



Diabetes in Poland – public health challenges and opportunities

Cukrzyca w Polsce – trendy i wyzwania z perspektywy zdrowia publicznego

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Abstract

Introduction and Objective. Diabetes, with its medical complications and societal consequences, is one of the most difficult concerns for modern society. The purpose of this narrative review is to characterize the selected public health challenges and opportunities resulting from diabetes in Poland, as well as to identify public health measures that may be adopted to lower the diabetes burden in Poland.

Review Methods. This narrative review is based on the literature about diabetes in Poland. Scientific papers on diabetes published between 1 January 2010–31 January 2023, available in the PubMed database, were identified using a combination of the following key words: 'diabetes', 'Poland', 'public knowledge', 'management' and 'costs'. Particular attention was paid to the following diabetes-related issues: 1) current and forecast prevalence of diabetes in Poland, 2) diabetic care before and after the COVID-19 pandemic onset, 3) public knowledge of diabetes and diabetes risk factors, and 4) public health interventions to reduce the diabetes burden at the population level.

Brief description of the state of knowledge. A continuous growth of both the incidence and the prevalence of diabetes is predicted. Due to insufficient public awareness of diabetes risk factors and symptoms, and the health-debt caused by COVID-19 pandemic, a further rise in the number of diabetic complications is expected, as well as an increase in public spending on health care and social insurance systems.

Summary. Public health interventions targeted at preventing diabetes and its complications should not be confined to reducing complications and improving diabetes care, but also include a wide range of initiatives aimed at addressing the fundamental causes of diabetes. Future study should look at the cost-effectiveness of such initiatives in order to mobilize different stakeholders and society.

Keywords

Poland, diabetes, review, public health, preventive medicine, population health

Streszczenie

Wprowadzenie i cel pracy. Cukrzyca, z jej powikłaniami zdrowotnymi i konsekwencjami społecznymi, stanowi jedno z kluczowych wyzwań. Celem przeglądu narracyjnego było scharakteryzowanie wyzwań zdrowotnych wynikających z występowania cukrzycy w Polsce oraz określenie interwencji w zakresie zdrowia publicznego, które mogą zostać podjęte w celu ograniczenia skutków zdrowotnych i społecznych cukrzycy.

Metody przeglądu. Przeprowadzono przegląd literatury na temat cukrzycy w Polsce, obejmujący prace pełnotekstowe opublikowane od 1 stycznia 2010 do 31 stycznia 2023 roku, indeksowane w bazie PubMed. Użyto kombinacji następujących słów kluczowych: „cukrzyca”, „Polska”, „świadomość społeczna”, „zarządzanie”, „koszty”. Szczególną uwagę zwrócono na następujące zagadnienia: (1) bieżące i prognozowane rozpowszechnienie cukrzycy w Polsce, (2) opieka zdrowotna przed i po wybuchu pandemii COVID-19, (3) świadomość społeczna dotycząca cukrzycy oraz (4) interwencje zdrowia publicznego wdrażane w przypadku cukrzycy.

Opis stanu wiedzy. Prognozuje się ciągły wzrost zarówno zapadalności na cukrzycę, jak i jej chorobowości. Ze względu na niewystarczającą świadomość społeczną dotyczącą czynników ryzyka i objawów cukrzycy oraz dług zdrowotny spowodowany pandemią COVID-19 oczekuje się dalszego wzrostu liczby powikłań cukrzycowych, a także wzrostu wydatków publicznych na opiekę zdrowotną i systemy ubezpieczeń społecznych, wynikających z występowania cukrzycy.

Podsumowanie. Interwencje zdrowia publicznego ukierunkowane na zapobieganie cukrzycy i jej powikłań nie powinny ograniczać się do poprawy opieki nad pacjentem, ale również obejmować szeroki zakres inicjatyw mających na celu wyeliminowanie podstawowych przyczyn cukrzycy. W przyszłych badaniach powinny się znaleźć analizy opłacalności takich interwencji w celu zmobilizowania różnych interesariuszy i społeczeństwa.

Słowa kluczowe

Polska, cukrzyca, zdrowie publiczne, przegląd, medycyna prewencyjna, zdrowie populacyjne

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INTRODUCTION AND OBJECTIVE

The term ‘diabetes’ is included in a diverse group of metabolic diseases characterized by high tissue- and organ-damaging levels of blood glucose. Diabetes is recognized by the World Health Organization (WHO) as the first non-communicable epidemic of the 21st century. It is a common cause of disability and promotes cardiovascular disease, the leading cause of death [1].

