

CHAPTER 4

Quality of care from the perspective of patients with type 2 diabetes. A comparison between managed, protocolized and usual diabetes care

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ABSTRACT

Background: In two distinct regions of the Netherlands, diabetes care was implemented in primary care with a different organizational level in each region. Patients' experience with these two types of care was compared with usual diabetes care.

Methods: Patients with type 2 diabetes receiving managed care (MC) (n=242), protocolized care (PC) (n=186), or usual care (UC) (n=301) participated in this study. Managed care was characterized by a central organization and coordination of the diabetes care and a centrally organized annual assessment. Protocolized care had a central monitoring of the diabetes care delivered in patient's general practice. Usual diabetes care had a decentralized organisation structure without structural coordination between primary and secondary care. At baseline and one year after baseline, patients expressed their experience with the care by the general practitioner (GP), diabetes nurse and dietician, and the continuity of care using validated questionnaires.

Results: Perceived quality of care in the three diabetes care systems varied for GPs, diabetes nurses and dieticians. Risk of a negative experience in the care by the GP was higher in MC and PC than UC. Experience with the diabetes nurse was better in MC but worse in PC compared to UC. Results were statistically not significant after multivariable adjustment. Patients receiving MC had a lower risk of a negative experience with care delivered by the dietician and the continuity of care compared to patients receiving PC or UC. During follow-up, PC and UC improved significant regarding the continuity of care.

Conclusions: The dietician added positively to patients' experience with MC, probably because of a high involvement in the diabetes care. Improvements during follow-up in the continuity of care in PC and UC, closed the gap with managed care.

BACKGROUND

Patient satisfaction is an important aspect of diabetes care and is associated with an active involvement of the patient.^{1,2} Structured care, improved coordination and a patient-centred approach, has been postulated to improve the interaction between patient and health care professional, resulting in high-quality, satisfying consultations.^{3,4}

Only a few studies on the effectiveness of diabetes care have included outcome measures on patient opinion on the quality of care. They showed that the implementation of managed diabetes care improved the process of diabetes care as well as patient satisfaction with care⁵⁻⁷ and that patient experience with the continuity of diabetes care was positively associated with patient satisfaction with diabetes care.⁸ These studies did not specify which aspects were responsible for the improved satisfaction, nor did they distinguish between health care professionals involved in the diabetes care, which might be important information when aiming at improving diabetes care.

In two distinct regions of the Netherlands, diabetes care with a different level of organization in each region was implemented in primary care. We investigated patients' opinions on what aspects of the diabetes care they deemed important and patients' experiences with these aspects of care. Differences in patients' experience with the quality and continuity of diabetes care were compared between patients treated by these two types of diabetes care and usual diabetes care during follow-up.

METHODS

Study population

From July 2007 to May 2009, type 2 diabetes patients receiving diabetes care with different organizational levels i.e. managed care (MC), protocolized care (PC) or usual care (UC) were invited for this study. Patients with type 2 diabetes who were aged between 40 and 75 years and capable of understanding the Dutch language were eligible for participation. A random sample of 643 patients receiving managed care was invited for this study and 315 (49%) patients agreed to participate. In the protocolized care group, 802 patients were invited and 293 (37%) patients were included in our study. Of the 1098 patients invited for the usual care group, 482 (44%) patients participated. We excluded patients with type 1 diabetes, which was defined as diabetes with onset before the age of 40 in combination with insulin treatment, (MC: n=2, PC: n=1, UC: n=10) After exclusion of patients who did not complete the QUOTE questionnaire after one or two years of follow-up, 244 patients in the managed care group, 187 patients in the protocolized care group and 304 patients in the usual care group remained for the analyses. Participants who did not complete all questionnaires during follow-up were less likely to be treated

R1 with medication (OR: 2.31 (95% CI: 1.45-3.68) and had more years of education (OR:
R2 1.08 (95% CI: 1.03-1.12) compared to completers of the study. There were no differences
R3 between completers and drop-outs regarding age, sex, diabetes duration, marital status,
R4 work status or care group.
R5

R6 **Diabetes care**

R7 According to the Dutch guidelines for type 2 diabetes,⁹ patients should receive a diabetes
R8 assessment four times a year. During these examinations weight and fasting blood
R9 glucose should be measured. Assessment of blood pressure in case of antihypertensive
R10 medication use, and screening of the foot in patients at risk for developing an ulcer should
R11 be performed. Patients' well being, lifestyle and medication use should be discussed.
R12 Once a year the assessment has to be extended with assessment of, among others, blood
R13 pressure and HbA_{1c} and screening of diabetes related complications.
R14

R15 **Usual diabetes care**

R16 Patients received usual diabetes care by their general practitioner (GP), diabetes nurse
R17 specialist, practice nurse or GP assistant according to the Dutch guidelines for type 2
R18 diabetes.⁹ Patients could consult a dietician after referral by the GP.

