Perceived Barriers, Benefits, Facilitators, and Attitudes of Health Professionals Towards Type 2 Diabetes Management in Oujda, Morocco: A Qualitative Focus Group Study

Usman Sani Dankoly

University of Antwerp

Dirk Vissers (✉ dirk.vissers@uantwerpen.be)

University of Antwerp

Souad Ben El Mostafa

University Mohammed Premier

Abderrahim Ziyyat

University Mohammed Premier

Bart Van Rompaey

University of Antwerp

Paul Van Royen

University of Antwerp

Abdellatif Maamri

University Mohammed Premier

Research Article

Keywords: Type 2 Diabetes, Morocco, Qualitative Research, Health Professions

Posted Date: January 6th, 2022

DOI: <https://doi.org/10.21203/rs.3.rs-1160643/v1>

License: (cc) (i) This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: In Morocco, the treatment of type 2 diabetes (T2D) is mainly focused on medication and only 2% of patients are coached towards a healthier lifestyle. In Oujda, Eastern Morocco the prevalence of T2D is 10.2%, and the current trend is alarming, especially for women. Therefore, the aim of this study is to explore healthcare professionals' (HCP) views about the perceived barriers and benefits towards an integrated care approach in primary healthcare centers (PHCCs) to T2D management in Oujda.

Methods: A descriptive study using focus groups in 8 PHCCs. This resulted in a sample of 5 doctors and 25 nurses caring for diabetes patients. The transcripts of all conversations were coded to allow for thematic analysis.

Results: The participants mentioned different *barriers to an integrated approach of DM management*:: excessive workload; poor reimbursement policy; lack of staff and equipment; interrupted drug supply; poor working environment; limited referral; gap in the knowledge of general practitioners; health beliefs; poverty; advanced age; gender; the use of psychotropic drugs. *An integrated approach could be facilitated by* simplified electronic records and referral; uninterrupted free care; staff recruitment; continuous professional development; internships. *Benefits*: structured care; promotion of care in PHCCs; empowerment of self-management.

Conclusion: HCP views reflect the urge to strengthen the management of T2D in PHCCs. There is a need for HCP with expertise in physical activity and nutrition to solve the current gap in the multidisciplinary integrated care approach. The specific local context can contribute to patients' reluctance to change their lifestyles and is a challenge to provide care in an efficient and sustainable manner. More research is needed to see how a patient-centered multidisciplinary approach to T2D management can help motivate patients in Morocco to change to a healthier lifestyle.

Introduction

In 2015, worldwide around 415 million people have diabetes and by 2040, this figure is predicted to rise to 642 million people [1]. Type 2 diabetes (T2D) accounts for 90% of the total diabetes burden [2]. In Morocco, as in many Middle Eastern and North African countries, T2D prevalence is increasing at unprecedented rates more than in any part of the world [3]. Physical inactivity and unhealthy dietary habits have contributed to a high prevalence of T2D, up to 10.6 % among adults Moroccans between 2017 to 2018 [4]. In Oujda, Eastern Morocco the prevalence of T2D is 10.2% [5] and the current trend is alarming, especially for women [6].

An international diabetes study shows that Moroccan healthcare professionals (HCPs) mainly focus on the monitoring and medical treatment of diabetes. Only 2% of the study population received lifestyle recommendations [7]. According to 2018 World Bank reports, only 6.35 million people (19%) percent of the population are covered by subsidized basic health insurance. **Private hospitals are only accessible by money whilst quality of care remains a challenge for public** primary healthcare centers (PHCCs) [8].

Patients with T2D benefit from integrated multidisciplinary integrated care[9]. However, in Oujda, T2D management in public PHCCs is currently limited to general practitioners (GPs) and nurses, and treatment is predominantly focused on medication. Education about healthy food is done by GPs if they have time to do so at all. Exploring the views of HCPs is essential in order to help understand their preferences and suggestions for the improvement of T2D care. There is no published qualitative study that has examined the views of the HCPs about this phenomenon in Morocco. Therefore, this study aims to explore HCPs' perception of barriers, facilitators, attitudes, and benefits towards an integrated care approach of T2D management in Morocco.

