



# Epidemiological and therapeutic profile of diabetes managed in primary healthcare facilities in the Gharb region (Kenitra Province)

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## Abstract

This study aims to provide an in-depth understanding of the epidemiological and therapeutic characteristics of diabetes cases managed in primary healthcare facilities within the Gharb region of Kenitra Province during the year 2019. Methodology: A descriptive study design was utilized, utilizing data derived from the four quarterly reports of epidemiological surveillance. The study included all individuals with diabetes who underwent screening and received management at the primary healthcare facilities in the region. Results: The prevalence of diabetes cases in primary healthcare centers in the province was found to be 2.73%. Among the managed cases, a notable proportion was observed in the age group [40-59 years], accounting for 29.28% of the cases. The recruitment of new cases in 2019 revealed a higher prevalence among females, with a sex ratio of 1.7 females per 1 male. Complications associated with diabetes were predominantly represented by hypertension, accounting for 52.21% of the complicated cases. The management approach predominantly involved the use of oral antidiabetic drugs (61.43%), while management based solely on hygienic and dietary measures had a very low utilization rate of 2%. conclusion, the findings of this study provide valuable insights into the management of diabetes in the Gharb region. It is recommended to integrate data from the private sector to have a more comprehensive understanding of the epidemiological situation and improve healthcare planning. Furthermore, the implementation of national and local strategies for the prevention and control of non-communicable diseases should prioritize early diagnosis to facilitate lifestyle-based management. These recommendations will help enable targeted interventions and improve healthcare strategies for effective diabetes management in the Gharb region.

**Keywords:** Diabetes, epidemiology, therapeutic profile, primary healthcare, Gharb region.

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## 1. Introduction

Diabetes represents a significant public health challenge worldwide, yet there is a scarcity of epidemiological information in our nation[1]. To formulate a successful approach to combating this condition, it is crucial to ascertain its scale and magnitude. According to the World Health Organization (WHO), approximately 422 million adults are affected by diabetes[2]. The disease leads to approximately 1.5 million fatalities annually, with 80% of these occurrences transpiring in low- and middle-income countries[3]. Based on WHO forecasts, diabetes is projected to become the primary cause of death by the year 2030. The World Health Organization (WHO) reports that in Morocco, the prevalence rate of diabetes among adults stands at 12.4%. Given the presence of this disease, the WHO emphasizes the importance of intensifying efforts in prevention and diagnosis. Many instances of diabetes can be avoided, and

there are measures available for identifying and managing the condition, enabling individuals with diabetes to enjoy extended and healthy lives[4,5]. The commendable initiative undertaken by the Moroccan government to raise awareness about the risks associated with diabetes among the population and promote widespread screening deserves recognition[6]. This initiative will contribute to the prevention of new cases, enhance the health of individuals in need of healthcare services, and ultimately save lives[7]. People's lifestyles have undergone substantial changes, particularly in terms of their dietary choices[8]. The excessive consumption of salt, sugar, and fats has resulted in a growing prevalence of chronic metabolic diseases such as obesity and diabetes[9]. Diabetes exists in three primary forms: type 1 diabetes, type 2 diabetes, and gestational diabetes. Type 2 diabetes accounts for the majority of diabetes cases globally. The objective of our ongoing research is to outline the epidemiological and

therapeutic characteristics of diabetes within Primary Healthcare Facilities (ESSP) in the Kenitra province throughout the year 2019.

## 2. Materials and methods

### 2.1. Study area

The study is conducted in the province of Kenitra, which falls under the Rabat-Sale-Kenitra region. The province encompasses 5 districts, 3 urban municipalities, and 20 rural municipalities. As per the most recent General Population and Housing Census conducted in 2014, the population of the Kenitra province was recorded at 1,061,435 individuals, constituting 23.2% of the regional population. The province spans an area of 3,253 square kilometers. In 2019, the population of the province had increased to 1,195,271 inhabitants [10–12].

### 2.3. Study Design

The study utilizes a descriptive methodology, drawing data from the quarterly reports of epidemiological surveillance of individuals with diabetes throughout the year 2019. It includes all individuals diagnosed with diabetes who underwent screening and received treatment at public health centers within the province of Kenitra during the same year. This process was thoroughly validated. It facilitated the identification of relevant indicators and variables based on a review of the existing literature and the established objectives. Subsequently, administrative procedures were initiated to acquire and utilize the data available at the Kenitra Provincial Delegation. In collaboration with the Diabetes Program coordinator, an electronic form was created to extract data from the quarterly reports of 2019, which were submitted by each health center. This data was utilized to construct a database. Before proceeding with data processing and analysis using Excel software, an initial verification of data accuracy was conducted.

