



Social inequalities in care for the elderly with diabetes in Brazil

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ABSTRACT

Objective. To measure the prevalence of various care services offered to the elderly with diabetes mellitus in Brazil, and to assess the social inequalities in these services.

Methods. This cross-sectional, population-based study was carried out in 2013. The care services offered were evaluated in terms of the following eight indicators: recommendations to lower carbohydrates, to measure blood glucose, and to examine the feet; requests made for blood tests, for glycosylated hemoglobin tests, and for glycemic curve tests; and whether service users had had their eyes or feet examined in the previous year. We used the slope index of inequality and the concentration index to assess the inequalities among wealth quintiles.

Results. A total of 1 685 elderly persons with diabetes were evaluated. Overall, 41.7% of them had had their eyes examined in the preceding year, 35.4% had had their feet examined in the preceding year, and 10.9% had been offered all eight of the care services. The largest absolute differences (in percentage points) between the first (poorest) and fifth (richest) wealth quintiles in terms of the care services that were offered to the users were for: a recommendation to measure blood glucose (25.8), a glycosylated hemoglobin test request (27.4), a glycemic curve test request (31.9), having the eyes examined in the preceding year (29.3), and having the feet examined in the preceding year (27.0).

Conclusion. There were notable inequalities in the prevalences of the care services. In the future, measurement of blood glucose and examination of the feet should be emphasized, especially for elderly persons in a lower socioeconomic level.

Key words

Diabetes mellitus; health status disparities; quality of health care; quality indicators, health care; health services research; Brazil.

With the increase in the elderly population in recent years, chronic noncommunicable diseases (NCDs), which are

more frequent in this age group, have become an important public health issue (1, 2). Diabetes mellitus (DM) is an NCD

that has a high occurrence, mainly among the elderly (1), and its complications increase health system costs, as well as the years of life lost due to disability and mortality (2, 3).

An individual with this condition has hyperglycemia and carbohydrate, protein, and fat metabolism disorders, resulting

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from defects in insulin secretion and/or action, which can lead to blindness, renal failure, and limb amputations (4). Furthermore, DM is associated with such comorbidities as obesity and arterial hypertension (4).

DM prevalence has been increasing worldwide (5). In Brazil, according to the Chronic Disease Risk and Protection Factor Surveillance Telephone Survey (VIGITEL) (6, 7), in 2006, 19% of individuals aged 65 and over reported having diabetes. In 2015 that figure was 23%, representing a substantial increase in a short period of time.

Worsening the high and increasing prevalence are inequalities in the occurrence of this disease, with people of a lower socioeconomic level being the most affected by DM and its complications (8–11). In addition, inequalities in health service access and utilization still persist in Brazil (12). Nunes et al. (13) showed that a lower socioeconomic level is associated with a higher probability of lack of access to health services, although inequalities in the utilization of these services have decreased (14, 15). With regard to the quality of the health services offered, inequalities were also observed between socioeconomic levels (13, 16).

Despite the advances in Brazilian research on health service access and utilization, as well as the improvement in access in recent years (13, 14, 17), inequalities persist (17). Further, there is a gap in the literature on the quality of care offered to the elderly with diabetes and on the magnitude of existing inequalities.

Most studies evaluating the quality of care offered to people with diabetes have been carried out in high-income countries, where it is easier to obtain indicators on health professional work processes (18–21). Among these indicators are the proportion of people having annual glycated hemoglobin and urine tests and feet, eye, and body mass index examinations, as well as receiving counseling on healthy lifestyles (16, 18–22).

Studies with this approach are highly relevant for public health and for health system planning, since the provision of good-quality care can lead to better health outcomes, help control diseases, help avoid conditions caused by complications, and lower costs to the health system (23, 24). Within this context, the aim of this study was to measure the prevalence of various care services offered

to the elderly with diabetes mellitus in Brazil, and to assess the social inequalities in these services.