Methodology

Design

We used a qualitative exploratory research design. Focus groups were used to collect data, as this is an effective way to use group interactions to explore perceptions of HCPs about T2D management [10].

Settings

This study was carried out across 8 PHCCs located in both urban and rural regions in Oujda. T2D management in these settings is currently limited to GPs and nurses. There were no specialist diabetes nurses; instead, the nurses who are responsible for the provision of care for patients with diabetes are called general nurses. The interview took place between November 2019 and February 2020. Most nurses are between 25 and 55 years old while GPs are between 40 and 55 years old. Each focus group took place either in the doctor's or medical director's office.

Participants

A purposive sample of 30 healthcare professionals (5 doctors and 25 nurses) participated in a focus group interview (*Table 1*).

Table 1: Distribution of HCPs in PHCCs for focus group

Primary Healthcare Centers	Doctors (n=5)	Nurses (n=25)
Oued Nachef	0	4
Nssar1	0	3
Sidi yahya	0	4
Al Andalouss	1	1
Mbasso	1	1
Boudir	1	5
Moulay driss	0	4
Lazaret	2	3

Both doctors and nurses had working experience in T2D management for 6 or more months in a primary healthcare center. Besides the clinical task, some of the HCPs have administrative responsibility. Eligibility criteria included having experience of managing patients with T2D and practicing in the health facility where the interview is conducted.

Procedure

This study was reviewed and approved by the Comité d'Ethique pour la Recherche Biomédicale d'Oujda (CERBO) and participants signed informed consent before participating. An interview guide was developed and used to maintain the consistency of methods across groups (Additional file 1). The interviews were done in the French language but some participants combined this with Arabic dialect in the course of the interview.

Focus group discussions lasted approximately 30 to 120 minutes and were moderated by a researcher with experience in qualitative methods. The focus group interviews were audiotaped and transcribed verbatim into the French language.

Data analysis

Initially, all transcripts were written in the French language and before analysis, they were translated into English language using standardized procedures [11]. Using thematic analysis the textual data was analyzed in three steps. These include; (I) reading and re-reading transcripts until we became familiar with the views and language of participants; (II) Combining inductive and deductive approach to create a thematic framework (III) coding the data line-by-line against the themes and emerging sub-themes; and (IV) comparison and relational analysis of themes within cases of HCPs and PHCCs. Via face-to-face meetings, researchers identified the themes, which were discussed until consensus was reached. Transcripts in Microsoft Word format were imported into a qualitative research software package (NVIVO 12 Pro) to facilitate data management and analysis.

Results

Health professionals identified barriers, facilitators, attitudes, and benefits of T2D treatment in primary health centers, which were grouped into three main categories: healthcare system, HCPs, and patients (Figure 1).

BARRIERS ASSOCIATED WITH HEALTH SYSTEM MANAGEMENT

Excessive workload and lack of human resources

The disproportionate clinicians-to-patient ratio was mentioned by the participants as a major problem affecting proper individual medical consultations. They added that only a few doctors and nurses run the diabetes clinic and have to attend to long queues of patients beyond official working hours. Thus, often patients are given longer appointments for medical follow-up.

Too many patients with diabetes are attending consultations, which does not allow adequate centered care for each patient (D).

Diabetic patients and health workers suffer due to too much workload (N).

Lack of enough staff to listen well (N).

We give longer appointments (D).

Nurses have mentioned that one nurse is responsible for multiple tasks, which is time demanding. In addition, participants attribute shortage of staff to lack of recruitment and demotivated staff who are overdue for retirement but still in public service. Besides the lack of general practitioners in PHCCs, the doctors said there are no medical specialists to attend to patients with T2D requiring advanced care, and added that the nurses are not certified, diabetes specialists.