## 3. Results

### 3.1. Socio-demographic and Anthropometric

The findings of the study reveal that in the province of Kenitra, the prevalence of diabetics receiving healthcare center follow-up in 2019 is 2.73%. This prevalence is 1.7 times higher in urban areas (3%) compared to rural areas (2.3%). Furthermore, the prevalence among women is 1.7 times higher than among men. Analysis of Figure 1 indicates that women have a higher proportion of diabetics across all age groups. The largest proportion of diabetics is found among women aged between 40 and 59 years, accounting for 29.28% of diabetes cases in the year 2019. The data reveals that a total of 2,480 new cases of diabetes were recorded. Among these cases, 63% were women, with a predominant occurrence in the age group [40-59 years], as illustrated in Figure 2. Based on the data obtained from the delegation, out of the total of 32,572 individuals with diabetes, there were 1,465 cases of complications, accounting for a proportion of 4.50%. Among these complications, arterial hypertension (HTA) was the most prevalent, comprising 52.21% of the cases, as depicted in Figure 3. Regarding referred cases, out of the total of 1,465 individuals with complications, 807 were referred for further treatment or specialized care. This translates to a referral rate of 55.09% in the province. The

management of screened cases in the province demonstrates insufficient coverage, with a rate of 90%.

In terms of treatment approaches, the most commonly employed method is the administration of oral antidiabetic drugs (OAD), accounting for 61.43% of cases. Insulin therapy follows closely behind at 29.5%. However, the utilization of management through hygienic and dietary measures alone is notably low, with a rate of only 2%, as depicted in Figure 4.

### 3.2. Discussion

In Morocco, the number of individuals aged 18 and above with diabetes exceeds 2 million, with approximately 50% of them being unaware of their condition[13]. According to estimates from the World Health Organization (WHO), diabetes is responsible for over 12,000 deaths annually, along with an additional 32,000 deaths resulting from complications[14]. In response to this significant health issue, numerous studies have been conducted to examine and evaluate the management, progression profile, and therapeutic approaches for diabetes. One descriptive study, conducted by Srougbo JK et al. in the Sidi Bernoussi prefecture of the Casablanca region, revealed a predominance of cases in the age group [40-59 years], which accounted for 39.9% of the managed cases. Furthermore, the study indicated a higher proportion of cases among females, with 62.5% of the cases managed in the province being women[15]. In contrast, a study carried out in Demnat, located in the Marrakech region in 2009, presented contrasting results, with 48% of the cases occurring in women and 52% in men (6)[16]. Another study conducted by Georges Rosario Christian Millogo et al. reported a distribution of 55.6% of cases in men and 44.4% in women (7). In our study, the prevalence of diabetes cases in 2019 within the Primary Healthcare Facilities (ESSP) of the province was found to be 2.73%. However, it is important to note that this prevalence is lower than the theoretical prevalence due to factors such as diabetic patients seeking treatment in private facilities and the presence of undiagnosed cases. Furthermore, it is noteworthy that the age group [40-59 years] was the most represented, accounting for 44.9% of the cases managed in the ESSP of the province. Additionally, there was a predominance of female cases, with 62.5% of the cases managed in the province being women. This trend of higher prevalence among women is consistent with the findings of the 2018 National Survey on Population and Family Health (5)[17]. The difference observed in incident cases, where there were 1.6 women diagnosed for every 1 man, can be attributed to the fact that women tend to seek medical consultations more frequently than men. Diabetes is associated with various complications, with arterial hypertension (HTN) being the primary one, as diabetes serves as a significant risk factor for HTN. The studies conducted by Srougbo JK et al. and N. Oulad Sayad et al. demonstrated high rates of HTN complications, with percentages of 77.1% and 45% respectively[18]. Previous research has also indicated an increased risk of HTN among individuals with diabetes. This corresponds with our study's findings, which showed a prevalence of HTN complications at 52.21%.

