## Original Article

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# Quality of the health care network: evaluation by the patient with Diabetes Mellitus

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## Abstract

**Introduction**: Diabetes Mellitus (DM) is a common chronic condition that needs an organized and qualified health care network to provide appropriate prevention and treatment of this condition. These investigation mains to assess the quality of health care network according to the perception of patients diagnosed with DM. **Method**: It was conducted a cross-sectional study inside a cohort follow-up. Primary health care users were interviewed to evaluate quality of the health care network using the Patient Assessment of Care for Chronic Conditions scale. Clinical and socio demographic information was collected. **Results**: A total of 24 patients was interviewed, and the overall score of scale was 2.25 (1-5). When the patients were classified by groups based on the control of the DM, the overall score for those with controlled diabetes was lower (2.11) than the group of participants with not controlled diabetes (2.66). **Discussion**: It was found a low global evaluation of the health care network by the patients. This finding can be related with a low health literacy by the patients included in this evaluation. **Conclusion:** The lack of a health care network for chronic conditions acting in a coordinated care can compromised the quality of care provided to DM patients, as noted by the low overall scores of evaluations. A more positive assessment among patients not controlled in their glycemic level may reflect an incipient health literacy these patients.

Keywords: Quality of Health Care; Diabetes Mellitus; Patient Care.

## Qualidade da rede de cuidados em saúde: Avaliação pelo paciente com Diabetes Mellitus

## Resumo

**Introdução**: O diabetes mellitus (DM) é uma condição crônica comum e que necessita de uma rede de atenção à saúde organizada e qualificada para oferecer prevenção e tratamento adequados. O objetivo deste estudo foi avaliar a qualidade da rede de atenção à saúde de acordo com a percepção do paciente com diagnóstico de DM. **Método**: Estudo seccional conduzido dentro de uma coorte de seguimento. Foram incluídos usuários da atenção primária em saúde de um município brasileiro. A avaliação da rede foi feita por meio da escala *Patient Assessment of Care for Chronic Conditions* e foram coletadas informações clínicas e sociodemográficas. **Resultados**: Um total de 24 participantes foi entrevistado e o escore global da escala foi de 2,25 (1-5). Quando classificados por grupos em relação ao controle da doença, o escore global da escala para o grupo de participantes com DM controlado (2,11) foi menor quando comparado aos participantes não controlados (2,66). **Discussão**: Os resultados dessa investigação mostram uma baixa avaliação global para a rede de cuidados em saúde e, diante deles, ressalta-se a importância da discussão sobre o papel que a alfabetização em saúde exerce na avaliação dos serviços. **Conclusão**: A ausência de uma rede capaz de atender às condições crônicas de forma coordenada compromete a qualidade da assistência aos pacientes portadores de DM, como observado pelo baixo escore de avaliação atribuído. A avaliação mais positiva da rede entre pacientes com nível glicêmico não controlado pode refletir uma alfabetização em saúde ainda incipiente entre esses usuários.

Palavras-chave: Qualidade da Assistência à Saúde; Diabetes Mellitus; Assistência ao paciente.

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## Introduction

Over the years, health events have been classified, strictly, into chronic or acute diseases. However, there was a need for these concepts to undergo a redefinition, seeking to consider not only the pathologies themselves, but also physiological situations that somehow require care and longitudinal attention, such as pregnancy. Therefore, a new categorization was constructed, using the terms acute conditions and chronic health conditions[1].

In the Brazilian context, chronic conditions, following the global trend, assume supremacy in the epidemiological profile[2]. About 40% of the Brazilians claim to be affected by at least one chronic disease[3]. And this situation tends to increase, which is confirmed by the estimates of the World Health Organization (WHO) that in 2020, 80% of the diseases in developing countries will be chronic[4]. Despite this, a reactive and fragmented approach to health in the Brazilian health system still prevails, with interventions aimed at acute conditions or episodes of acute chronic conditions[1].

In order to improve the management and provision of services for chronic conditions, the Health Care Network (Rede de Atenção à Saúde, RAS) was proposed, which organizes the system in a non-hierarchical way, placing Primary Health Care (PHC) as the care coordinator center, articulating and integrating the primary, secondary and tertiary spheres[5]. As a way of organizing the operation of the RAS, the Theoretical Model of Care for Chronic Conditions (TMCCC) was recommended by Mendes (2010), to be applied directly in the Brazilian Public Health System (Sistema Único de Saúde, SUS)[1].