The nurses do not do their job due to lack of time, workload (N).

Staffs are already old, sick, and demotivated (3 years above retirement age) almost 41 years of civil service (N). Specialists are no longer available in diabetic centers (D).

If a patient is hypo or hyperglycemic, there is no referral to a specialist (N).

Restricted referral policy to diabetes centers

The referral system is vague and patients find it difficult to make the transition from PHCCs to specialized healthcare centers. Participants noted that the Centre de Référence Préfectoral Diabétologie et Maladies Chroniques restrict referral of T2D patients to limited figures as opposed to the large number of patients with complications who need specialized care. Nurses mentioned that doctors exercise power autonomy by monopolizing the decision for referring patients to specialized care. More so, nurses perceived that

they always had to fill in too much patient information on the computer during consultations. They said it demands too much time and effort, as they have too many patients to attend to.

Centre de Référence Préfectoral Diabétologie et Maladies Chroniques gives us a specific number of patients for referral (N).

Ambiguous referral system and difficult for the patient to identify (D).

It is only the doctors who recommend a referral if a patient is unstable or has complications (N).

Complex database for health record information system (N).

Poor reimbursement policies and working environment

At public hospitals, all HCP's salaries are paid by the Ministry of finance. Doctors perceived their salary as low and not meeting their expectations. Participants described their working environment as having deteriorating working conditions. In addition, they mentioned that the universal medical coverage is inadequate due to lack of medical equipment and often the disrupted supply of free drugs. In addition, necessary medical investigations are left undone due to the poor economic status of the patients.

Lack of motivation in health professionals (D).

Lack of adequate premises and diabetes education materials (N).

The government cannot provide complete medical coverage for all the people. Lack of blood glucose meters. Routine assessment of lipid profile and HbA1c every three months are not done, because it's expensive. Lack of drugs. Patients do not buy drugs, because they are poor. Blood tests are not done and patients abandon their follow-ups (D).

BARRIERS ASSOCIATED WITH HEALTHCARE PROFESSIONALS

The Gap in doctor's knowledge

General practitioners expressed their incapability to manage elderly patients and complications. Questions about the general knowledge of T2D revealed that doctors perceived T2D as a chronic disease frequently found in young adults and the elderly population, and further highlighted heredity, obesity, and sedentary lifestyle as associated risk factors. They mentioned that treatment is non-insulin-dependent and lifestyle-oriented.

Doctors only control the blood sugar and prescribe medication. When there are complications nothing can be done. They always come with complications (diabetic feet, amputation, or dialysis) (D).

We do not target stable glycemic control in the elderly because it is difficult (D).

Chronic disease, disease of the century. In all age categories above 30 years. Associated with heredity, obesity, or sedentary lifestyle. Clinically, a serious pathology. Requires assessment and multi-discipline monitoring (D).

BARRIERS ASSOCIATED WITH PATIENTS

The participants expressed that beliefs about T2D among Moroccan patients are constructed out of cultural values and spiritual beliefs. Several patients believed that any illness including T2D comes from Allah (God) and he decides their fate with or without having T2D. This belief made them less likely to follow lifestyle changes advice. However, they do pay attention to getting free medicines.

Patients do not accept their illness and do not adhere to diet advice, everything. Always the diabetic patients perceive higher HbA1c as caused by stress. They just need the drugs (D).

Participants mentioned that patients' willingness to adhere to treatment advice is negatively influenced by their poor socioeconomic status. Doctors mentioned the role of gender in terms of adherence to advice in favor of men. Nurses added that patients of advanced age did not engage in physical activity. Nurses said T2D patients were often prescribed antidepressant drugs, it influences their behaviors.

Patients' adherence to advice depends on socioeconomic status, culture, and education level (D).

Men adhere to advice more than women (D).

Aged have a problem especially with physical activity (N).

Diabetes patients always take psychotropic drugs (N).