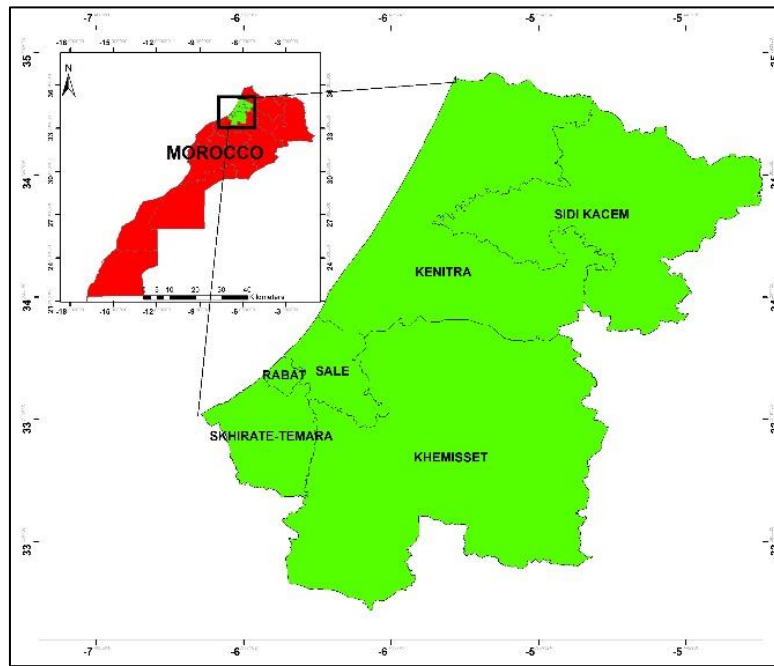


Figure 1 : Study area

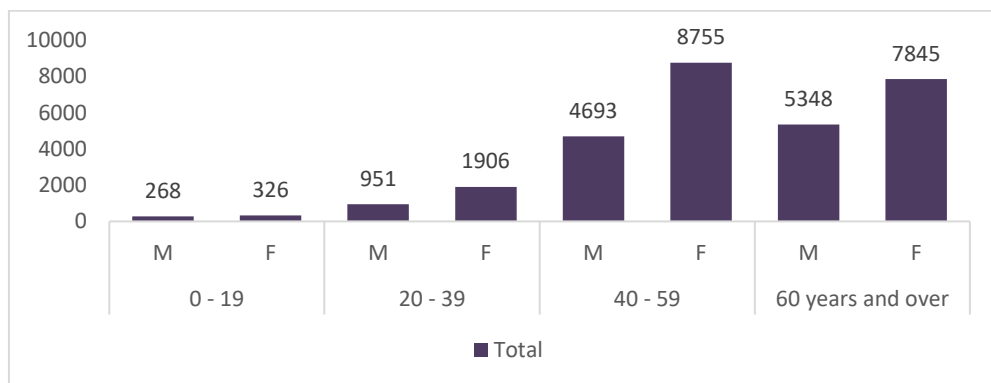
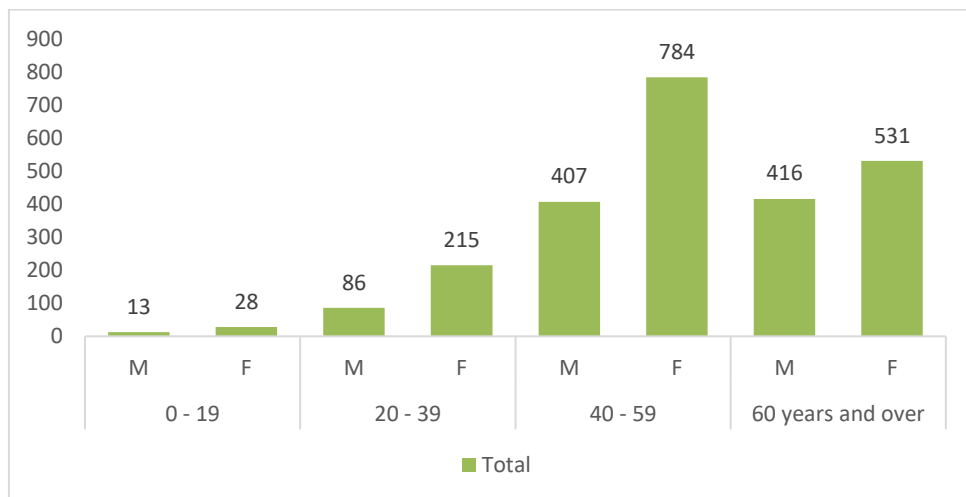
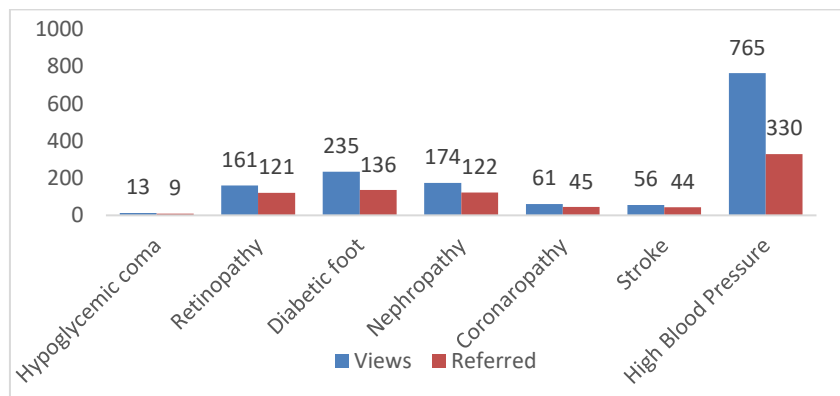