An important chronic condition that can benefit from an organized and qualified RAS is Diabetes *Mellitus* (DM). DM is a heterogeneous group of metabolic disorders that have hyperglycemia in common, resulting from defects in insulin action, insulin secretion, or both[6]. According to estimates by the International Diabetes Federation (IDF), in 2015 there were approximately 415 million people worldwide with DM aged between 20 and 79 years old[7]. Among these individuals, around 14.3 million were Brazilians, making Brazil the fourth country with the highest number of people with DM, with a prevalence of 10.2% and more than 130,000 deaths related to diabetes in 2015[7].

To ensure the proper implementation of a RAS for users with DM, with integrated services and continuous care, it is essential to evaluate the care received by the user himself, as the indicators raised can assist in the definition of priorities by the health policies[8]. In this context, the *Patient Assessment of Care for Chronic Conditions* (PACIC) was created, a scale that allows assessing the functioning of the RAS according to the experience of the patients with chronic diseases[8].

An evaluation based on the perception of users can contribute significantly to the measurement of the quality of the RAS, considering that this network is in the process of structuring itself in the country. Therefore, the main objective of our study was to evaluate the quality of the health care network from the perspective of the patient with a diagnosis of DM previously hospitalized for ambulatory care sensitive conditions, ACSC.

## Method

### Study design and place

A sectional study was conducted within a follow-up cohort from 2013 to 2015 in Divinópolis, Minas Gerais. This municipality is located in the Midwest region of Minas Gerais and belongs to the expanded West health macro-region, comprising 55 municipalities. It has an estimated population of 230,848 inhabitants[9].

At the time of the study, the Divinópolis health network was composed of: In PHC it had 14 traditional Basic Health Units (BHUs) and 20 Health Units with a Family Health Strategy (FHS), which supported PHC with an FHS coverage of approximately 28%[10]. In this context, PHC comprised general practitioners, family and community doctors, as well as professionals from the Mais Médicos program. The Divinópolis health network also have services at the secondary level, with a Polyclinic and in an Emergency Care Unit (ECU). A philanthropic hospital10 makes up the tertiary level of assistance. In support of these levels of care, the region has a State Center for Specialized Care (Centro Estadual de Atenção Especializada, CEAE), located in Santo Antônio do Monte, Minas Gerais, which acts as a specialized service for the care of patients with Diabetes *Mellitus* (DM) and/or with Systemic Arterial Hypertension (SAH). This is a secondary level service that can be used by the patients of the municipality of Divinópolis, when PHC does not achieve satisfactory results in patient control.

### Study population and recruitment of the participants

The study population consisted of patients diagnosed with DM identified in the study of the prevalence of hospitalization for primary care-sensitive conditions developed by Cardoso *et al.* (2013)[11]. In this study, a total of 2,775 hospitalizations were identified, of which 860 were due to PCSC (36.6%). Of the total of PCSC, 72% (615) were patients from the municipality of Divinópolis; however, only 370 (60.16%) were included in the interviews and analyses of the study. The others had been transferred to another hospital or did not have favorable clinical conditions at the time of the interview. Of the interviewed patients, 98 had a previous diagnosis of DM[11].

After 12 months of hospitalization, these 98 patients were contacted to be part of a follow-up cohort for clinical and service evaluation after hospitalization for PCSC. The follow-up included two follow-up visits and one of the components of wave 2 was the assessment of the RAS according to the patient's perception.

Among the contacted patients, 32 deaths were identified (32.6%), 15 patients refused to participate in the study (15.3%), 3 denied the diagnosis of DM (3.1%) and 11 were not found (11.2%). Therefore, the *follow-up* cohort consisted of 37 patients, over 18 years old, diagnosed with DM2. Between the first and second visits, there were losses related to deaths, refusals, changes in the municipality and participants who were not located. Thus, 24 patients were interviewed in wave 2. The entire sequence that makes up the population is shown in Figure 1.
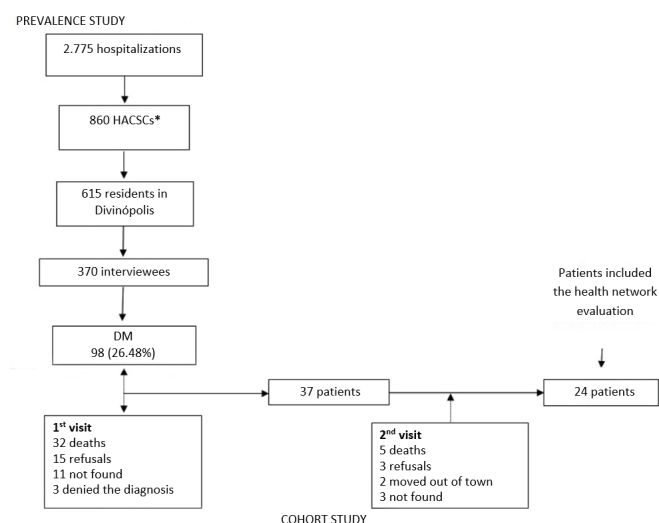
### Data collection and instruments

