsky W.H., Understanding and Assessing Diabetes-Specific QOL, *Diabetes Spectrum*, 2000, **13**:36 [Google Scholar], [Publisher]

[16]. Wandell P.E., QOL of patients with Type-2 Diabetes. An overview of research in primary health care in the Nordic countries, *Scandinavian journal of primary health care*, 2005, **23**:68 [Crossref], [Google Scholar], [Publisher]

[17]. Chyun D.A., Melkus G.D., Katten D.M., Price W.J., Davey J.A., Grey N., The association of psychological factors, physical activity, neuropathy, and QOL in type 2 diabetes, *Biological Research for Nursing*, 2006, **7**:279 [Crossref], [Google Scholar], [Publisher]

[18]. Tang W.L., Wang Y.M., Du W.M., Cheng N.N., Chen B.Y., Assessment of QOL and relevant factors in elderly diabetic patients in the Shanghai community, *Pharmacoepidemiology and*

drug safety, 2006, **15**:123 [Crossref], [Google Scholar], [Publisher]

[19]. Fazelipour S., Moghadam F.A., Davudi P., Tootian Z., Assadi F., Histometrical study of ovarian follicles of immature mice treated with methylphenidate, *Journal of veterinary Research*, 2015, **70** [Google Scholar], [Publisher]

[20]. Farhad A.M., Elham I.P., Psychological disorders in patients with retinitis pigmentosa in Iran, *Iranian Journal of Public Health*, 2014; **43**:523 [Google Scholar], [Publisher]

[21]. Geravandi S., Sahebalzamani M., Moghadam F.A., Mehrpour M., Yousefi F., Ahangari S.A., Mohammadi M.J., Refusing to report the medication errors observed in Ahvaz Jundishapur University of Medical Sciences during 2014–2015, *Clinical Epidemiology and Global Health*, 2019, **7**:620 [Crossref], [Google Scholar], [Publisher]

[22]. Solati H., Sahebalzamani M., Adhami Moghadam F., Effect of Family-Based Care Training by Tele-nursing on Emotional Reactions in Mothers of Children with Bone Marrow Transplantation, *Journal of Mazandaran University of Medical Sciences*, 2021, **30**:156 [Google Scholar], [Publisher]

[23]. Mazlominezhad A., Moghadam F.A., Evaluation of quality of life and self-efficacy in adolescents with amblyopia, *Journal of Medicine and Life*, 2022, **15**:499 [Crossref], [Google Scholar], [Publisher]

[24]. Daryabari S.H., Asadollah A., Moghadam F.A., Dorostkar R., Bahramifar A., Aghamollaei H., Detection of COVID-19 in tears of ICU-admitted patients with SARS-CoV-2 infection, *International Ophthalmology*, 2022, **42**:723 [Crossref], [Google Scholar], [Publisher]