According to WHO data, the prevalence of diabetes among adults throughout the world has increased from 4.7% in 1980 to 8.5% in 2014, and it is predicted that by 2045 there will be 700 million diabetics worldwide [2]. In Poland, more than 3 million people (8% of the population) already have diabetes, among whom 750,000 are unaware of their condition [3]. It is estimated that in 2030 there will be 4.2 million people with diabetes. Type 2 diabetes especially is the cause of numerous hospitalizations and, consequently, deaths in Poland [4]. The risk of diabetes is strongly linked to patients’ socio-economic status. At the same time, the health, social and economic consequences associated with the course and complications of this disease contribute to the deepening of social exclusion of people with diabetes [5]. Effective prevention of diabetes requires adequate public awareness of its risk factors, symptoms and complications. Higher awareness of patients, in turn, results in better compliance with therapeutic recommendations and makes it possible to reduce disease complications [6]. Treatment outcomes also depend on the accessibility of modern medications and technologies [7], which is strongly determined by the level of spending on social services, health care, and public health interventions [8].

This narrative review aimed to characterize the public health challenges and opportunities resulting from diabetes in Poland, and to identify public health interventions that may be implemented to reduce the burden of diabetes in Poland.

REVIEW METHODS

The narrative review is based on the literature on diabetes in Poland. Scientific papers on diabetes published between 1 January 2010–31 January 2023 available in the PubMed database were identified using the combination of the following keywords: ‘diabetes’, ‘Poland’, ‘public knowledge’, ‘management’, and ‘costs’. From this search, a total of 911 potentially relevant papers were identified. Two independent reviewers screened the titles and abstracts for relevance to the current review. Only articles published in English were analyzed. After reaching a list of potentially relevant papers, the full text of each paper was analyzed, with particular emphasis on the following diabetes-related issues:

- 1) the current and forecast prevalence of diabetes in Poland;
- 2) diabetic care before and after the COVID-19 pandemic onset;
- 3) difficulties and challenges in diabetes management;
- 4) public knowledge of diabetes, its risk factors;
- 5) public health interventions to reduce the diabetes burden at the populational level.

The detailed analysis included publications aimed at one of the above-mentioned diabetes-related issues. A total number

of 56 papers matched the scope of this review; data were aggregated and summarized in the form of a narrative review.

STATE OF KNOWLEDGE

A comparative analysis of papers on diabetes management, costs of diabetes and public knowledge of diabetes, revealed 5 major issues that pose challenges for public health, and opportunities related to diabetes in Poland:

- 1) A high hospitalization rate and the burden of comorbidities and complications of diabetes;
- 2) negative impact of the COVID-19 pandemic on diabetes management in Poland, including a decrease in the number of hospitalizations (children and adults), deterioration of the health status of the patients, and an increase in in-hospital mortality rates;
- 3) low knowledge about risk factors and symptoms of diabetes and its socio-economic background – a challenge for health policy;
- 4) high economic costs of diabetes in Poland;
- 5) the need to implement population diabetes prevention and early diagnosis, based on the principle of selective universalism – addressed to the entire population, with particular emphasis on vulnerable groups.

High hospitalization rate, the burden of comorbidities, and complications of diabetes. According to data collected in the National Hospital Register maintained by the National Institute of Public Health/National Institute of Hygiene (NIPH/NIH) [9], the number of hospitalizations for diabetes ranged from 76,305 in 2016 to 45,196 in 2020. Regardless of the studied year, type 2 diabetes affected more than a half of hospitalized patients. During the last decade, hospitalization rates (per 100,000 inhabitants) ranged between 84–53 for type 1 diabetes and 111.4–61.6 for type 2 diabetes [10]. During the COVID-19 pandemic, a substantial drop in the number and rate of hospitalization was observed.

Regardless of the studied year, type 2 diabetes affects more than a half of the hospitalized patients (52–55% in the last decade). Type 1 diabetes is the second most common diagnosis (41–45% in the previous decade), while other types of diabetes represent a small portion of the total numbers (3,500–1,400 cases). Male patients are more often hospitalized for both types of diabetes. Most patients with type 1 diabetes are aged 10–19 years. However, a second peak of hospitalizations can be observed in patients aged 60 and over. Type 2 diabetes hospitalization rate increases with age, with a marked peak after 40 years of age [11].