The recruitment of patients for the present investigation was done through telephone contact and/or home visit. The interviews and clinical evaluation were conducted at the Regional Rehabilitation Center (CRER) in Divinópolis. Patients with impaired autonomy were interviewed at their homes. The interviews were conducted by nurses with experience in research and previously trained in the study protocols.

In the interview, a questionnaire was applied with information on clinical status, comorbidities and complications related to the disease, course and use of the health system after hospitalization for ACSC, and evaluation in the CEAE. In addition, we measured the quality of the assistance network with the application of the PACIC. That instrument was validated and adapted to the Brazilian context by Moysés *et al.* (2012)[13], and evaluates the care provided to the patient in the last six months. It consists of 20 questions, organized on a *Likert*-type scale of five points: never, a few times, sometimes, often, always.

The score for each item ranges from 1 to 5, and the higher the score obtained, the better the quality of care received[8]. The questions are grouped into five different dimensions related to the theoretical model of care for chronic conditions[1]: *1) Adherence to treatment (questions 1 to 3), 2) Decision support systems (questions 4 to 6), 3) Goal setting (questions 7 to 11), 4) Assistance in problem solving (questions 12 to 15) and, 5) Monitoring and coordination of care (questions 16 to 20).* The score for each dimension is calculated from a simple mean value of responses. Given this assessment, it is possible to identify the gaps present in the care network.

**Figure 1.** Study sequence on ACSC in Divinópolis and the patients included in the "Quality of the Care Network" evaluation.



*Hospitalizations for Ambulatory Care Sensitive Conditions

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After the interview, all the participants were referred to a clinical analysis laboratory for the collection of blood samples, in order to assess the metabolic control of DM. The parameter used to assess metabolic control was glycated hemoglobin (HbA1C).

### Data analysis

Data analysis was performed using descriptive statistics, with measures of central tendency and dispersion. The PACIC score was calculated for each dimension and for the global scale. For comparison, two analyses were performed: in relation to laboratory control, patients were divided into two groups, patients with HbA1C within the therapeutic target (HbA1C≤7% for adults and HbA1C≤8.5% for the elderly) and those with HbA1C above that target; with regard to attendance at the CEAE, participants were divided into two groups, those who attended and those who did not attend the CEAE after referral[12]. The comparison of the patients in the groups was performed using Fisher's exact test.

Seeking to assess the complexity of the care received by each patient, we adopted a hierarchy model, in which health units were classified as follows, regarding the degree of specialized care: CEAE > Polyclinic > PHC > without any determined health service. This measure aimed at ordering the health service responsible for controlling the clinical condition of the user, understanding that the most specialized services were directly responsible for it, given the severity of their condition and the difficulty in glycemic normalization.

The data were collected in an electronic registration system containing the *Questionnaire Design Software*, QDS° V 2.6.1 program, and the descriptive analysis of the data was made using SPSS 19.0°. This research was approved by the Research Ethics Committee of the Federal University of São João Del Rei, under opinion number 258,574/2013.

## Results

The study population consisted of 24 patients. Of the total, 58.3% were women, most patients were elderly (75%), black or brown skinned (65.2%), married (52.2%), with elementary education (81.8%) and a family income of up to two minimum wages (75%), as shown in Table 1.

**Table 1.** Distribution of the patients as regards the sociodemographic characteristics, Divinópolis, Minas Gerais, 2014. (n=24)

| Variables | Total n (%) |
|---|---|
| Gender | |
| Female | 14 (58.3) |
| Male | 10 (41.7) |
| Age | |
| <50 | 1 (4.2) |
| 50 to 59 | 5 (20.8) |
| >60 | 18 (75.0) |
| Skin color* | |
| Brown/Black | 15 (65.2) |
| White | 8 (34.8) |
| Marital status* | |
| Married | 12 (52.2) |
| Widower/Widow | 8 (34.8) |
| Single/Divorced | 3 (13) |
| Schooling** | |
| Elementary | 18 (81.8) |
| Never went to school | 3 (13.6) |
| High School | 1 (4.6) |
| Family income | |
| Up to two salaries | 18 (75) |
| More than two salaries | 6 (25) |
| Total | 24* (100) |

* Valid n for Skin color and Marital status: 23/ **Valid n for Schooling: 22

Regarding the use of the services, we observed that the most used by patients for DM control were the PHC units (87.50%) and the polyclinic (29.17%), as can be seen in Table 2.

