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Factors that influence the intended intensity of diabetes care in a person-centred setting

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Abstract

Aims To assess the intended intensity of Type 2 diabetes care and the factors associated with that intensity of care after the annual monitoring visit in which a new person-centred diabetes consultation model including shared decision making was used.

Methods We conducted an observational study in 1284 people from 47 general practices and six hospital outpatient clinics. Intensity of care (more, no/minimal change, less) was based on monitoring frequency and referral to other care providers. We used multivariable analyses to determine the factors that were independently associated with intensity of care. Care providers also reported three factors which, in their opinion, determined the intensity of care.

Results After the consultation, 22.8% of people chose more intensive care, 70.6% chose no/minimal change and 6.6% chose less intensive care. Whether care became more intensive vs not/minimally changed was associated with a high educational level (odds ratio 1.65, CI 1.07 to 2.53; $P=0.023$), concern about illness (odds ratio 1.08; CI 1.00 to 1.17; $P=0.045$), goal-setting (odds ratio 6.53, CI 3.79 to 11.27; $P<0.001$), comorbidities (odds ratio 1.12, CI 1.00 to 1.24; $P=0.041$) and use of oral blood glucose lowering medication (odds ratio 0.59, CI 0.39 to 0.89; $P=0.011$). Less intensive care vs no/minimal change was associated with lower diabetes distress levels (odds ratio 0.87, CI 0.79 to 0.97; $P=0.009$). According to care providers, quality of life, lifestyle, person's preferences and motivation, glycaemic control, and selfmanagement possibilities most frequently determined the intended care.

Conclusions In person-centred diabetes care, the intended intensity of care was associated with both disease- and person-related factors.

Introduction

Many countries offer disease management programmes that may contribute to better healthcare for people with a chronic condition [1,2]. These programmes vary widely and consist of different types of interventions in different settings. Nowadays, disease management programmes tend to focus on realigning the care-giving process with person-centred care [3,4]. The American Diabetes Association (ADA), the European Association for the Study of Diabetes (EASD) and the UK-based National Institute for Health and Care Excellence (NICE) all emphasize the need for a person-centred approach that takes into account people's preferences, needs, values and self-management possibilities [5,6]. This type of approach is likely to improve the efficiency of diabetes care, for example, by increasing adherence to therapy [7,8].

To facilitate person-centred care, the Dutch Diabetes Federation introduced a consultation model which includes shared decision-making [9]. The model strongly resembles the ADA/EASD decision cycle for person-centred glycaemic management and has previously been shown to help physicians and nurses to gain insight into person- and disease-related factors that determine diabetes self-management and care needs [9,10]. Shared decisions regarding goals and treatment could be made for eight out of 10 people [9]; however, two important points remain unclear: 1) to what extent the use of the model results in different intensities of diabetes care, and 2) whether person-related factors are independently associated with the intensity of care after a person-centred consultation.

In the present study we aimed to assess a) the intended intensity of diabetes care, and b) the disease and person-related factors involved in a planned change after a person-centred annual monitoring visit.

What's new?

- Diabetes care organizations often state that a person's preferences, needs, values and self-management possibilities should be taken into account by care providers.
- After implementation of a person-centred diabetes consultation model, which included shared decision-making, the intended diabetes care for the upcoming year was heterogeneous and was associated with not only disease but also person-related factors, such as educational level, concern about illness, goal-setting and diabetes distress.
- Care providers should consider both disease- and person-related factors when making shared decisions regarding the intensity of the diabetes care.

Participants and methods

This observational study involved the voluntary participation of 47 general practices (57 general practitioners and 23 practice nurses) and six hospital outpatient clinics (17 medical specialists and eight diabetes specialist nurses). Our previous study showed that these diabetes care providers form a representative sample of healthcare providers [9]. Between November 2015 and February 2017, 2617 people aged ≥ 18 years, with Type 1 or Type 2 diabetes, and capable of filling out questionnaires supplied by their diabetes care provider were invited to participate. All participants were sent a letter explaining the consultation model or received that letter from their diabetes care provider a month before the annual check-up. In total, 1487 people agreed to participate, of whom 1366 had Type 2 diabetes [9].