R19 The usual care group consisted of patients treated by a representative sample of 17
R20 general practices throughout the Netherlands. The GPs in the usual care group were
R21 affiliated to the Continuous Morbidity Registration (CMR) sentinel general practice
R22 network of NIVEL, The Netherlands Institute for Health and Services Research.¹⁰
R23 The network of 42 general practices represents 0.8% of the Dutch population and is
R24 representative at a national level for age, sex, geographic distribution and population
R25 density.
R26

R27 **Managed diabetes care**

R28 In 1996, centrally managed care was implemented in the Diabetes Care System in the
R29 West-Friesland region of the Netherlands, which organized the diabetes care centrally
R30 and coordinated the care between all care professionals.

R31 In contrast with usual care, in which the GP was responsible for the diabetes care,
R32 the Diabetes Care System was responsible for the performance and quality of diabetes
R33 care. In addition to the diabetes care in patients' own general practice according to the
R34 Dutch guidelines for type 2 diabetes, patients visited the Diabetes Care Centre for a
R35 centrally organized annual assessment. During this annual assessment patients received
R36 screenings, assessments, advice, information and education by the diabetes nurse, not
R37 by the general practitioner. Individual care plans were discussed with the patient and
R38 patients were stimulated to make their own choices regarding treatment options and
R39

lifestyle behaviour. Patients also visited the Diabetes Care Centre, for consultations with the dietician for advice and education. Every six months diabetes nurses visited participating GPs to provide feedback about their performance. Individual patients were evaluated and mean values of risk factors of the diabetes population of the GP were compared to the diabetes populations of other participating GPs.

Protocolized diabetes care

In 2007, in 12 GPs in the Amstelland region of the Netherlands protocolized care was implemented.

In contrast to managed diabetes care, all assessments were performed in patient's own GP practice and there was no centrally organized annual assessment. A web-based database was used for the registration of diabetes-related data. This database was used to monitor whether patients receive diabetes care according to the Dutch guideline for type 2 diabetes. Education is offered to all involved health care professionals to increase their expertise on type 2 diabetes.

A more detailed description of specific characteristics in the three diabetes care groups is shown in the online appendix.

Measurements

Using a self-administered questionnaire, we obtained data on diabetes duration, marital status, educational level, work status, smoking status and treatment status.

We used the QUality Of care Through the patients' Eyes questionnaire for diabetes (QUOTE-diabetes) to obtain information on the patient's opinion on the quality and continuity of diabetes care. Quality of care mainly focuses on the discussion of disease specific aspects and communication between health care professional and patient. The continuity of care includes the arrangement of consultations, performed screenings and assessments made during the previous year. The method used in this questionnaire has been validated in various patient groups¹¹⁻¹³ Patients were asked to rate the importance of and their experience with 29 aspects of the diabetes care. Importance was categorized into: 1) not important, 2) fairly important, 3) important and 4) extremely important. Experience with all aspects of care by the GP, diabetes nurse and dietician was categorized into: 1) on the whole yes, 2) yes, 3) not really and 4) no.

PC was implemented in GP practices at the start of the baseline measurement. Changes in the process of the diabetes care were implemented and improved during two years of follow-up of the study, which might have resulted in less effects on patients' experience with PC. Therefore, we added a group of patients receiving MC to investigate patients' experience with managed care which was already successfully implemented. This group was followed for one year.

Statistical analysis

Characteristics of the study population are presented as means (SD), median (interquartile range) in case of a skewed distribution, or proportions, by diabetes care group. Differences in patient characteristics between the three groups were investigated using t-tests for continuous variables and Chi² tests for categorical variables.