METHODS

This was a cross-sectional, population-based study that used data from the National Health Survey (PNS) carried out in Brazil in 2013 by the Brazilian Institute of Geography and Statistics (IBGE) in partnership with the Ministry of Health (25). The sample in this study was representative of permanent residents living in urban and rural areas of municipalities of Brazil's five geographic regions, distributed over the country's 26 states and 1 federal district.

The sampling process was done in three stages. First, the census tracts were selected, then households, and finally individuals aged 18 or over. The sample was made up of 64 348 households. A total of 60 202 individuals answered the questionnaire on chronic diseases, including 23 815 who were 60 years of age or older (25).

Data collection was done by trained interviewers who used personal digital assistants for data storage. The questionnaire consisted of three parts. The first part collected household variables. The second part was on the general characteristics of all the residents of the household, including education level, work, income, disabilities, health plan coverage, utilization of health services, elderly health, mammography coverage, and characteristics of children under 2 years of age. In the third part, questions were directed to a randomly selected household resident 18 years or older about other characteristics of work and social support, perception of health status, accidents and violence, lifestyles, chronic diseases, women's health, prenatal care, oral health, and medical care. The data for individuals aged 60 years or older with DM were used in this study. More details on the sampling process used in the National Health Survey are available in an article by Souza-Júnior et al. (25).

To evaluate the care offered to the elderly with diabetes, the following recommendations, given by health professionals, were used as indicators: to reduce carbohydrates, to measure blood glucose, and to examine the feet. This information was obtained by asking the following question: "During any of your

appointments for diabetes, did any doctor or other health professional make any of these recommendations to you?" In addition, information on requests made by the doctor or other health professional for blood tests, glycated hemoglobin tests, and glycemic curve tests were obtained through the following question: "During any of your appointments for diabetes, was any examination requested?" Elderly people with diabetes were also assessed regarding whether they had had their eyes and feet examined by a health professional in the preceding year. Finally, a variable was created that included the proportion of the elderly who received all the care indicators. All the variables evaluating the care offered to the elderly with diabetes were categorized as yes or no.

The independent variable was an asset index, validated in Brazil, constructed by means of principal component analyses (26), using the following answers: type of housing (house, apartment, or rooming house, tenement, etc.), number of bedrooms, number of bathrooms, television (yes or no), refrigerator (yes or no), video/DVD player (yes or no), washing machine (yes or no), landline telephone (yes or no), mobile phone (yes or no), microwave (yes or no), computer (yes or no), motorcycle (yes or no), car (yes or no), Internet service (yes or no), and housemaid (yes or no).

This analysis assesses household wealth, with individuals classified according to the total household score and subsequently categorized into quintiles, where the first quintile (Q1) represents the poorest 20% of households and the fifth quintile (Q5) represents the wealthiest 20%.

Two indices were calculated to measure inequalities: the slope index of inequality (SII) and the concentration index (CI) (27, 28). SII expresses the absolute difference in percentage points (pp) between the poorest and richest quintile, using a logistic regression model. The CI is based on a scale from -100 to +100, with zero representing equal distribution across the wealth scale. Positive CI values indicate a pro-rich distribution. The SII expresses absolute inequality, whereas the CI expresses relative inequality (27, 28). More information about these two measures is available in the articles by Mackenbach and Kunst (27) and Silva et al. (28).

The prevalence and 95% confidence intervals of each indicator of the quality of care offered and the prevalence according to the quintiles of the asset indices were calculated. In addition, the magnitude of the inequalities of each indicator was estimated in relation to the asset indices, using SII and CI and 95% confidence intervals. All analyses were carried out using Stata 12.1 software (StataCorp LP, College Station, Texas, United States of America), using the “svy” command. That command takes into account the survey design, including sampling weights of the individual and clustering.

The PNS project was approved by the National Commission for Ethics in Research (CONEP) in June 2013, under protocol 10853812.7.0000.0008. All the participants signed the terms of consent, thus following ethical principles.

