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Knowledge, attitudes and practices regarding prediabetes among general practitioners in Reunion Island

Nicolas Montee[a,1], Norah Anthony[b,c,1,*], Anthony Collet[a], Jean-Marc Franco[a,c], Catherine Marimoutou[b,c], Sébastien Leruste[a,c,1], Estelle Nobecourt[c,d,e,1]

[a] University Department of General Medicine, University of La Réunion, University Hospital, Saint Denis, Reunion Island
[b] Methodological Support and Biostatistics Unit, University Hospital, Saint Denis, Reunion Island
[c] National Institute of Health and Medical Research (INSERM), CIC 1410 Saint Pierre, Reunion Island
[d] Department of Endocrinology, Diabetes and Nutrition, Hospital Research Institute of La Réunion, Saint-Pierre, La Réunion
[e] University of La Réunion, INSERM, UMR 1188 Diabète Athérothrombose Thérapies Réunion Océan Indien (DéTROI), Plateforme CYROI), Saint-Denis de La Réunion, France

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ABSTRACT

Background: General practitioners (GPs) are among the first health care providers to be involved in prediabetes care, and their actions can prevent patients' transition from prediabetes to diabetes. However, data on knowledge and management of prediabetes in primary care remain scarce.
Aim: To describe the knowledge, attitudes and practices of GPs towards prediabetes.
Design and setting: This descriptive cross-sectional study included all private GPs working in Reunion Island.
Method: GPs were sent an electronic questionnaire that specifically sought to establish whether GPs knew the definition of prediabetes and whether their practices were in line with French guidelines for prediabetes screening and management.
Results: A total of 121 GPs completed the questionnaire. Of these, 95.0% knew the definition of impaired fasting glucose, but only 66.1% knew that of impaired glucose tolerance. Many GPs reported practices that are not recommended in guidelines. Thus, 59% of respondents declared that they monitored prediabetes with HbA1c and 10% said that they prescribed oral anti-diabetic drugs as prediabetes treatment. The risks factors associated with prediabetes were generally well known. Although 59.5% of respondents reported not having enough time to provide therapeutic education and medical follow up, only 19% referred their patients to a nutritionist or dietician. Lastly, 93.4% of respondents favoured the implementation of a local therapeutic education program targeting prediabetic individuals.
Conclusion: Prediabetes management in primary care can be made more effective by improving GPs' knowledge of prediabetes and official guidelines, facilitating referral of prediabetic patients to lifestyle specialists and implementing local therapeutic education programs.
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What was previously known

Prediabetes is an asymptomatic stage preceding diabetes. Prediabetic patients are at high risk of developing type 2 Diabetes. General practitioners are among the first health care providers to be involved in prediabetes screening and management.

What this research adds

Neither the definition of prediabetes nor official guidelines for prediabetes screening and management are perfectly known in primary care. Despite stating that they lack time to provide therapeutic education, GPs rarely refer their prediabetic patients to lifestyle specialists such as nutritionists, dieticians or sports coaches. Overall, GPs favor the implementation of local therapeutic education programs targeting prediabetic individuals.

* Corresponding author at: University Hospital, Saint Denis, Reunion Island.
E-mail address: a-norah@hotmail.fr (N. Anthony).
[1] These authors contributed equally to this work.

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Introduction

Type 2 diabetes mellitus (T2DM) has become a global public health concern in recent decades [1]. Although management and prevention have improved over time, T2DM continues to spread worldwide and remains one of the main contributors of morbidity [2,3].

In France, the prevalence of T2DM is on the rise [4], despite the publication in 2014 of national guidelines for primary prevention [5]. The T2DM burden is particularly alarming in the French overseas departments, all of which show higher prevalence, complications and mortality than mainland France [6]. The highest prevalence of treated diabetes is observed in Reunion Island, an overseas department located in the Southwestern Indian Ocean and inhabited since the 17th century by a mixed population of European, African and Asian origin. In 2015, 7.4% of adult Reunionese received diabetes medication; when standardized on the age structure of mainland France, the prevalence of treated diabetes rose to 10%, a figure twice as high as that reported for mainland France [7].

While the French Institute for Public Health Surveillance [4], the ENTRED study [8] and other studies [9–11] have described the prevalence and/or management of T2DM and the demographic profile of diabetic patients in both mainland France and Reunion Island, studies on prediabetes remain scarce. This is unfortunate, as prediabetic subjects are at high risk of developing T2DM, along with macrovascular/microvascular complications. Since prediabetes is a pathological state between normoglycaemia and diabetes, it has become a primary target for T2DM prevention. Identifying prediabetic subjects and offering them personalized care at an early stage has been shown to favourably influence clinical course through reducing the risk of transition to diabetes in both the immediate and long term [12–16]. Interventions that have proven to be efficient are essentially based on lifestyle interventions such as dietary measures and increase in physical activity.