Mean score of the importance was calculated for each aspect of care and when the mean importance was higher than 3 (range 1 to 4), the aspect was selected for further analyses on patient experience with the aspect of care. Patient experience was dichotomized into no (no and not really) and yes (on the whole yes and yes). Logistic regression analysis was used to compare the risk of a negative experience with specific aspects of care between the three diabetes care groups at baseline. Multivariable models were used to adjust for age, sex, importance of the specific aspect of care, diabetes duration, treatment status, educational level and work status. Changes in risk of a negative experience with aspects of the quality and continuity of care during follow-up were analyzed with generalized estimating equations (GEE's). GEE adjusts for the correlation between repeated observations in the same subjects. An exchangeable correlation structure was assumed and time was treated as a categorical variable. Negative or positive experience with the specific aspect of care was the dependent variable. Care group was added to the model as the independent variable and the interaction between this variable and time was added to investigate differences in change in the risk of a negative experience during follow-up between patients in the three care groups.

All analyses were performed using SPSS (version15.0, Chicago, Illinois, USA) for Windows.

RESULTS

More patients in the managed care group had lower education (51% versus 28% (protocolized care and 43% (usual care)) and used glucose lowering medication compared to patients treated by protocolized care or usual care (90.3% vs. 76.1% and 79.5% respectively) (Table 1).

More patients receiving protocolized care visited the general practitioner (90.1%) compared to patients receiving managed care (82.5%) or usual care (82.8%). In managed care, a higher proportion of patients visited the diabetes nurse (84.9%) compared to protocolized (74.7%) and usual care (65.2%). The dietician was visited by more patients in the managed care group (72.2%) compared to protocolized (27.3%) and usual care (21.5%).

Table 1. Patient characteristics according to diabetes care group

	Managed care (N=244)	Protocolized care (N=187)	Usual care (N=304)
Men (%)	50	51	50
Age (years)	64.4 ± 7.7	65.1 ± 7.5	64.3 ± 6.6
Married/living together (%)	80	77	80
Educational level (%) - Low	51	28	43
- Medium	41	47	37
- High	8	26	20
Paid job (%)	20	29**	18
Retired (%)	48	45	42
Disabled (%)	8	4	6
Diabetes duration (years)	6 (3-11)	5 (3-9)	6 (3-10)
Treatment (%) - Diet	10*	24 [#]	20
- Oral agents	70	65	58
- Insulin	8	2**	8
- Oral agents and insulin	12	9	14
Smoking status (%) - current	17	12	16
- Former	52	56	51
- Never	31	32	33

Values are means (SD), median (interquartile range) or proportions.

* Indicates a statistically significant difference with usual care (p<0.05)

[#] Indicates a statistically significant difference with managed care (p<0.05)

Quality of the diabetes care

Aspects of diabetes care that were considered important by diabetes patients are shown in Table 2. Most important aspects of the diabetes care were: the health care professional should a) have expertise in the field of diabetes, and b) provide adequate education about diabetes. Aspects of diabetes care that were found to be the least important were: 1) the availability of information leaflets in the health care institution and 2) paying attention to psychosocial and societal aspects of the disease. The ranking of aspects of diabetes care did not differ between groups.

Quality of care by the GP showed inconsistent results (Table 2). The GP's in usual care performed better than the GP's in protocolized care regarding guidance for insulin treatment or change in treatment, however not statistically significant after multivariate adjustment. Significantly fewer patients under usual care reported a negative experience with the provision of the latest developments in the field of diabetes compared to patients in managed care.

Regarding the care delivered by the diabetes nurse, managed care was associated with non-significant lower odds of a negative experience with most aspects of the diabetes care. Protocolized care was associated with higher odds of a negative experience with the diabetes care compared to usual diabetes care. Results were statistically not significant after multivariable adjustment.

Table 2. Odds of a negative experience with aspects of the diabetes care in patients receiving managed care and patients receiving protocolized care compared to usual care (reference category). Data are presented according to health care professional with 95% confidence intervals.