RESULTS

Out of the 23 815 elderly persons interviewed, 1 896 individuals reported a previous medical diagnosis of DM. From these 1 896, 1 685 of them (89%) had received medical care because of diabetes and answered the questions about the

care services used, thus making up the sample of this study.

Regarding the characteristics of the included individuals, 61.9% were female, 54.2% were between 60 and 69 years old, 56.2% said they had white skin color, 55.4% lived with a partner, and the majority had either no formal education (32.8%) or an incomplete elementary education (41.8%) (Table 1).

Figure 1 shows the prevalence of each of the indicators studied for the entire sample. Among the recommendations given, the most prevalent were to reduce carbohydrates (85.2%) and to measure blood glucose (62.6%), while 54.8% received a recommendation to examine their feet. With respect to the requested examinations, blood and glycated hemoglobin were the most frequent (93.1% and 72.9%, respectively), whereas the glycemic curve was least requested (59.4%). Fewer than half had had their eyes (41.7%) or feet (35.4%) examined in the preceding year, while 10.9% had been offered all eight of the care services that were assessed.

In terms of the analysis of the inequalities, for all the care services, the highest prevalences were found in the quintile

with the highest score in the asset index (richest). As the asset index quintile score increased, so did the proportions for recommendations to measure blood glucose and to examine the feet, for a glycemic curve request, and for having had the eyes examined in the preceding year (Figure 2).

Among the care services that were evaluated, five showed the largest absolute differences (represented by SII) between the prevalence in the first and fifth quintiles, all being greater than 20 pp: recommendation to measure blood glucose (25.8 pp), glycated hemoglobin request (27.4 pp), glycemic curve request (31.9 pp), eyes examined in the preceding year (29.3 pp), and feet examined in the preceding year (27.0 pp). The relative inequalities (CI) were higher in the glycemic curve request, eyes and feet examined in the preceding year, and the variable encompassing all the indicators (Table 2).

In addition, a general decrease in relative inequality (CI) was seen as the prevalence increased (Figure 3). In contrast, with absolute inequality (SII), some indicators showed greater differences between the richest and the poorest quintiles, even when they had higher proportions.

DISCUSSION

Our findings showed inequalities in the care offered to elderly with diabetes mellitus. Five indicators (recommendation to measure blood glucose, glycated hemoglobin request, glycemic curve request, eyes examined in the preceding year, and feet examined in the preceding year) presented a difference between the prevalences in the first quintile and the fifth quintile, with all being greater than 20 pp. Furthermore, only 1 in every 10 elderly persons with diabetes received all the care services that were evaluated. Fewer than half had had their feet and eyes examined by a health professional in the preceding year. This is a worrying situation since these are procedures recommended for the provision of good-quality care (4). In 2009, Facchini et al. (16) found a comparable prevalence (36.6%) of feet examination in the preceding year among elderly Brazilians. This suggests that the quality of care offered to this population is still a challenge, in spite of the