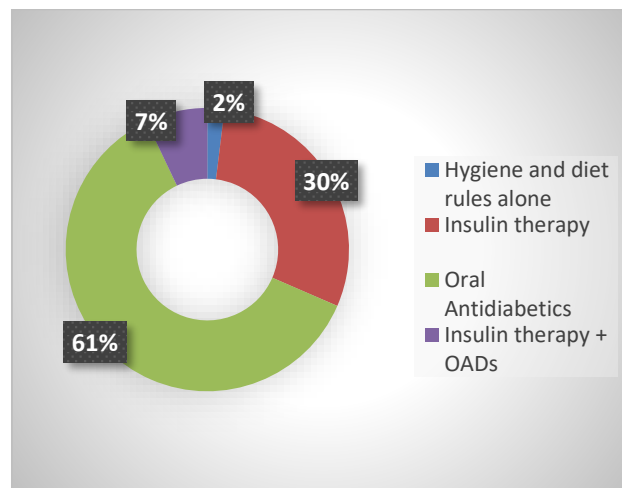
Fig 1: The distribution of the proportion of diabetics under care by age and gender in Kenitra Province in 2019.



**Fig. 2.** The distribution of incident cases by age and gender in Kenitra Province in 2019.



**Fig 3:** The specific distribution of complications seen and referred among prevalent cases in Kenitra Province in 2019.



**Fig 4:** The breakdown by treatment type for diabetes cases.

In terms of management, the healthcare centers in the province recorded a 90% management rate for diagnosed cases in 2019, compared to 99% in the Sidi Bernoussi prefecture in 2018[18]. The most common treatment approach employed is the administration of oral antidiabetic drugs (OAD), accounting for 61.43% of cases. However, there is a minimal adoption of management through hygienic and dietary measures alone, with a rate of only 2%. These findings are consistent with the studies conducted by Srougbo JK et al. and N. Oulad Sayad et al., which reported rates of 54% and 70% respectively for the use of OAD[18]. The limited utilization of hygienic and dietary measures alone can be attributed to the delayed detection of individuals with diabetes in the Primary Healthcare Facilities (ESSP) of the province.

#### 4. Conclusions

Diabetes remains a substantial public health challenge globally and in Morocco. In the province of Kenitra, a majority of new cases are observed among women aged 40 to 59 years, with oral antidiabetic drugs being the most commonly prescribed treatment. However, it is important to clarify that this study does not cover individuals

receiving diabetes treatment in the private sector within the province of Kenitra. Including this group would offer a more comprehensive understanding of the epidemiological situation in the province. Furthermore, there is a crucial need to prioritize early diagnosis as it would allow the implementation of management strategies focused on hygiene and lifestyle habits. Emphasizing early detection can contribute significantly to improved outcomes for individuals with diabetes.