Globally, there exist several biological definitions of prediabetes that are based on three parameters: fasting plasma glucose (FPG), plasma glucose two hours after a 75 g glucose load on the oral glucose tolerance test (OGTT) and glycated haemoglobins (HbA1c). The different definitions of prediabetes moderately overlap, making it difficult to determine which is optimal in clinical practice [17]. In France, the French High Authority of Health [5] recommends using the WHO (World Health Organization) definition [18]. According to the WHO, prediabetes is characterized by two different clinical entities: impaired fasting glucose (IFG), defined by a fasting plasma glucose level between 1.10 g/L and 1.25 g/L, and impaired glucose tolerance (IGT), defined by a plasma glucose level between 1.40 g/L and 1.99 g/L two hours after a 75 g glucose load on the OGTT.

Prediabetic subjects have a 5 to 10% per year risk of developing T2DM, resulting in a 70% risk of developing diabetes over one's lifetime [19]. From a public health perspective, limiting the transition from prediabetes to diabetes and facilitating regression from prediabetes to normoglycaemia is a major challenge. Because the prediabetic state is clinically asymptomatic, screening for prediabetes is a sound public health strategy in T2DM prevention. Screening is essentially the responsibility of general practitioners (GPs), who are the main actors in primary care. To this day, however, few data have been published on the attitudes of GPs towards prediabetes. As Reunion Island is strongly affected by the T2DM burden, exploring the attitudes of Reunionese GPs towards prediabetes seemed to us particularly relevant.

The aim of this study was to describe the knowledge, attitudes and practices of GPs working in Reunion Island towards prediabetes.

Method

This descriptive, cross-sectional study included all private GPs working in Reunion Island and registered in the directory of the Regional Union of Liberal Physicians. Hospital practitioners and specialists were excluded from the study.

A questionnaire was developed based on a review of the literature on prediabetes in primary care and on the recommendations of the High Authority of Health for T2DM prevention and screening [5]. The questionnaire was peer reviewed by three senior faculty members of the Reunion Island University Hospital and validated through a pilot study of five GPs who were not asked to complete the questionnaire. It was then computerized using Google Forms®. The questionnaire can be found in Appendix 1.

The questionnaire was composed of 37 questions divided into 5 parts. The first part focused on the general characteristics of respondents. The remaining parts sought to establish whether GPs knew the definition and diagnostic criteria of prediabetes and whether their practices were in line with French guidelines for screening, management and monitoring of prediabetes.

All private GPs were invited to participate in the study by email between December 2018 and March 2019. Two email reminders were sent to increase response rates.

Statistical analysis

Descriptive and bivariate analyses of the data were performed using R®. Quantitative variables were expressed as mean (standard deviation) and qualitative variables as number (percentage). Quantitative variables were compared using the Student's test or the non-parametric Wilcoxon test, as appropriate. Qualitative variables were compared using Fisher's exact test. A p-value < 0.05 was considered significant.

Results

Characteristics of general practitioners

The questionnaire was completed by 121 (18.1%) of the 668 GPs who were invited to participate.

The mean age of respondents was 49 years and 52.9% were men. Respondents practiced in rural or semi-rural areas in 62% of cases. They had between 10 and 30 years of practice experience in 54.5% of cases and more than 30 years of experience in 24.0% of cases, and they routinely followed more than 400 patients in 81.8% of cases. Moreover, 80.7% of GPs declared that more than 20% of their patients lived in precarious conditions (Table 1).

Most respondents knew the percentage of diabetics among their patients, as this figure was calculated by their professional software. Specifically, 81.1% declared that more than 10.0% of their patients were diabetic. Because prediabetes is not included as a diagnosis in the majority of medical software programs, 21.5% of respondents did not know the percentage of their patients who had been diagnosed with prediabetes. Nevertheless, 53.0% estimated that less than 10.0% of their patients were prediabetic (Table 1).

Definition and diagnostic criteria of prediabetes

When asked about the diagnostic criteria for prediabetes recommended by the French High Authority of Health, 96.7% of GPs responded fasting plasma glucose, 30.6% plasma glucose two hours after a 75 g glucose load on the OGTT and (14.9%) HbA1c. In 95.0% and 66.1% of cases, respectively, respondents knew the definitions of IFG and IGT provided in national guidelines.

Prediabetes was considered to be a risk factor of cardiovascular disease and a major risk factor of diabetes by 76.0% and 88.4% of respondents, respectively. Lastly, 95.9% of respondents viewed prediabetes care as a priority for T2DM prevention, and 86.8% considered prediabetes screening and care to be a cost-effective health policy.