	Model	General practitioner			Diabetes nurse			Dietician		
		MC*	PC†	UC	MC	PC	UC	MC	PC	UC
• has expertise in the field of diabetes	1	0.75 (0.39-1.46)	1.18 (0.61-2.28)	-	-	-	0.16 (0.05-0.54)	0.89 (0.26-3.00)	1	
• provides adequate education about diabetes	2	0.76 (0.37-1.57)	1.21 (0.58-2.50)	-	-	-	0.08 (0.02-0.36)	0.51 (0.11-2.30)	1	
• discusses laboratory results with me	1	1.60 (0.66-3.88)	1.67 (0.65-4.24)	1.31 (0.44-3.87)	1.63 (0.53-5.02)	0.24 (0.08-0.72)	0.67 (0.18-2.44)	1		
• provides adequate education about dietary guidelines	2	2.28 (0.85-6.10)	2.28 (0.83-6.30)	1.19 (0.39-3.61)	1.88 (0.55-6.40)	0.24 (0.07-0.79)	0.63 (0.15-2.65)	1		
• discusses aims of treatment with me	1	1.28 (0.64-2.56)	0.75 (0.32-1.75)	0.60 (0.28-1.29)	0.99 (0.47-2.11)	-	-	1		
• provides information about developments in the field of diabetes	2	1.45 (0.69-3.04)	0.77 (0.32-1.86)	0.62 (0.28-1.35)	1.26 (0.56-2.82)	-	-	1		
• discusses the optimality of treatment with me	1	0.89 (0.53-1.50)	0.77 (0.43-1.38)	0.63 (0.34-1.17)	1.11 (0.59-2.08)	0.27 (0.07-1.07)	0.58 (0.14-2.52)	1		
• provides adequate guidance regarding insulin dosage	2	0.96 (0.55-1.68)	0.78 (0.41-1.46)	0.61 (0.32-1.16)	1.06 (0.54-2.10)	0.16 (0.03-0.88)	0.51 (0.08-3.29)	1		
• provides adequate guidance when treatment changes	1	1.62 (0.79-3.43)	1.16 (0.51-2.67)	1.55 (0.63-3.84)	2.68 (1.09-6.59)	0.36 (0.11-1.16)	1.03 (0.44-2.44)	1		
	2	2.03 (0.92-4.48)	1.43 (0.59-3.48)	2.06 (0.77-5.48)	2.36 (0.87-6.37)	0.33 (0.08-1.33)	0.51 (0.08-3.29)	1		
	1	1.85 (1.16-2.94)	1.44 (0.87-2.39)	0.96 (0.59-1.56)	1.94 (1.16-3.22)	0.55 (0.28-1.08)	1.03 (0.44-2.44)	1		
	2	1.96 (1.19-3.24)	1.34 (0.78-2.32)	1.01 (0.61-1.68)	1.81 (1.05-3.13)	0.48 (0.24-0.99)	0.93 (0.35-2.45)	1		
	1	1.08 (0.59-1.98)	1.10 (0.58-2.10)	0.99 (0.52-1.91)	0.97 (0.47-2.01)	0.35 (0.15-0.79)	1.21 (0.46-3.18)	1		
	2	1.05 (0.54-2.02)	1.31 (0.65-2.62)	1.01 (0.51-1.98)	0.90 (0.42-1.94)	0.32 (0.14-0.77)	1.14 (0.39-3.29)	1		
	1	0.97 (0.50-1.87)	2.02 (1.02-3.99)	0.58 (0.29-1.17)	2.18 (1.09-4.35)	-	-	1		
	2	1.12 (0.54-2.34)	2.08 (0.96-4.51)	0.44 (0.19-1.01)	1.47 (0.64-3.38)	-	-	1		
	1	1.02 (0.52-1.99)	2.25 (1.10-4.61)	0.53 (0.26-1.08)	1.96 (0.98-3.93)	0.46 (0.19-1.08)	2.51 (0.91-6.91)	1		
	2	1.10 (0.51-2.39)	2.09 (0.90-4.88)	0.51 (0.26-1.10)	1.21 (0.56-2.65)	0.49 (0.19-1.25)	1.94 (0.62-6.06)	1		

Model 1: adjusted for age and sex

Model 2: further adjusted for importance of the specific aspect of care, diabetes duration, sort of treatment (diet, oral, insulin), educational level and work status

*In this group, a small number of patients consulted the dietician and there were no negative experiences in this group with this aspect of care. Therefore, an Odds Ratio could not be calculated.