Conversation model and its implementation

As described in our previous study [9], the conversation model consists of the following four steps. (1) With each individual, physicians and nurses discuss not only disease-related factors such as comorbidities, glycaemic control and medication use, but also person-related factors such as illness perceptions, preferences, self-management possibilities and the social context. The topics to be addressed will depend on the individual's personal circumstances and the conversation is not

protocolled. (2) Based on both disease and person-related factors, the individual and his or her healthcare provider set personalized goals. (3) Treatment options are discussed. (4) A decision is made regarding the type and extent of professional diabetes care for the coming year. Steps 2 to 4 are based on shared decision-making.

Participants were asked to prepare for the annual conversation by answering four questions: (1) Do you have health problems?; 2) Do you want to solve your health problems?; (3) How do you wish to do that?; and 4) What kind of support do you need? [9].

In the Netherlands, disease management programmes for Type 2 diabetes include monitoring four times a year, with standard check-ups of disease-related variables. According to guidelines from the Dutch College of General Practitioners, general practitioners are expected to provide a comprehensive annual monitoring visit [11]; however, many practice nurses take on this task.

Care providers used the consultation model during the annual diabetes check-up after having completed a training course consisting of two 2-h sessions. This training course included an introduction to the determinants of self-management, explanation about the use of the model, and how to manage disagreement with their patients regarding goals and treatment choices. Communication skills were taught through role playing [9].

Data collection and variables

Diabetes care provider questionnaire

Care providers completed an online questionnaire immediately after the consultation. The questionnaire included questions regarding the intended number of agreed monitoring visits to the general practice or hospital outpatient clinic by the patient (<4, 4 or >4 times a year) during the following year, and referral(s) to other healthcare providers such as other medical specialists, or a dietitian, physiotherapist, psychologist, podiatrist or lifestyle coach. Thereafter, they answered a question about the intended intensity of diabetes care for the next year: 'How does the intended extent and type of support for the year after this consultation compare to the support received in the past year?'. There were five possible responses: 1) 'more intensive in multiple aspects'; 2) 'more intensive in one specific aspect'; 3) 'no/minimal change'; 4) 'less intensive in one specific aspects'; or 5) 'less intensive in multiple aspects'.

Care providers were also asked if they had set goals together with the patient during the annual monitoring visit, a question that could be answered 'yes' or 'no'. Finally, the care providers were asked to choose three out of 20 factors that were, in their opinion, the most important factors determining the person's care needs (data subjectively measured). Twelve factors were person-related: age, educational level, ethnicity, stage of life, quality of life, lifestyle, pregnancy (or wish to become pregnant), illness perception, motivation, personal preference, self-management possibilities, and social context. Eight factors were disease-related and comprised diabetes control, cardiovascular risk factors, complications, comorbidities, disease duration, hereditary factors, medication use, and results of previous treatments.

Participant questionnaires

The participants with Type 2 diabetes completed a set of questionnaires prior to the consultation. These have been described previously [12]. In short, they covered:

- Sex, ethnicity, marital status, level of education, employment status, diabetes duration, alcohol use, comorbidities, and a statement on social support that read 'People around me support me when I have health-related problems'.
- The EuroQol 5D questionnaire (EQ-5D), which has a score range of -0.33 to 1.00, with a higher score indicating a better health status [13].

- The Audit of Diabetes-Dependent Quality of Life (ADDQoL), which has a score range of -9 to 3; a lower score represents a more negative influence of diabetes on quality of life [14].
- The Brief Illness Perception Questionnaire (BIPQ), which consists of the following items: consequence of the disease; timeline; personal control; treatment control; identity; concern about illness; coherence; and emotional representation. All dimensions were rated on a 0–10 scale. For example, when measuring control over your diabetes, 0 meant no control at all and 10 meant considerable control [15].
- The five-item Problem Areas In Diabetes scale (PAID-5), score range 0–20; a total score of ≥ 8 indicates severe diabetes-related distress [16].
- The Summary of Diabetes Self-Care Activities measure (SDSCA), score range 0–7, reflecting the number of days during the previous week in which a self-care activity has been carried out. We included general diet, physical exercise, blood glucose testing, foot care, and a question on smoking status, ‘Have you smoked cigarettes in the last 7 days?’, which could be answered ‘yes’ or ‘no’ [17,18].
- The Patient Activation Measure (PAM-13), for which the mean PAM-13 score was transformed into a score ranging from 0 to 100, a higher score reflecting higher activation [12,19].