Table 1
Characteristics of participating general practitioners.

	General Practitioners (n = 121)
Age in years *mean (sd)*	49 (11)
	N (%)
Sex	
Male	64 (52.9)
Female	57 (47.1)
Number of years of practice as a GP	
<10 years	26 (21.5)
10–30 years	66 (54.5)
>30 years	29 (24.0)
Type of practice	
Rural or semi-rural	75 (62.0)
Urban	46 (38.0)
Number of patients followed up	
<400 patients	22 (18.2)
400–800 patients	49 (40.5)
>800 patients	50 (41.3)
Percentage of precarious patients*	
<20%	23 (19.3)
20–30%	42 (35.3)
>30%	54 (45.4)
Percentage of diabetic patients per GP	
<10%	24 (19.8)
10–25%	85 (70.2)
>25%	12 (9.9)
Estimated percentage of prediabetic patients per GP	
<10%	64 (52.9)
10–25%	29 (24.0)
>25%	2 (1.6)
unknown	26 (21.5)

* 2 missing observations.

Screening of at-risk patients

Almost all respondents (95.9%) performed prediabetes screening. The most frequent contexts for screening were: general check-up for cardiovascular risk factors (86.0%), targeted screening in patients with risk factors for diabetes (79.3%) and patients' request (41.3%). Overweight-obesity (77.7%) was the main motivating factor, followed by history of high plasma glucose (71.9%), gestational diabetes (71.1%), family history of diabetes (62.0%), high blood pressure (62.0%) and dyslipidaemia (60.3%). The least mentioned motivating factors were history of polycystic ovarian syndrome (33.9%), sedentary lifestyle (30.6%), precarious status (19.8%) and active smoking (29.8%).

Only 29.9% of respondents knew the FINDRISK score (see Appendix 2) [20], which is recommended by the French High Authority of Health for the identification of patients at risk of diabetes. Of these, 77.6% declared not using this score due to the length of the questionnaire, 41.2% for reasons of poor access and lack of time and 52.9% because they were already using a clinical score and did not wish to use another one.

Management of prediabetes

All respondents communicated the diagnosis of prediabetes to their patients during consultation. Moreover, 73.6% described the disease to their patients, 99.1% explained its management and 52.1% reassured them by saying that they were not diabetic. Prediabetes management consisted mainly of making recommendations on lifestyle and diet (77.7%). The main dietary recommendations were to reduce the consumption of sweet beverages (66.1%), to increase the intake of fruits and vegetables (14.1%), to stop snacking (9.4%) and to reduce the consumption of saturated fat (5.8%). Only 19.0% of respondents referred their prediabetic patients to a nutritionist or a dietician. While 62.3% of respondents explained the importance of physical activity, only 21.5% mentioned the WHO's recommendation of 150 min of moderate physical activity per week [21]. Oral anti-diabetic drugs were prescribed to prediabetic patients by 9.9% of respondents, with biguanide being the preferred treatment.

Finally, 93.4% of respondents considered that the implementation of a local therapeutic education program targeting prediabetic individuals would be beneficial.

Patient monitoring and follow-up

The majority (73.5%) of respondent monitored their prediabetic patients more than once a year using either fasting plasma glucose (85.1%) or HbA1c (58.7%). Respondents also evaluated the efficacy of their intervention by monitoring weight loss (76.9%), dietary changes (68.8%), increased physical activity (76.9%) and waist circumference (58.7%).

According to respondents, a lack of time for therapeutic education and patient follow-up (59.5%), a lack of official recommendations (32.2%), a lack of awareness-raising campaigns by health authorities (24.0%) and a lack of personal knowledge (20.7%) limited prediabetes management in primary care. Other factors related to prediabetic patients themselves were mentioned: lack of motivation to modify lifestyle and dietary habits (76.0%), lack of compliance (60.3%), refusal or misunderstanding of diagnosis (27.3%) and minimization of risk due to absence of specific medication (10.7%).

Discussion

Summary

In our study, 96.7% of GPs mentioned fasting plasma glucose as a recommended diagnostic test for prediabetes and 95.0% knew the definition of IFG. However, only 30.6% of GPs mentioned plasma glucose two hours after a 75 g glucose load as a recommended test and only 66.1% knew the definition of IGT. This suggests that the use of the OGTT is limited and, consequently, that a large number of prediabetics with isolated IGT (i.e. without IFG) are left undetected and untreated. This hypothesis is further supported by studies conducted in Reunion island and Mauritius island, which estimated the prevalence of isolated IGT among prediabetic subjects at 57% and 61%, respectively [22,23].