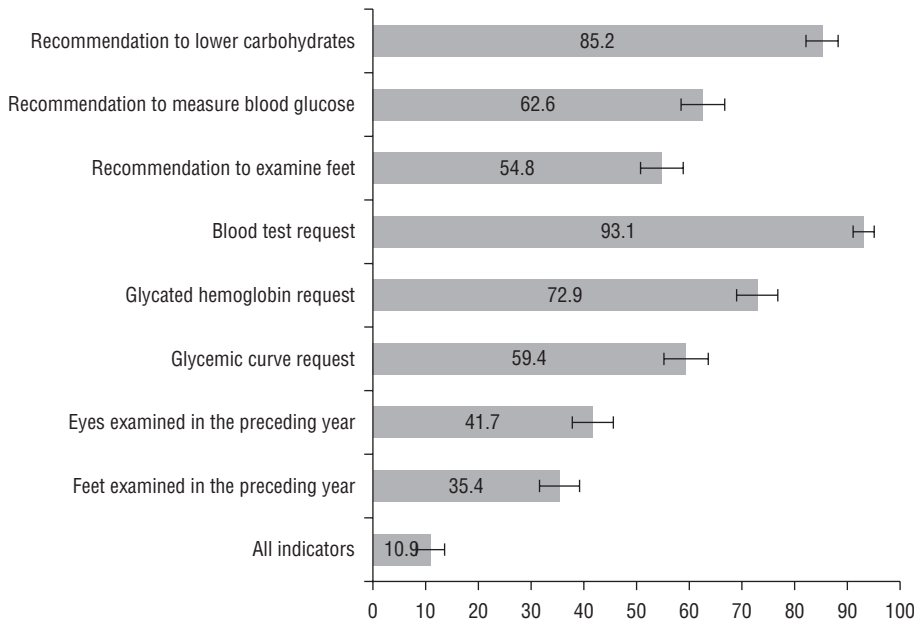
TABLE 1. Description of the sample according to sociodemographic characteristics in the elderly with diabetes mellitus. Brazil, 2013 (N = 1 685)

Variable	Number (%) ^a
Sex	
Male	558 (38.1)
Female	1 127 (61.9)
Age (years)	
60–69	890 (54.2)
70–79	576 (32.6)
80 and over	219 (13.2)
Skin color	
White	816 (56.2)
Black	196 (10.9)
Brown	646 (31.1)
Yellow/indigenous	26 (1.8)
Marital status	
Not living with a partner	953 (44.6)
Living with a partner	732 (55.4)
Education level	
No education	622 (32.8)
Elementary education incomplete	617 (41.8)
Elementary education completed/high education incomplete	142 (7.8)
High education completed/higher education incomplete	187 (10.3)
Higher education completed	117 (7.4)

Source: Prepared by the authors, based on the study results.

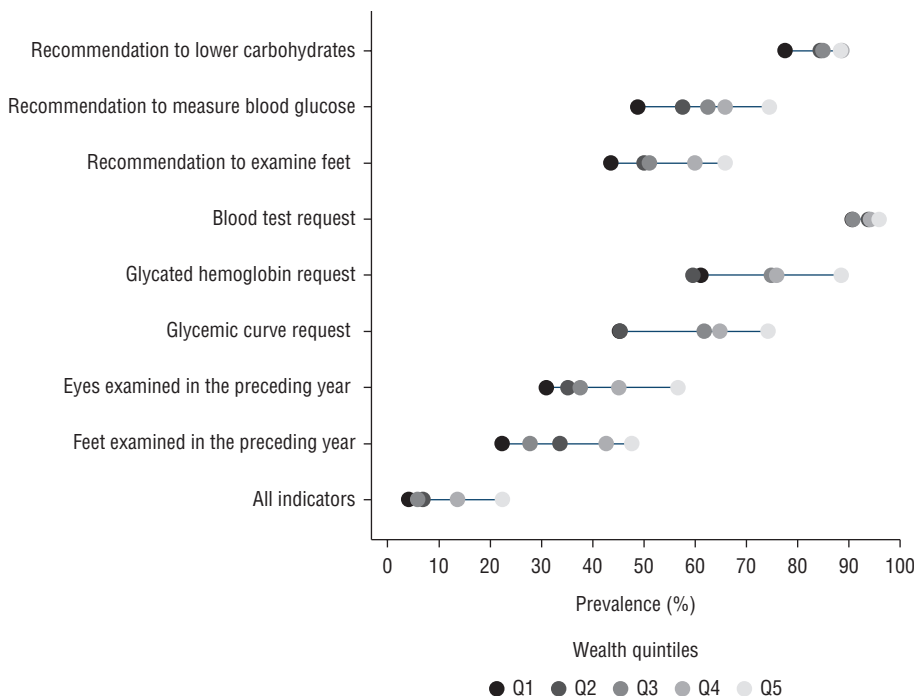
^aThese are the absolute number and the weighted sample proportion.