FACILITATORS AND BENEFITS ASSOCIATED WITH HEALTH SYSTEM MANAGEMENT

Participants suggested that an institutionalized referral system to a specialist, a simplified electronic health record, a continuous supply of free drugs, a diagnostic tools referral system, and recruitment of more HCPs into the civil service will augment structured T2D care in primary centers.

Availability of drugs and equipment in adequate quantity and quality. Free routine medical investigations, for example, HbA1c and blood glucose. Recruit young competent staff. Simplify the health record database. Provide nurses just responsible for type 2 diabetes. Reduce appointment times (D).

You need a nutritionist, dietetics, or nurse at CRD (in case of obesity) Ensure endocrinology consultation 1 time in 3 months in the primary medical centers (N). They added that there is a need to improve the working atmosphere. *Favorable working conditions, air conditioning (N).*

FACILITATORS AND BENEFITS ASSOCIATED TO HCPs AND PATIENTS

Participants recognized the need to engage in lifelong learning. They mentioned attending training would benefit continuously upgrading their skills. On the other hand, the participants perceived the provision of

free medical services as an approach that will promote diabetes self-management and therapy adherence. In addition, they stressed the need to use social media to create awareness and to promote diabetes education.

Continuous professional development program for staff that will provide diabetes education (D).

Free medical consultation for these patients. Otherwise, patients will neglect the disease if not provided with their needs, everything (D).

Therapeutic education should be done in the media and social networks for detailed diabetes education (D).

Locally adapted poster and teaching material (N).

Discussion

This study provided an in-depth understanding of the barriers and facilitators for a integrated approach to T2D management. The barriers were excessive workload, insufficient medical consultation time, and lack of human resources. The views of nurses, doctors, and health service managers differ, so determining the optimal doctor-to-patient ratio is a complex matter [12]. For too many GPs, the workload has become unmanageable, so patients don't receive adequate care. Moreover, the pressure leads to burn-out and the intention to leave the profession earlier than planned. This will certainly have a major impact on the time patients have to wait for a follow-up medical appointment [13].

Although there is insufficient evidence to either support or resist a policy of increasing consultation lengths, longer consultations may facilitate integrated care and offer sufficient time to explain treatment options to patients [14]. More so, nurses described their work as multitasking demanding a lot of time. Indeed, nurses' cognitive load is exceptionally heavy and the environment surrounding them is fast-paced and unpredictable. Nurses can manage interruptions and multitask well, but the potential risk for errors increases with the workload, hence strategies to decrease interruptions are needed [15].

Doctors raised concerns about the lack of easily available specialists to attend to patients suffering from complications. Also, they described the referral system as unclear and difficult for patients to make a transition from PHCCs to specialized care. Moreover, only a limited number of patients with T2D are accepted in diabetes referral centers. Literature on the referral practices of GPs for diabetes shows that factors influencing the referral threshold include multiple complications, the presence of comorbidities, uncertainty concerning medical management, and the need for self-management education [16, 17]. The inability to gain timely access to specialized diabetes consultation teams may contribute to GP's and patients' frustration and sub-optimal disease management [10].

In this specific study, nurses perceived that it is the sole responsibility of doctors to refer patients to specialized care. However, models of nurse-led T2D clinics exist worldwide. Hence, this needs to be addressed in order to improve the quality of diabetes care. Evidence shows that diabetes nurse

specialists have a key role in supporting and coordinating the integrated care management of T2D through nurse-led clinics in primary care. They facilitate the delivery of integrated care within the PHCCs and the cooperation between health care settings and specialists [18, 19]. An integrated approach for T2D management is effective in significantly reducing glycated hemoglobin levels, increasing treatment compliance and it is cost-effective [20]. Including specialist diabetes nurses, dieticians, physiotherapists and psychologists would allow GPs and nurses to focus on their core tasks. GPs and Nurses found it difficult to include physical activity support and healthy lifestyle advice in a T2D care program. But integrating physiotherapists into the interdisciplinary leads to the opportunity to include specialized diabetes physical activity care to elderly patients [21]. In our study, we were not able to explore how GPs and nurses advise patients to engage in physical activity since triangulation between the quotes of nurses and GPs was not done..