Most GPs knew the risk factors of prediabetes and used them as indications for prediabetes screening. A significant portion used HbA1c to diagnose (14.9%) and/or monitor (58.7%) prediabetes and 9.9% GPs prescribed oral anti-diabetics drugs for the treatment of prediabetes, even though these practices are not in line with official guidelines. Interestingly, more than half of GPs stated that they did not have enough time to provide therapeutic education, but only 19% referred their patients to a nutritionist or a dietician. While only 20.7% reported lacking knowledge about prediabetes, 70.1% did not know about the FINDRISK score, which is recommended by the French High Authority of Health for the identification of patients at risk of diabetes. Lastly, 76.9% of GPs monitored weight loss as part of patient follow-up, but only 58.7% monitored waist circumference even though this parameter is deemed a better diabetes risk predictor by the recent consensus Statement from a working group on Visceral Obesity [24].

Our findings suggest that Reunionese GPs do not perfectly know or follow French guidelines for prediabetes screening and monitoring. About one third of GPs deplored a lack of recommendations, even though official guidelines were issued in 2014 [5]. A greater visibility of official guidelines would probably benefit both GPs and patients. Awareness-raising campaigns by health authorities would also be useful since 24.0% of GPs considered these to be lacking.

Comparison with existing literature

Our findings are consistent with the available literature, even though most studies on prediabetes in primary care were published in the US, which has a different health system and different national guidelines than France. A number of similar findings are worthy of note: incorrect identification of laboratory parameters by a non-negligible fraction of GPs, poor knowledge of official guidelines, and strong interest in lifestyle intervention programs and therapeutic education on prediabetes [25–28].

Interestingly, one study in USA found that primary care physicians are open to lifestyle interventions but are generally unaware of the many weight loss program resources that have been made available in recent years [26]. Moreover, a US study based on the National Ambulatory Medical Care Survey data found no indication of treatment in 23% of the medical records of patients with an HbA1c consistent with prediabetes (as per US guidelines). These results and our findings suggest that there is considerable room for improving diabetes prevention [29].

Implications for research and/or practice

In Reunion Island, a new therapeutic education program called "*Dites Non au Diabète (DND)*" ("Say No to Diabetes") was implemented on an experimental basis by the National Health insurance in April 2018 [30]. This program aims to limit the transition from prediabetes to diabetes by informing prediabetic patients about dietary and physical activity recommendations and by motivating them to change their habits. This initiative is promising for several reasons. First, 93.4% of GPs in our study declared that they favoured the implementation of a local therapeutic education program targeting prediabetic individuals. Second, while more than half of GPs reported not having enough time to provide therapeutic education, the majority failed to refer their prediabetic patients to lifestyle specialists (e.g. dieticians, nutritionists, sports coaches). Third, the metabolic and cardiovascular risk of prediabetic patients is obviously underestimated since a majority of GPs stated that they reassured their newly diagnosed patients by telling them that they were not diabetic.

The PREDIABRUN study now being conducted in Reunion Island was designed to address difficulties in the management of prediabetes [31]. This cohort study of prediabetic patients recruited and followed in primary care aims to identify the local profile of prediabetic patients and the local factors of transition to diabetes. Results are to be exported to others regions via the creation of a local network of primary care health professionals specialised in prediabetes screening and care.

Strengths and limitations

The low response rate may have introduced a selection bias in the study sample. However, the mean age of respondents (49 years) was close to that of Reunionese GPs (51 years) [32].

The results obtained may differ from actual knowledge and practices since the questionnaire was completed in the office by GPs, some of whom may have done some research before responding [33]. However, GPs are unlikely to have done so given that time is a precious resource to them.

The questionnaire did not contain any open-ended question, and the predefined answers did not necessarily reflect the full range of GPs' knowledge, attitudes and practices regarding prediabetes. While a qualitative study would have provided a more refined view, the results obtained would not have been quantifiable.

Few studies on the management of prediabetes in primary care have been published to date, and to our knowledge this is the first study to be conducted on the topic in France. Our findings open up new perspectives on diabetes prevention in Reunion Island.

Conclusion

As our results indicate, GPs are generally well aware of the risks of progression from prediabetes to diabetes. However, they are far less familiar with the definition of IGT than that of IFG. This is unfortunate, as it is essential to identify prediabetics with isolated IGT, who are also at risk of cardiovascular disease and transition to diabetes. Encouraging screening would improve the detection of prediabetics and would therefore help to reduce the prevalence of diabetes. More generally, there is a need for improved diagnosis and management of prediabetes, greater awareness of official guidelines and facilitated referral of prediabetics to lifestyle specialists. Finally, targeted therapeutic education programs such as the DND program and the Diabetes Prevention Program (US) should be generalized, as they constitute a promising approach for the management of prediabetes.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.deman.2021.100048.

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