FIGURE 1. Prevalence (%) of the care services offered to elderly persons with diabetes mellitus for the entire sample, Brazil, 2013, (N = 1 685)



Source: Prepared by the authors, based on the study results.

FIGURE 2. Prevalence (%) of care services offered to elderly persons with diabetes mellitus, according to wealth index, Brazil, 2013 (N = 1 685)^a



Source: Prepared by the authors, based on the study results.

^aThe first quintile (Q1) represents the poorest 20% of households, and the fifth quintile (Q5) represents the wealthiest 20%.

Although the prevalence of recommendations made to DM patients is high, there are marked inequalities, which increase as the asset index score rises. The elderly with the highest asset scores also had the highest prevalence rates, which may be explained by greater access to health services by this portion of the population (13) and by the opportunity to choose a health service with a wider range of care services for this disease (8, 16). Other studies (10, 16, 18) that evaluated themes related to interventions or health indicators have also found similar trends.

Absolute inequalities are not consistent. Even with higher prevalence, the differences between the poorest quintile and the richest one are still present, indicating that the elderly who are considered richer present the best prevalence. However, relative inequality decreased as prevalence increased, probably because more people are benefiting and only a small portion are not receiving the intervention, thus making this scenario less unequal. A small amount of inequality still existing in these cases may occur due to extreme levels of wealth and poverty. An example of this is found in one of the individual indicators, the blood test request, which had the highest prevalence and the lowest relative inequality. On the other hand, feet examined in the preceding year had lower prevalence and the highest relative inequality.

There are inequalities in the occurrence of DM, with the disease being more prevalent in elderly people of a lower socioeconomic level (8, 9). In addition, people with lower socioeconomic status have less access to health services and receive worse care (13, 16). It was precisely the portion of the population that needed care the most that had the lowest prevalence of care interventions evaluated. This result is compatible with a study that evaluated care for people with diabetes in Canada (18).

Using the constructed index of assets as a socioeconomic level proxy, it is possible to state that elderly people with less purchasing power are less likely to receive measures for health promotion and the prevention of complications caused by diabetes. It is common knowledge that patients with chronic diseases should receive guidance regarding a more accurate management of their

increased access to and expansion of primary care, as well as programs focused on NCDs. A study in Spain found

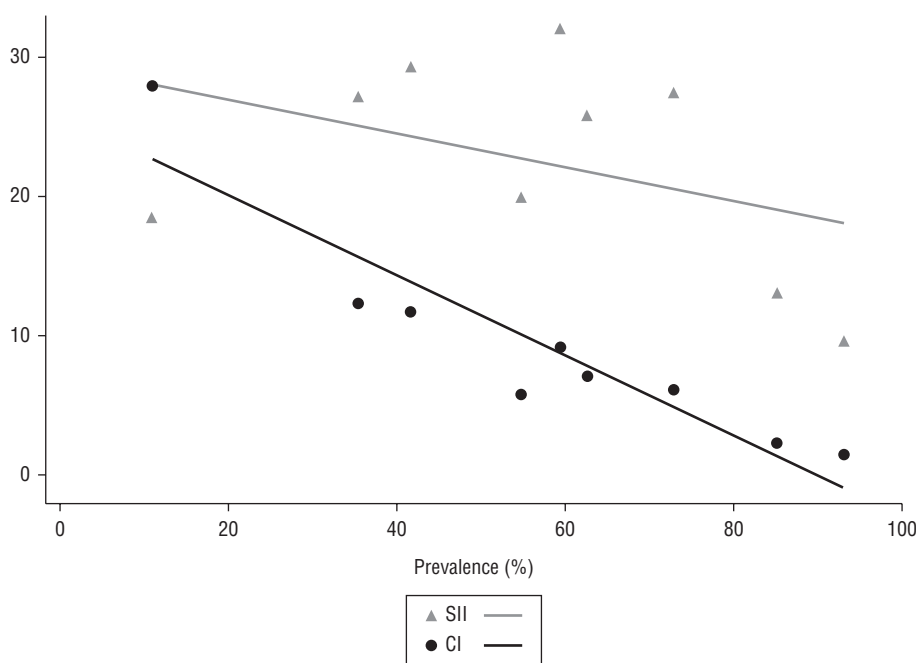
a similar problem, with only 14.4% of adults with diabetes having had their feet examined in the previous year (21).