The introduction of an electronic health record system (EHR) is an important development to facilitate the processing of large amounts of patient data. However, in our study nurses perceived EHR as an additional workload in T2D care because they had to input numerous data during medical consultations. This finding is quite essential given the current trend of using computer applications in diabetes management, and thus this contributes to the strength of this study. A previous study [22] that examines the emerging practices of the use of EHR in diabetes care reported that there is a mismatch between EHR designs and diabetes care practices. Some health professionals perceived EHR as a source of increase in caregivers' administrative time, while others described EHR as a tool that modestly decreases the clinical documentation time. Therefore, it is recommended that system designers first make overviews of the necessary information about diabetes patients in order to develop systems that can be used optimally during clinical consultations.

Doctors that participated in the focus group discussions indicated that they were not satisfied with their salaries. Clinical management, according to recommended guidelines, at the level of primary care improves outcomes for patients with diabetes but it is linked to incentives for health professionals. In the United Kingdom, evidence has shown that incentive models have spurred some improvements in process outcomes and achievement of cholesterol, blood pressure, and HbA1C targets [23]. To improve subsidized diabetes care, Morocco has included the prevention and control of diabetes as a priority program in its health action plan 2012-2016. Still, diabetes care is limited. In 2011, the number of diabetic patients supported by the Moroccan Ministry of health was 460,000 representing only 33% of the known diabetics [24]. Patients who have no health care insurance receive high medical bills. Those who cannot afford or are financially unable do not use the health services or do not adhere to the treatment. [25].

Islam is predominantly the religion practiced in Morocco and some Muslims with T2D believe that health and illness are part of Allah's plan determining their fate and time of death with or without having T2D. Consequently, patients are less likely to clearly understand the disease and the urgency for lifestyle changes. Alsairafi et al.,[26] reported that many patients believed that only God can cure diabetes and not doctors or medicines. However, it is well known that severe untreated cases of diabetes can lead to death,

and there are different verses of the Holy Quran (the Islamic divine book) and Prophet's sayings that stress disease prevention and treatment.

Participants in our study perceived that elderly patients do not engage in insufficient physical activity. However, there is functional heterogeneity because some older patients are highly functional, some are disabled and frail, and many are between these two extremes [27]. Hence, tailored programs can address this specific population.

Strengths and limitations

To the best of our knowledge, this study was the first in Morocco to assess perceived barriers, benefits, facilitators, and attitudes of health professionals towards T2D management. Nevertheless, our study has some limitations. A convenience sample was used to select the participants possibly leading to some missed respondents. The data was translated into English affecting the trustworthiness of the original data due to an interpretation of the translator. Also, there was no member checking, and we did not include perceptions of patients. However, the specific findings in this study provide essential information to strengthen T2D care in this region. We also reached data sufficiency after eight focus groups, giving sufficient richness and depth of the data.

Conclusions And Implications

Our findings indicate a need for an adapted patient-centered multidisciplinary team and an integrated care approach. The importance of political will and the possibility to ensure adequate universal health coverage, and well-equipped PHCCs with synchronized secondary care service should be emphasized. In addition, including dietitians, physiotherapists and occupational therapists with expertise in diabetes are crucial for establishing lifestyle-changing interdisciplinary programs. A discussion of our findings with the health policy authorities of the Ministry of Health of Morocco could lead to suggestions to strengthen the organization of T2D care to meet the needs of patients. There is a need for changes in the behavior of professionals towards less authoritarian styles of medical decision-making and more patient-centered care. The characteristics of the patient-care provider relationship that affect reluctance to change lifestyle also deserve further research.

Declarations

Ethics approval and consent to participate

This study was ethically approved and reviewed by the Comité d'Ethique pour la Recherche Biomédicale d'Oujda (CERBO).