Severe dysglycemia is the primary factor in most hospitalizations for diabetes [12]. Most hospitalizations in type 2 diabetes patients are caused by poor adherence to treatment plans, or other illnesses that could affect blood sugar levels or general health. This manifests in common comorbid conditions among hospitalized patients [13], especially those diagnosed with type 2 diabetes and older patients (over 60 years) with type 1 diabetes. Emergency hospital admissions are very common and represent the majority of cases – from 58.7% among patients with type 1 diabetes to 68.1% among patients with type 2 diabetes.

In the case of type 1 diabetes, the national guidelines state that all newly diagnosed patients should be hospitalized in a specialized diabetes unit, which led to the hospitalizations

of children with type 1 diabetes in Poland [14]. Because of the way that Poland's healthcare system is organized, general practitioners who identify diabetic children refer their patients to these facilities [15]. Moreover, a growing number of patients hospitalized with type 1 diabetes have comorbidities (53.4% in 2009 and 55.2% in 2020).

The high proportion of emergency admissions and observed comorbid conditions of hospitalized patients has resulted in prolonged hospitalization (above average – 7 days), and a significantly higher risk of in-hospital death [16]. For emergency admissions, the in-hospital mortality rate is 4.0% and 4.5% (type 1 and type 2 diabetes, respectively).

Moreover, a particularly high number of individuals with diabetes in Poland have developed diabetes-related complications. The relationship between diabetes and macrovascular complications (coronary heart disease, stroke), and microvascular complications (neuropathy, nephropathy, and retinopathy), has been established and proven [17]. Independent of other risk factors, it is believed that diabetes doubles the excessive risk of coronary heart disease, stroke, and vascular-related deaths. This manifests clearly in the rising number of diabetes-related limb amputations that increased by over 20 percentage points during the last decade [18, 19]. The relationship between diabetes and conditions like cancer, dementia, and liver diseases is becoming clearer [20], adding to the burden of diabetes in Poland.

The negative impact of the COVID-19 pandemic on diabetes management in Poland. Pandemic-induced lifestyle changes meant new challenges for diabetes patients. On the one hand, lockdown, remote work, and reduced access to entertainment venues, suggested that patients should spend more time preparing meals and taking care of their glycaemic control. On the other hand, however, the pandemic reduced opportunities for physical and social activities. The psychological factor played a non-negligible role in glycaemic control and pharmacotherapy. Some patients adopted an attitude of resignation – abandoning dietary recommendations, giving up all forms of physical activity, and not adhering to existing oral medication and insulin therapy. Moreover, the risk of severe SARS-CoV-2 infection in patients with type 2 diabetes, especially in the elderly, was soon recognized [21, 22]. Such conditions required additional effort to ensure the psychological comfort of patients with diabetes and support them in maintaining treatment recommendations.

Meanwhile, the COVID-19 pandemic limited access to non-covid health services for all patients, including diabetics [23]. As many out-patient facilities were closed and hospital admissions were limited to life-threatening situations, regular check-ups by diabetic patients were no longer possible. According to a report by the Ministry of Health entitled 'Report on Deaths in Poland in 2020', diabetes accounted for 16% of the increase in the number of deaths, compared to 2019, among people who were burdened with comorbidities. The number of deaths in Poland in 2020 increased by 67,100 compared to 2019. About 10,600 more patients with diabetes died in 2020 than in 2019. As many as one in three deaths due to COVID specifically involved patients with diabetes [1]. The rapid development of telemedicine (mainly consultations by telephone) was not sufficient to meet all of the patient's needs, especially in the case of the elderly [24]. This resulted in worsening the health

status of people with diabetes, manifested in an increased number of diagnosed diabetic ketoacidosis cases [25], and a higher share of emergency admissions [26]. The rate of type 1 diabetes-related hospitalizations decreased by more than 37 percentage points among young adults (20–39 age group). The youngest age group (0–9 years) had the lowest change in the hospitalization rate, which may be because doctors tend to maintain hospital admissions in this age group because children are more likely to experience a sudden deterioration in their health status. In the case of patients with type 2 diabetes, hospitalization rates dropped even further. In that period, females had a lower hospitalization rate (due to type 1 and type 2 diabetes), but a higher in-hospital mortality rate.