†MC = managed care; †PC = protocolized care; UC = usual care; In bold: p<0.05

Patients receiving managed care had significantly better experiences with the dietician regarding 1) expertise in the field of diabetes (OR: 0.08 (95% CI: 0.02 to 0.36)), 2) education about diabetes (OR: 0.24 (95% CI: 0.07 to 0.79)), 3) education about dietary guidelines (OR: 0.16 (95% CI: 0.03 to 0.88)), 4) provision of information about the latest developments in the field of diabetes (OR: 0.48 (95% CI: 0.24 to 0.99)) and 5) discussion of the optimality of treatment with the patient (OR: 0.32 (95% CI: 0.14 to 0.77)).

Longitudinal results of the quality of care

During follow-up, improvements on most aspects of the quality of care by the GP and the diabetes nurse were seen in the managed care and usual care group, though none of the improvements were statistically significant (data not shown).

There were no statically significant differences in the changes in odds of a negative experience with aspects of care between the three care groups.

Quality of the continuity of care

Most aspects relating to the continuity of care were considered important by patients in all care groups, which are shown in table 3.

Compared to patients treated by usual care, significantly fewer patients receiving managed and protocolized care reported a negative experience with the possibility to consult a specialist in ophthalmology within 2 months. Except for the aforementioned aspect and the intensive support after diabetes diagnosis, fewer patients in the managed care group had a negative experience with aspects of the continuity of care compared to usual care.

Longitudinal results of the continuity of care

In usual and protocolized care, risk of a negative experience decreased significantly during two years of follow-up regarding the screening of the feet, eyes and kidneys. This improvement did not differ between the two groups. Provision of information about self-control of the feet and screening of blood pressure improved significantly more in usual care compared to protocolized care. The possibility to consult a specialist in ophthalmology within 2 months improved in protocolized care. There were no consistent or statistically significant changes in odds of a negative experience in the managed care group.

Table 3. Odds of a negative experience with aspects of the continuity of care in patients receiving managed care and protocolized care compared to usual care (reference category) with 95% confidence intervals.

It is important that... /it is my experience that...	Model	MC	PC	UC
I received intensive support early after diabetes diagnosis	1	1.40 (0.88-2.24)	1.56 (0.95-2.56)	1
	2	1.29 (0.78-2.11)	1.50 (0.88-2.56)	1
it is possible to consult a specialist in ophthalmology within two months	1	1.80 (1.07-3.05)	2.54 (1.56-4.12)	1
	2	1.67 (0.96-2.92)	2.29 (1.37-3.82)	1
I receive adequate education about self-control feet	1	0.26 (0.14-0.48)	0.71 (0.42-1.19)	1
	2	0.32 (0.17-0.61)	0.72 (0.55-1.13)	1
I receive a screening of the foot each year	1	0.12 (0.05-0.29)	0.61 (0.35-1.05)	1
	2	0.10 (0.03-0.27)	0.62 (0.34-1.15)	1
I receive a screening of the eye each year	1	0.56 (0.32-0.98)	1.68 (1.04-2.73)	1
	2	0.77 (0.42-1.46)	1.46 (0.85-2.52)	1
I receive a screening of kidney function each year	1	0.69 (0.47-1.00)	1.16 (0.79-1.70)	1
	2	0.72 (0.48-1.09)	1.13 (0.75-1.72)	1
my blood pressure is measured during each diabetes assessment	1	0.26 (0.09-0.79)	0.42 (0.15-1.16)	1
	2	0.32 (0.10-0.99)	0.59 (0.20-1.71)	1

Model 1: adjusted for age and sex

Model 2: further adjusted for importance of the specific aspect of care, diabetes duration, sort of treatment (diet, oral, insulin), educational level and work status
 *MC = managed care; fPC = protocolized care; UC = usual care; In bold: p<0.05

DISCUSSION

At baseline, patients receiving usual care were at lower risk for a negative experience with the diabetes care by the GP. Patients receiving protocolized care had more negative experiences with the care by the diabetes nurse. Lowest risk of a negative experience with the quality of care was seen in the care delivered by the dietician and was in favour of managed care. Overall, managed care was associated with fewer negative experiences with the continuity of care. During follow-up the results of none of the groups improved significantly regarding the quality of care. The continuity of care improved significantly in protocolized and usual care, closing the gap with managed care, which had the best continuity.