It was also identified that, in the 18-month period since the first interview in 2013, the majority of the respondents (54.17%) went through at least one hospitalization. Eight patients (33.33%) did not visit the BHU/FHS for the follow-up of DM, although the majority of the patients (70.83%) had their last consultation to assess metabolic control in the last 6 months before the interview, also considering other health services and not only the BHU. Still during this period, less than half of the participants consulted a specialist, with the exception of the cardiologist, who was consulted by 13 (54.17%) patients. Regarding the DM complications presented since the diagnosis of the disease, the most prevalent was chronic kidney disease, diagnosed in six patients (25%), followed by diabetic foot (20.83%). Almost half (45.9%) of the patients report having presented some complication.

**Table 2.** Course of the patient in the service network. Divinópolis, Minas Gerais, 2014. (n=24)

| Variables | Valid n | % |
|---|---|---|
| Most used health services* | | |
| BHU/FHS | 21 | 87.50 |
| Polyclinic | 7 | 29.17 |
| Private care | 4 | 16.67 |
| ECU | 3 | 12.50 |
| CEAE | 3 | 12.50 |
| Hospitalizations** | | |
| Yes | 13 | 54.17 |
| No | 11 | 45.83 |
| Number of consultations in the BHU/FHS** | | |
| None | 8 | 33.33 |
| Up to 2 | 6 | 25.00 |
| 3 or more | 10 | 40.66 |
| Diabetes complications | | |
| No complications | 13 | 54.17 |
| Chronic kidney disease | 6 | 25.00 |
| Diabetic foot | 5 | 20.83 |
| Others*** | 3 | 12.50 |
| Specialist consultation** | | |
| Cardiologist | 13 | 54.16 |
| Nutritionist | 9 | 37.50 |
| Ophthalmologist | 8 | 33.33 |
| Nephrologist | 7 | 29.17 |
| Endocrinologist | 5 | 20.83 |
| Angiologist | 4 | 16.67 |
| Did not consult any specialty | 3 | 12.50 |
| Attendance to the CEAE | | |
| Yes | 14 | 58.33 |
| No | 7 | 29.16 |
| Does not apply | 3 | 12.50 |
| Have had a care plan prepared by health professionals | | |
| Yes | 9 | 41.66 |
| No | 11 | 37.50 |
| Not knowing | 4 | 20.83 |
| Total | 24 | 100 |

* The valid n is greater than 24, since more than one service may have been chosen by the same patient.
** In the 18 months prior to the interview.
*** Others: amputation, stroke and retinopathy.
**** BHU: Basic Health Unit; FHS: Family Health Strategy; ECU: Emergency Care Unit

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With regard to referral to the CEAE, all the patients have this reference after the first interview, as part of the study protocol. However, 03 of them claim to have never been referred to the CEAE, and 01 reports having already been referred before participating in the study. Only 14 (58,33%) actually attended the consultation, and the reasons for not attending were mainly problems with transportation and disabling clinical condition.

Another aspect assessed was the development of a care plan to guide the patient's approach within the care network. The study showed that only 9 individuals (41.66%) recognize the existence of this document and, of these, 8 obtained their care plan in consultations with the CEAE, with only three being delivered to the Primary Care service that follows the patient.

From the data shown in Table 3, it can be seen that 18 patients (75.0%) used the specialized services for DM control more frequently than primary care, as the latter was the reference for only 6 patients (25.0%). Regarding metabolic control, there was no statistically significant difference between the health services used by the patient (p=0.604).