There are no comprehensive studies on the utilization of outpatient services by patients with diabetes in Poland. However, considering data from other countries [27, 28], and studies conducted in Poland before the pandemic outbreak, two-fold consequences are expected. The widespread of telemedicine allowed some patients, mainly younger and living in more developed (urban) regions, to maintain contact with health professionals [26, 29]. On the other hand, patients who were less autonomous in their daily disease management, or were unable to adapt to new ways of communicating with doctors and ordering medicinal products, were left to contend alone. It is believed that such disparity may lead to health debt, and result in an even greater increase in health needs in the future [30].

Low level of knowledge about risk factors and symptoms of diabetes and its socio-economic background – a challenge for health policy. The Polish population has a relatively low awareness of diabetes, its risk factors, symptoms, and complications [31]. Although a study conducted in 2022 revealed that the knowledge of diabetes is better than in 2017, it still remains on a rather low level [32]. Most respondents could name only a few risk factors, symptoms, and complications of diabetes. Moreover, respondents seemed to be aware of insufficient knowledge, and admitted its low level twice as often as those with a good knowledge. This is consistent with Poland having a high rate of lower limb amputations (about 8,000 per year), more than half of which are performed on diabetic patients (1.7 per 1,000 patients diagnosed with diabetes) [18].

High blood sugar is the most recognized symptom of diabetes [33]. Poles also know that a healthy lifestyle significantly impacts on the risk of developing diabetes. However, despite the latter, not many people consider smoking and excessive alcohol consumption as contributing to the risk of diabetes. This can derive from the fact that over 25% of Poles aged 15 and over smoke regularly, and alcoholism remains one of the country's biggest issues [34]. The same applies to obesity and arterial hypertension, which are prevalent among Poles, but still often not recognized as a serious condition [35]. However, this situation has changed in recent years because of extensive campaigns on diet-related diseases [36].

As in the case of more general health literacy assessments, gender, age, and educational level are the 3 socio-demographic factors influencing public awareness of specific aspects of diabetes [37]. Females, older people (over 40 years of age), and those with high (university) education are significantly more likely to indicate more diabetes risk factors and symptoms. Also, the place of residence differentiates awareness of

diabetes-related topics (people living in rural areas/small towns present the worst knowledge), which is further amplified by their limited access to healthcare, resulting in lower chances of early detection of the disease and mitigation of its complications (social inequities in health). Therefore, special attention should be paid to counteract this social gradient in awareness of diabetes. Males (especially those who live in rural areas/smaller towns), who are at higher risk of substance abuse and overweight/obesity [38], but present significantly lower awareness of diabetes, should be the first target of awareness and empowerment actions.

High economic costs of diabetes in Poland. Diabetes is one of the 10 most common causes of disability worldwide. It excludes people of working age from an effective, satisfying life. It causes an increase in public spending on health or social insurance systems, and a decrease in government revenue from production and consumption. This proves the value of health, not only for the individual or his family, but for society as a whole [39]. However, a precise assessment of the direct and indirect costs of diabetes is not easy to obtain because it requires reliable data on all public and private spending related to diabetes.

A comprehensive study conducted in 2014, showed that in Poland the direct expenses of treating hospital complications totaled EUR 332 million, more than 5 times the direct costs of treating diabetes in hospitals, which came to EUR 58.5 million annually [40]. In comparison, indirect expenses associated with diabetes alone (costs of complications related to diabetes) are believed to be 41% higher. The entire cost of healthcare services for patients with diabetes and treatment of its consequences, amounted to EUR 654 million, or 2.8% of Poland's total healthcare expenditures. The total cost of diabetes in Poland in 2009 amounted to EUR 1.5 billion. A decade later, with an increase in the number of patients diagnosed with diabetes, the introduction of new and costly therapies, and coping with the pandemic-related health-debt, this amount can be accepted as the minimum economic cost of diabetes in Poland. The actual and up-to-date costs are probably much higher.

Change of care model and support provided to patients. The modern approach to diabetes acknowledges it as a chronic disease and a problem for public health. Yet, many medical professionals still view diabetes as essentially a clinical illness. Diabetes care frequently follows a model for acute disease and is provided in a doctor's office or a hospital bed. This approach shapes the healthcare systems and can be seen even in newly-introduced organization schemes, such as 'coordinated care for diabetes in primary care' [41]. Acute medical treatment follows the 'find it – fix it' philosophy. Hence, older people with several chronic conditions receive most of the resources in the healthcare system. Few patients, for instance, are diagnosed with type 2 diabetes alone. Because they have numerous medical issues, finding and treating one problem may leave them with an equal level of handicap [42]. Moreover, the risk of heart disease is increased by diabetes and other disorders, including hypertension, dyslipidaemia, and obesity, which usually go hand-in-hand with diabetes [43]. While helping with 'here-and-now' problems, such an approach does not reduce the incidence of diabetes and fails to substantially change the patient's quality of life [44].