The expected improvements in quality of care by the GP, the diabetes nurse and the dietician after implementation of protocolized care were not found. Maybe the duration of the study was too short to detect changes in patients' opinion of the care. In the current study, managed care performed better at baseline on most aspects of the continuity of care compared to usual care. Because of the central coordination, the planned management of diabetes and feedback to caregivers, it was expected that managed care would be rated more favourable regarding the continuity of care compared to the usual care group. In managed care, the quality of care by the dietician and the continuity of care remained stable while the other two groups improved, possibly due to an already low risk of a negative experience in this group.

Two studies investigating patients' perspective on the quality and continuity of usual diabetes care showed a relatively low quality of the continuity of care.^{14,15} Previous studies showed that patients treated by managed diabetes care or case management were overall more satisfied with the diabetes care than patients receiving usual diabetes care.⁵⁻⁷ However, these studies did not specify on which aspects of care resulted in higher satisfaction and on different health care professionals involved in the diabetes care.

Particularly the GP scored worse in managed and protocolized care compared to usual care. Health care professionals concerned with the treatment of patients receiving managed care, share their responsibility for patient care. This shared responsibility might have resulted in a decreased involvement of the GP in the diabetes care. Furthermore, compared to usual care, managed care was significantly associated with fewer negative experiences with the care by the dietician. Dieticians in the managed care group are highly educated and experienced in the treatment of patients with type 2 diabetes and it may be anticipated that the dieticians in the managed care group have a higher level of expertise in the field of diabetes compared to the dieticians in the usual care group.

Treating patients by the patient-centred approach of managed care should activate patients and stimulate patients' responsibility for the disease.^{3,4} Our results showed that

R1 the availability of information leaflets about diabetes was considered least important
R2 while the provision of good education of diabetes by the health care professional was
R3 most valued by diabetes patients, indicating a passivity of patients. Stimulating an active
R4 role of patients in their care might increase the perceived quality of diabetes care.

R5 Some potential limitations of our study need to be discussed. Because of the low
R6 response rate, it is possible that a selection of motivated and satisfied patients is included
R7 in our study resulting in more favourable results. However, we assume no differences in
R8 this possible selection of patients between the three groups.

R9 Because of the increasing interest in strategies to decrease the burden of diabetes,
R10 it is possible that some GPs in the usual care group implemented an intervention
R11 aiming at optimizing diabetes care, which might have decreased the difference in
R12 the patients' opinion on the quality of diabetes care or continuity of care between the
R13 managed and usual care groups.

R14 To assess patient experience with the continuity of care, we asked patients whether
R15 assessments and screening of risk factors and complications were performed during the
R16 previous year. Due to the use of this self-reported data, risk of recall bias exists. An earlier
R17 study showed a high sensitivity and low specificity for self-reported examinations,
R18 resulting in an overestimation of received examinations.¹⁶ However, using medical
R19 records as an alternative could lead to an underestimation of performed examinations
R20 because these records are often incomplete.¹⁷ Moreover, we do not expect that the possible
R21 overreporting of examinations in our study differed between the care groups.

R22 To conclude, in the diabetes care patients found it important that the health care
R23 professional has expertise in the field of diabetes, discusses aims and optimality of
R24 treatment and laboratory results, provides adequate guidance regarding insulin dosage
R25 and when treatment changes, adequate education (including dietary guidelines) and
R26 information about developments in the field of diabetes. Intensive support after diabetes
R27 diagnosis, short-term access to a specialist in ophthalmology, adequate education about
R28 self-control of the feet and screenings and assessments of the feet, eyes, kidneys and
R29 blood pressure were important aspects in the continuity of care.

R30 A dietician connected to the Diabetes Care Centre, in the managed care group,
R31 was associated with lower risk of a negative experience with the care compared to
R32 protocolized and usual care. Considering the importance of expertise in the field of
R33 diabetes and adequate education of dietary guidelines, rated by patients, a dietician
R34 closely linked to patients' general practice might improve the quality of care. Lower risk
R35 of a negative experience with the care was not seen in the care received by the general
R36 practitioner in the managed or protocolized care group, which might be caused by a
R37 decreased involvement of the GP in the diabetes care. The difference in the continuity
R38 of care at baseline in favour of managed care decreased during follow-up because of
R39 improvements in protocolized and usual care.

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