**Table 3.** Metabolic control and health service responsible for patient follow-up, Divinópolis, MG, 2014. (n=24)

| Service | n (%) | Controlled* n | Not controlled n | p-value |
|---|---|---|---|---|
| Specialized services** | 18 (75.0%) | 13 | 5 | 0.604 |
| Primary Health Care | 6 (25.0%) | 3 | 3 | |
| Total | 24 | 16 | 8 | |

In the comparison for categorical variables, the Fisher's exact test was used
* Controlled: adults HBA1c ≤7.0% and elderly (≥60 years old) HBA1c ≤8.5%
** Specialized services (CEAE and Polyclinic)

The results of the assessment of the RAS by means of the PACIC are shown in Table 4. It is observed that the global score was 2.25 (± 1.6) on a scale of 1 to 5. The dimension with the lowest evaluation was *coordination of care/follow-up* with a score of 1.78 (± 1.4). The dimension best evaluated by the participants was the care *model/decision making* with a score of 3.00 (± 1.62).

The quality of the care network was better assessed by uncontrolled patients than among controlled participants (2.66 *versus* 2.11). It is also possible to observe that there was an agreement between the groups as to the dimension best evaluated (*care model/decision making*) and as to the dimension with the lowest score (*coordination of care/follow-up*). Regarding the comparison of scores compared to the attendance at CEAE consultations, it is observed that all dimensions, including the global score, reached slightly higher values in the group of individuals who had never consulted at the CEAE. However, it is observed that the dimensions with the best and worst evaluation were also the same for both groups, respectively: *care model/decision making and care coordination/follow-up* (Table 4).

## Discussion

The results of this research show a low global assessment of the Health Care Network, mainly in the *Adherence to treatment and Coordination* of care dimensions. The respondents who had their glycemic level controlled assessed the health care network with lower scores and, similarly, those referred to the CEAE had slightly lower scores in all dimensions assessed; however, there was no difference. There was no difference in glycemic control in relation to the health service most used by the patient, whether PHC or specialized care.

The Health Care Network had a global score of 2.25, a mean value that identifies services which do not provide an adequate assistance to chronic conditions, more specifically in this work, to patients with DM. According to the literature[14], only scores above 3.5 represent a good quality care offered in chronic conditions. However, none of the studies analyzed has shown a result lower than 2.35[8,15-19]. There was no work that reached the cutoff score established for a good service, and the best evaluation found was 3.22, in a study conducted in the United States[16]. It should be noted that all of these studies are from developed countries such as Switzerland, Canada, Australia and the United States.

When analyzing the scores of the health care network stratifying the patients regarding metabolic control, it is observed that the global assessment score remains with a low mean value, keeping the service in a poor quality level. When comparing the two groups, it would be expected that the evaluation by patients with good metabolic control would show better results in the evaluation of the network. This is because it is believed that the levels of glycated hemoglobin are lower when there is a higher resolution of the service, which would be assessed as better quality of care. However, we observed an inverse classification and the individuals with the worst laboratory indexes were those who most positively evaluated the diabetes health care network.

In view of the results found in this research, we emphasize the importance of discussing the role that health literacy plays in the evaluation of the services. This characteristic does not only include the ability of users to know how to read or write, but involves the entire health/disease context and the individual's ability to understand and evaluate the service provided to him/her, in addition to establishing their preferences regarding to the care received. Health literacy elevates the user to the category of active subject within the health care network. On the other hand, those who do not share this experience are generally configured as passive agents within the health care network and may have difficulty in recognizing exacerbations of the disease itself, as well as presenting challenges in the exercise of self-care, resulting in greater failures in the treatment of the chronic condition. We also highlight that the precariousness in health literacy predominantly affects the elderly and individuals with low income and low schooling, which are also dominant characteristics in the sample of the present research1. It is understood that adequate health literacy represents an important tool for increasing self-care in chronic health conditions[20].

Thus, we can raise the hypothesis that, although the health system has evolved from a biomedical approach to a proposal for health promotion and multidisciplinary care, the patients probably did not understand this transition. Thus, their demands in relation to the services are focused on medical care and on receiving medications21. However, for an effective control of a chronic disease like DM, the care provided to the patient must be multidisciplinary and aim, above all, at promoting health and at preventing diseases, actions that are pertinent to primary care[1].