#### References

- [1] P.Z. Zimmet. (2017). Diabetes and its drivers: the largest epidemic in human history? *Clinical diabetes and endocrinology*. 3(1): 1-8.
- [2] D. Lovic, A. Piperidou, I. Zografou, H. Grassos, A. Pittaras, A. Manolis. (2020). The growing epidemic of diabetes mellitus. *Current vascular pharmacology*. 18(2):104–109.
- [3] K.L. Koenig, C.H. Schultz. (2010). *Koenig and Schultz's disaster medicine: comprehensive principles and practices*. Cambridge University Press: pp.
- [4] K.K. Ahmed Chetoui, A. El Kardoudi, K. Boutahar, F. Chigr, M. Najimi. (2018). *Epidemiology of*

- diabetes in Morocco: review of data, analysis and perspectives. *International Journal of Scientific & Engineering Research*. 9: 1310-1316.
- [5] S. Pengpid, K. Peltzer. (2022). Prevalence and correlates of undiagnosed, diagnosed, and total type 2 diabetes among adults in Morocco, 2017. *Scientific reports*. 12(1): 16092.
- [6] B. Utz, B. Assarag, T. Lekhal, W. Van Damme, V. De Brouwere. (2020). Implementation of a new program of gestational diabetes screening and management in Morocco: a qualitative exploration of health workers' perceptions. *BMC Pregnancy and Childbirth*. 20: 1-12.
- [7] C. Fichtenberg, J. Delva, K. Minyard, L.M. Gottlieb. (2020). Health And Human Services Integration: Generating Sustained Health And Equity Improvements: An overview of collaborations, partnerships, and other integration efforts between health care and social services organizations. *Health Affairs*. 39(4): 567-573.
- [8] N. Redondo-Useros, E. Nova, N. González-Zancada, L.E. Díaz, S. Gómez-Martínez, A. Marcos. (2020). Microbiota and lifestyle: a special focus on diet. *Nutrients*. 12(6): 1776.
- [9] C.G. Awuchi, C.K. Echeta, V.S. Igwe. (2020). Diabetes and the nutrition and diets for its prevention and treatment: A systematic review and dietetic perspective. *Health Sciences Research*. 6(1): 5-19.
- [10] N. El Hachlafi, A. Chebat, R.S. Bencheikh, K. Fikri-Benbrahim. (2020). Ethnopharmacological study of medicinal plants used for chronic diseases treatment in Rabat-Sale-Kenitra region (Morocco). *Ethnobotany Research and Applications*. 20: 1-23.
- [11] S. Loulad, T.T. Nguyen, M.R. Simou, H. Rhinane, A. Buerkert. (2023). Monitoring rural-urban transformation in the coastal region of Rabat-Sale-Kenitra, Morocco. *PLoS One*. 18(8): e0290829.
- [12] K. Berred, M.E. Youssi, S. Berred. (2022). Inventorying Rabat-Salé-Kénitra region's geological heritage within Central Morocco: a useful tool for developing regional geotourism activity. *Geoheritage*. 14(3): 91.
- [13] M. Evans, A.R. Morgan, D. Patel, K. Dhatariya, S. Greenwood, P. Newland-Jones, D. Hicks, Z. Yousef, J. Moore, B. Kelly. (2021). Risk prediction of the diabetes missing million: identifying individuals at high risk of diabetes and related complications. *Diabetes Therapy*. 12: 87-105.
- [14] R. Biselli, R. Nisini, F. Lista, A. Autore, M. Lastilla, G. De Lorenzo, M.S. Peragallo, T. Stroppolini, R. D'Amelio. (2022). A historical review of military medical strategies for fighting infectious diseases: From battlefields to global health. *Biomedicines*. 10(8): 2050.
- [15] K.J. Srougbo. (2020). Epidemiological and Therapeutic Profile of Diabetes Cared in Primary Health Care Establishments in Sidi Bernoussi-Casablanca District during 2018. *Health Sciences*. 1(1): 4.
- [16] K. Azekour, S. Belamalem, A. Soulaymani, B. El Houate, B. El Bouhali. (2019). Epidemiological profile of drug overdose reported in South-East Morocco from 2004 to 2016. *Drugs-Real World Outcomes*. 6: 11-17.
- [17] A. Asraoui, C.E. Khassouani, A. Soulaymani In The National Survey on Population and Family Health (NSPFH), Morocco-2018: a Data Quality Assessment, E3S Web of Conferences, 2021; EDP Sciences: 2021; p 01010.
- [18] H. Bekele, A. Asefa, B. Getachew, A.M. Belete. (2020). Barriers and strategies to lifestyle and dietary pattern interventions for prevention and management of type-2 diabetes in Africa, systematic review. *Journal of Diabetes Research*. 2020.