Consent for publication

Participants signed informed consent before participating in the study.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests/

Funding

The City of Antwerp: Research mobility grant for the first author.

The Government of Flanders, Mastermind Scholarship (698261): Research grant for the first author.

VLIR-UOS South Initiative project funding (SI2019- S EL053): Study and collection, analysis, and interpretation of data and writing manuscript.

Authors' contributions

DV, BVR, SBEM, AM, and AZ contributed to the study conception and design. DV, AM, and USD performed data acquisition, analysis, interpretation of data, and drafting the article. DV, PVR and AM revised the article critically for important intellectual content and final approval of the version to be published. All authors read and approved the final manuscript.

Acknowledgements

"Not applicable"

Authors' information (optional)

"Not applicable"

References

1. Jaacks LM, Siegel KR, Gujral UP, Narayan KMV. Type 2 diabetes: A 21st century epidemic. *Best Practice & Research Clinical Endocrinology & Metabolism*. 2016;30(3):331-43. doi:<https://doi.org/10.1016/j.beem.2016.05.003>.
2. Diabetes IFo. IDF Diabetes Atlas 5th Edition (2011). 2020. <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/20-atlas-5th-edition.html>.
3. Chetoui A, Kaoutar K, Kardoudi A, Boutahar K, Chigr F. Epidemiology of diabetes in Morocco: review of data, analysis and perspectives. *International Journal of Scientific and Engineering Research*. 2018;9:1310-6.

4. Maamri A, Ben El Mostafa S. The Environmental Health Role in Reducing Non Communicable Diseases Through a Healthy Lifestyle. In: Boutayeb A, editor. Disease Prevention and Health Promotion in Developing Countries. Cham: Springer International Publishing; 2020. p. 39-59.
5. Hammoudi J, Dahmani H, Bouanani N, Nouayti H, Mekhfi H, Abdelkhaleq L et al. Risk Factors and Diabetes Related Complications Frequency in the Population of the Northeastern Morocco. *Open Journal of Epidemiology*. 2018;08:164-85. doi:10.4236/ojepi.2018.83014.
6. Ramdani N, Vanderpas J, Boutayeb A, Meziane A, Hassani B, Zoheir J et al. Diabetes and obesity in the eastern Morocco. *Mediterranean Journal of Nutrition and Metabolism*. 2011;5. doi:10.1007/s12349-011-0087-2.
7. Chadli A, El Aziz S, El Ansari N, Ajdi F, Seqat M, Latrech H et al. Management of diabetes in Morocco: results of the International Diabetes Management Practices Study (IDMPS) - wave 5. *Therapeutic advances in endocrinology and metabolism*. 2016;7(3):101-9. doi:10.1177/2042018816643227.
8. Organization WH. Health system profile - Morocco: Human resources for health 2006. 2017. <http://www.emro.who.int/human-resources-observatory/countries/country-profile.html>.
9. Wagner EH. The role of patient care teams in chronic disease management. *BMJ (Clinical research ed)*. 2000;320(7234):569-72. doi:10.1136/bmj.320.7234.569.
10. Brez S, Rowan M Fau - Malcolm J, Malcolm J Fau - Izzi S, Izzi S Fau - Maranger J, Maranger J Fau - Liddy C, Liddy C Fau - Keely E et al. Transition from specialist to primary diabetes care: a qualitative study of perspectives of primary care physicians. (1471-2296 (Electronic)).
11. Al-Amer R, Ramjan L Fau - Glew P, Glew P Fau - Darwish M, Darwish M Fau - Salamonson Y, Salamonson Y. Translation of interviews from a source language to a target language: examining issues in cross-cultural health care research. (1365-2702 (Electronic)).
12. Campbell JL, Ramsay J, Green J. Practice size: impact on consultation length, workload, and patient assessment of care. *The British journal of general practice : the journal of the Royal College of General Practitioners*. 2001;51(469):644-50.
13. Practitioners RCoG. College reveals worrying decrease in number of GPs per patient - despite increasing demand for general practice services. London. 2019. <https://www.rcgp.org.uk/about-us/news/2019/january/new-data-analysis-by-the-royal-college-of-gps-has-found-a-concerning-decrease.aspx>. Accessed May 17 2020.
14. Rodnick JE. United Kingdom: Does Having Longer Visits Make Any Difference? *Family Medicine*. 2007;39(7):516-7.
15. Kalisch BJ, Aebersold M. Interruptions and multitasking in nursing care. (1553-7250 (Print)).
16. Malcolm JC, Liddy C, Rowan M, Maranger J, Keely E, Harrison C et al. Transition of Patients with Type 2 Diabetes from Specialist to Primary Care: A Survey of Primary Care Physicians on the Usefulness of Tools for Transition. *Canadian Journal of Diabetes*. 2008;32(1):37-45. doi:10.1016/s1499-2671(08)21009-9.
17. Forrest CB, Nutting Pa Fau - von Schrader S, von Schrader S Fau - Rohde C, Rohde C Fau - Starfield B, Starfield B. Primary care physician specialty referral decision making: patient, physician, and health