**Table 4.** Evaluation of the health care network according to metabolic control and follow-up by the specialized center (n=24)

| Care dimension | PACIC scores* | | | Consultation at the CEAE** | |
|---|---|---|---|---|---|
| | All patients n=24 % (n) | Patients Controlled n=16 % (n) | Patients Not controlled n=7 % (n) | Yes n=14 % (n) | No n=10 % (n) |
| Adherence to treatment | 1.9 (1.0) | 1.7 (1.3) | 2.5 (1.6) | 2.0 (1.5) | 2.3 (1.2) |
| Care model/Decision making | 3.0 (1.6) | 2.9 (1.6) | 3.24(1.7) | 3.3 (1.5) | 4.7 (1.5) |
| Goal definition | 2.5 (1.2) | 2.3 (1.6) | 2.75(1.7) | 2.9 (1.6) | 4.1 (1.2) |
| Problem solving/Counseling | 2.3 (1.1) | 2.0 (1.5) | 2.79(1.7) | 2.6 (1.6) | 3.6 (1.3) |
| Care/Follow-up coordination | 1.8 (1.4) | 1.6 (1.1) | 2.2 (1.7) | 2.0 (1.5) | 2.8 (1.0) |
| Global score | 2.26 (1.5) | 2.1 (1.5) | 2.66(1.7) | 2.5 (1.6) | 3.5 (1.3) |

*Patient Assessment of Care for Chronic Conditions (PACIC)
**CEAE: Centro Estadual de Atenção Especializada
Data presented as mean and standard deviation.

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In this study, PHC, within its powers, proved to be an ineffective service in managing the clinical condition of patients with Diabetes *Mellitus*, perhaps due to the characteristic of a mixed care model, mixing FHS with a conventional model. Thus, PHC should act as a gateway to other health services, and as such, be able to offer support to the patient, avoiding complications and coordinating all care as the center of the RAS[21,22].

The difficulty in structuring the service health care network is predominantly due to the inability of primary care to exercise its role as a coordinating center, so that patients are referred to specialized services, depending on the severity of their staff, but there is no interlocution between the levels of care and the user gets lost in that flow. However, the absence of interconnected information systems, the low coverage and the infrastructural fragility of the FHS are still major obstacles to the work of PHC, thus making it difficult to establish integrated assistance in shaping care networks[1].

The lack of interaction between the services is evident when the care plan developed by specialized care does not reach PHC. This corroborates PHC's inability to adequately address DM with the support of an effective health care network. It is noteworthy that an effective approach includes multidisciplinary patient care, the elaboration of a care plan, and the agreement of treatment modalities, as well as the patient's understanding of the clinical condition, adherence and self-management of the case, which is still a challenge in PHC[1,23-25].

The fact that most patients with altered blood glucose levels have evaluated the health network well, unlike those who were compensated, raises the discussion about other factors involved with disease control, regardless of the quality and type of the service. The behavior of the patient in relation to his health condition, non-adherence to the proposed treatment, the lack of self-care and the unfavorable lifestyle can make the patients appear decompensated, even if they are followed-up by a good quality health service[1].

This research points out crucial elements for the organization of the care network for patients with DM; however, some limitations are identified. The first one is the small sample size, coming from the group of participants in the follow-up to the cohort study, in which our research is inserted. This fact affects the analysis, but does not invalidate the results found here, as it represents a defined group of individuals, the care for their health condition and satisfaction with the services they provide. Another limitation may concern the perception of the individuals participating in the research. Having contact with a health service, being known by the professionals who work in this service or even receiving the medication pertaining to the treatment of chronic health conditions, can have an impact on the individual assessment regarding the provision of health care, without reliably demonstrating the quality of the health care network. As Paiva *et al* (2006) point out, the judgment of the service offered is conditioned to the degree of acceptance and full knowledge of the patient's pathology, also influenced by the reception received, with or without resolution of his health demand[23].

As a benefit, this study brings the survey of health service evaluation indicators to, from this starting point, support actions aimed at its improvement. The importance of including individuals in the elaboration of Health Care Networks is also highlighted, instilling in them the ability to reflect on the care they receive and allowing them greater empowerment and the opportunity to act in the improvement of the health services.

## Conclusion

Chronic health conditions require that the care model is structured in health care networks. However, through this study we observed that the lack of service organization in this sense directly reflects on the quality of the care provided, a fact evidenced by the low score obtained by the health care network.

In addition to the poor organization of care in effective networks, we also found that the low knowledge on the part of users about this new model of care for chronic conditions interferes with the quality evaluation of care providedreceived. The patients with poorer diabetes control were those who best evaluated the network and, therefore, were not able to identify the failures that possibly resulted in greater difficulty in normalizing blood glucose levels, thus acting as passive subjects in the health-disease context.

Therefore, knowledge of the level of health literacy with empowerment strategies for individuals with chronic conditions is established as a fundamental aspect for the RAS. When considering these aspects in the organization of the RAS, the user would be favoring a critical posture regarding the care that is offered, as well as in the deepening of techniques and management of self-care.

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