TABLE 2. Slope index of inequality and concentration index, with 95% confidence intervals, for each care service offered to the elderly with diabetes mellitus, Brazil, 2013 (N = 1 685)

Care service offered	Slope index of inequality (%)	95% confidence interval	Concentration index	95% confidence interval
Recommendation to lower carbohydrates	13.0	7.3–18.7	2.3	1.3–3.4
Recommendation to measure blood glucose	25.8	18.0–33.5	7.1	5.0–9.1
Recommendation to examine feet	19.8	11.8–27.9	5.8	3.5–8.1
Blood test request	9.5	4.6–14.4	1.5	0.7–2.3
Glycated hemoglobin request	27.4	20.2–34.7	6.1	4.4–7.8
Glycemic curve request	31.9	24.1–39.6	9.2	6.8–11.5
Eyes examined in the preceding year	29.3	21.6–37.1	11.7	8.5–14.9
Feet examined in the preceding year	27.0	19.4–34.7	12.3	8.6–16.1
All indicators	18.4	12.8–24.1	28.0	20.6–35.5

Source: Prepared by the authors, based on the study results.

FIGURE 3. Prevalence of the care indicators offered to elderly with diabetes mellitus and the slope index of inequality (SII) and the concentration index (CI), Brazil, 2013 (N = 1 685)



Source: Prepared by the authors, based on the study results.

health conditions in all contacts with the health service. However, studies carried out with adults and elderly have found that the recommendations were not followed in 80% of the cases, even among individuals who had at least one NCD. In general, differences regarding schooling and socioeconomic level were found in relation to some recommendations (29, 30).

In the care of people with NCDs, there have been advances both in primary care and in the strengthening

of the bond between service users and health services themselves, centered on strategies that ensure improvement (albeit at a slow pace) (4). These strategies are based on health promotion, through recommendations about healthy habits and the prevention of complications caused by diabetes and other diseases (4, 31, 32).

In terms of limitations of the study, it is worth mentioning the lack of a recall period in the questions used to define the operational outcomes (indicators). This

may result in older people who have had DM for a longer period remembering more about the care indicators that were evaluated, since these persons may have consulted with health professionals more often. Moreover, without information about this period, it is more difficult to infer what the current status of the care quality is, since the person may have received the evaluated recommendations a long time before. Therefore, the results with the care indicators may be overestimated. If a 12-month recall period had been used, as is generally the case for studies in this field (16, 29, 30), the outcome prevalence rates might have been even lower.

The care offered to the elderly with DM show inequalities, with the people of lower socioeconomic status receiving lower-quality care. Challenges persist for comprehensive care, both on the part of health systems (especially regarding the elderly) and for individuals themselves with respect to self-care of their health conditions. With diabetes, for example, self-care is related to the measurement of blood glucose, self-examination of the feet, food control, and lifestyle (4, 33). Actions aimed at health promotion and prevention of diseases are the responsibility of health professionals, and these activities should be performed in all contacts with service users (4, 32). However, self-care of DM is also essential, because it empowers individuals to manage their health, including following the recommendations they receive during their contacts with health services (4, 32, 34).

Finally, more emphasis should be given to health promotion and illness prevention actions. This is especially true for the most vulnerable elderly, that is, the ones from a lower socioeconomic level, so that they can become aware of the importance of self-management of their health condition. Also, there is a need for studies that evaluate both the reports made by individuals and the work process of health teams, in order to help existing programs to reduce persisting inequalities.

Conflicts of interest. None declared.