A chronic care paradigm, in contrast, calls for continual, protracted interactions between healthcare professionals and patients, and acknowledges both illness and disease. Self-management is the essential difference and quality of this approach [45]. The patients are the ones who interpret, manage, and create the meaning of their health [46]. Environmental and emotional factors can affect how a disease is experienced, and therapies can have both negative and positive impacts. Treating chronic illnesses requires continuing care and frequent interactions, as opposed to a single practitioner being contacted to cure sickness. In acute care, one-way communication (such as instructions from the provider) may be sufficient, but two-way communication and coordination between various care providers are essential for chronic care.

It has been proven that modern technologies allow for the customization of therapy, give patients more control over their disease [47], improve their quality of life, and prevent social marginalization or exclusion [48]. The latter effect is especially important in the case of young patients with diabetes (mainly type 1), as in this period, socialization (taking part in social relations, attending school, etc.) has a key role in maintaining their mental health and well-being [49].

The public health approach to diabetes should acknowledge and address various factors influencing the therapy outcomes. From the patients' perspective, it is important to remove financial barriers to accessing recommended diabetes therapy by, for example, improving the economic availability of new drugs for the treatment of type 2 diabetes, providing reimbursement for personal insulin pumps and CGM systems for people over the age of 26, ensuring the availability of intranasal glucagon for insulin-treated diabetics, or reimbursement for needles used for the injection of insulin, which can only be used once.

Early diagnosis of diabetes and its effective treatment by increasing knowledge about risk factors and symptoms.

Strategies for secondary and tertiary diabetes prevention are effective for both types 1 and 2 of diabetes. Still, it is the primary prevention that may help reduce the incidence of this disease's [50]. Due to the crucial role of lifestyle in the development of type diabetes (representing about 95% of diabetes cases worldwide), primary prevention strategies must focus on diet, physical activity, and education (awareness-raising) activities. Such wide and comprehensive interventions are complicated and difficult to implement on a large scale. Therefore, most lifestyle and early diagnosis programmes are addressed to individuals presenting a higher risk of developing diabetes (mainly type 2) – most often people who are overweight. Although high-risk strategies are successful for programme participants, they have little effect on the whole target group and fail to lower the burden of diabetes on the public. At the societal level, more general actions are needed to address the root causes of diabetes – the prevalence of circumstances leading to a higher risk of diabetes, many of which are located outside the interest of the traditional healthcare system.

Dietary decisions, substance abuse, and a sedentary lifestyle are strongly culturally dependent. Therefore, future public health actions on diabetes should involve all government departments and society, in order that all sectors systematically consider the health effects of planned policies

in trade, agriculture, finance, transportation, and urban planning, realizing that the solutions adopted may promote or be detrimental to health.

Limitations of the review. The design of this narrative review has some limitations. The low number of papers presenting a public health approach to diabetes in Poland, their timelines and availability in English, create the risk of selectivity and unintentional bias. However, the study provides general insight into selected aspects of diabetes in Poland.

CONCLUSIONS

Diabetes remains one of the priorities for national health, as defined in various policy documents including the National Health Plan, and affects over 3 million Poles, or nearly 8% of the population. Moreover, it is assumed that a further one million Poles are unaware that they have pre-diabetes or diabetes. Poorly controlled diabetes leads to many severe complications, both acute and chronic, and excludes people who are often of working age from an effective and satisfying life. Diabetes also creates a serious financial burden on health and social insurance systems, and a substantial gap in budget revenues due to the loss of productivity and consumption. The projected further increase in the number of people with diabetes in Poland, and thus the rising social and economic costs of the disease, requires an urgent and decisive response.

The persistently low level of diabetes awareness is one of the most serious barriers to effective prevention, early detection, and proper treatment of diabetes. A with the incidence of diabetes itself, the phenomenon of inadequate knowledge about the disease has a distinct social gradient, and therefore leads to the widening of health inequities.

Reduction of the diabetes burden should be attained by actions taken in the following areas: population-based prevention addressed to the whole of society, with special attention paid to vulnerable groups, early diagnosis of diabetes and its effective treatment, and support for patients to prevent disability and exclusion.

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