- care system determinants. (0272-989X (Print)).
18. Newell E, Donnell MO. A qualitative study exploring GPs' and practice nurses' experiences of working with the diabetes nurse specialist. *Journal of Diabetes Nursing*. 2018;22(6):46-.
 19. Mc Hugh S, O'Mullane M Fau - Perry IJ, Perry Ij Fau - Bradley C, Bradley C. Barriers to, and facilitators in, introducing integrated diabetes care in Ireland: a qualitative study of views in general practice. (2044-6055 (Electronic)).
 20. Suwita BM, Friska D, Widjaja DS, Srisawitri L. Multidiscipline Care for Type 2 Diabetes Patients: from General to Asian Population. *Acta medica Indonesiana*. 2017;49(3):259-66.
 21. Deshpande AD, Dodson EA, Gorman I, Brownson RC. Physical Activity and Diabetes: Opportunities for Prevention Through Policy. *Physical Therapy*. 2008;88(11):1425-35. doi:10.2522/ptj.20080031.
 22. Veinot TC, Zheng K, Lowery JC, Souden M, Keith R. Using Electronic Health Record Systems in Diabetes Care: Emerging Practices. *IHI : proceedings of the ACM SIGHIT International Health Informatics Symposium ACM SIGHIT International Health Informatics Symposium*. 2010;2010:240-9. doi:10.1145/1882992.1883026.
 23. Latham LP, Marshall EG. Performance-Based Financial Incentives for Diabetes Care: An Effective Strategy? *Canadian Journal of Diabetes*. 2015;39(1):83-7. doi:10.1016/j.jcjd.2014.06.002.
 24. Dinar Y, Belahsen R. Diabetes Mellitus in Morocco: Situation and Challenges of Diabetes Care. *Journal of Scientific Research and Reports*. 2014;3:2477-85. doi:10.9734/jsrr/2014/10287.
 25. Yasmin F, Ali L, Banu B, Rasul FB, Sauerborn R, Souares A. Understanding patients' experience living with diabetes type 2 and effective disease management: a qualitative study following a mobile health intervention in Bangladesh. *BMC Health Services Research*. 2020;20(1):29. doi:10.1186/s12913-019-4811-9.
 26. Alsairafi ZK, Taylor KM, Smith FJ, Alattar AT. Patients' management of type 2 diabetes in Middle Eastern countries: review of studies. (1177-889X (Print)).
 27. Blaum CS. Management of diabetes mellitus in older adults: are national guidelines appropriate? *Journal of the American Geriatrics Society*. 2002;50(3):581-3. doi:10.1046/j.1532-5415.2002.50130.x.

Figures

Figure 1

Conceptual framework of type 2 diabetes treatment barriers, facilitators, attitudes and benefits derived from general practitioners and nurses in Oujda

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [ADDITIONALFILE1.docx](#)