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Desigualdades sociales en la atención de las personas mayores con diabetes en Brasil

RESUMEN

Objetivo. Medir la prevalencia de los diversos servicios de atención que se ofrecen a las personas mayores con diabetes mellitus en Brasil y evaluar las desigualdades sociales en dichos servicios.

Métodos. Este estudio transversal y basado en la población se llevó a cabo en el 2013. Los servicios de atención que se ofrecen se evaluaron en cuanto a los siguientes ocho indicadores: recomendaciones para reducir los carbohidratos, medir la glucemia y revisarse los pies; solicitudes de análisis de sangre, pruebas de glucohemoglobina y pruebas de la curva de glucemia; y si a los usuarios de los servicios les habían examinado los ojos o los pies en el último año. Usamos el índice de pendiente de la desigualdad y el índice de concentración para evaluar las desigualdades entre los quintiles de riqueza.

Resultados. Se evaluó en total a 1.685 personas mayores con diabetes. En términos generales, en el último año les habían examinado los ojos a 41,7% de ellos, en el último año les habían examinado los pies a 35,4% y les habían ofrecido los ocho servicios de atención a 10,9%. Las mayores diferencias absolutas en puntos porcentuales entre el primer quintil de riqueza (los más pobres) y el quinto (los más ricos) en cuanto a los servicios de atención ofrecidos a los usuarios se encontraron en la recomendación de medir la glucemia (25,8), la solicitud de pruebas de glucohemoglobina (27,4), la solicitud de pruebas de curvas de glucemia (31,9), el examen de los ojos en el último año (29,3) y el examen de los pies en el último año (27,0).

Conclusiones. Hubo notables desigualdades en la prevalencia de los servicios de atención. En el futuro, debe hacerse énfasis en la medición de la glucemia y el examen de los pies, especialmente en las personas mayores de un nivel socioeconómico bajo.

Palabras clave

Diabetes mellitus; disparidades en el estado de salud; calidad de la atención de salud; indicadores de calidad de la atención de salud; investigación en servicios de salud; Brasil.

Desigualdades sociais na atenção a idosos com diabetes no Brasil

RESUMO

Objetivo. Medir a prevalência de vários serviços de atenção oferecidos a idosos portadores de diabetes mellitus no Brasil e avaliar desigualdades sociais nestes serviços.

Métodos. Estudo transversal, de caráter populacional, realizado em 2013. Os serviços de atenção oferecidos foram avaliados quanto aos oito indicadores a seguir: recomendação de diminuir o consumo de carboidratos, medir a glicemia e examinar os pés; pedido de exames de sangue, hemoglobina glicada e curva glicêmica; e realização de exame dos olhos ou pés nos usuários do serviço durante o ano anterior. Foram utilizados o índice absoluto de desigualdade e o índice de concentração para avaliar as desigualdades entre quintis de renda.

Resultados. Foram avaliados 1.685 idosos com diabetes. Destes, 41,7% haviam sido submetidos a exame dos olhos no ano anterior, 35,4% a exame dos pés, e a 10,9% haviam sido oferecidos todos os oito serviços de atenção. As maiores diferenças absolutas (em pontos percentuais) entre o primeiro (mais pobre) e quinto (mais rico) quintis de renda foram constatadas para os seguintes serviços de atenção: recomendação de medir a glicemia (25,8), pedido de exame de hemoglobina glicada (27,4), pedido de exame de curva glicêmica (31,9), exame de olhos no ano anterior (29,3) e exame dos pés no ano anterior (27,0).

Conclusão. Foram constatadas desigualdades notáveis na prevalência dos serviços de atenção. Futuramente, deve-se dar ênfase à medição da glicemia e do exame dos pés, principalmente em idosos de nível socioeconômico mais baixo.

Palavras-chave

Diabetes mellitus; disparidades nos níveis de saúde; qualidade da assistência à saúde; indicadores de qualidade em assistência à saúde; pesquisa sobre serviços de saúde; Brasil.