Data on diabetes type, age, HbA_{1c}, LDL cholesterol, blood pressure and BMI were retrieved from people’s health records.

Statistical analysis

Continuous normally distributed data are presented as means with their standard deviation (SD), continuous non-normally distributed data as medians with their interquartile range 25–75% (IQR). Categorical data are presented as counts and percentages.

Because the numbers in some categories were very low, the question about ‘intended intensity of care’ was recoded into three categories; ‘more intensive’ (intensive on multiple parts or intensive on one specific part), ‘no/minimal change’ and ‘less intensive’ (less intensive on one specific part or less intensive on multiple parts). Whether people in each of these three categories differed with regard to disease and person-related factors was assessed by one-way ANOVA for normally distributed variables, while the Kruskal–Wallis test was used for ordinal and not normally distributed continuous variables and the chi-squared test for proportionate samples. If there was an overall statistically significant difference between the three groups, additional analyses were carried out for the ordinal variables (Mann–Whitney U-test) and the proportionate samples (chi-squared test) to assess among which groups the differences occurred. Significant differences between the more intensive vs no/minimal change groups and less intensive vs no/minimal change groups are reported.

Multivariable binary logistic regression analyses were used. We controlled for the disease and person-related factors that differed among the three intensity of care groups, the treatment setting of the participant (general practice or hospital outpatient clinic), the type of diabetes care provider (physician or nurse) and factors which were considered relevant based on the literature, i.e. educational level, ethnicity, illness duration, LDL cholesterol, systolic blood pressure and BMI [11,20–22].

Before performing multivariable regression analyses, missing data were imputed because they might otherwise lead to biased results. We generated five complete datasets using an iterative Markov chain Monte Carlo method [23]. The estimates are based on the pooled results of the separate analyses on the five imputed datasets.

Marital status was recoded into ‘married/cohabitating’ and ‘single’ (divorced, not or never married or widowed). Educational level was recoded into ‘low’ (no education, primary school only or lower vocational training), ‘intermediate’ (secondary school or middle vocational training) and ‘high’ (higher vocational training or university degree).

Participants who completed <10 items in the PAM-13 questionnaire or who answered all items with 'disagree strongly' or 'agree strongly' were excluded based on the Insignia Health guidelines [19].

Analyses were performed using SPSS version 23.0 (SPSS Inc., Chicago, IL, USA). A P value of <0.05 was considered significant.

Ethics

Ethical approval was not required after consultation with the Ethics Committee of the University Medical Centre Utrecht. Participants provided written informed consent.

Results

The question concerning the intensity of care was answered by physicians or nurses for 1284 of the 1366 participants. More intensive care was envisaged for 22.8% ($n=293$) and less intensive care for 6.6% ($n=84$) of the consultations. No/minimal change of care in the coming year was the chosen option for 70.6% ($n=907$).

[Table 1]

Table 1 shows the differences in person- and disease-related factors between the respective intensity of care groups. People in the more intensive vs no/minimal change group (Table 1) were younger (mean 64.3 vs 66.7 years; $P=0.001$), more often employed (34.5% vs 26.0%; $P=0.015$), indicated that the disease had a more negative impact on their quality of life (ADDQoL: median -0.51 vs -0.33 ; $P=0.002$), and/or had a higher level of diabetes distress (PAID: 4 vs 3; $P=0.004$). People in the more intensive group were more conscious about the consequences of the disease (4.7 vs 4.0; $P=0.001$), and/or felt less disease control (6.6 vs 6.9; $P=0.005$), and/or had more complaints (identity 4.0 vs 3.4; $P<0.001$) and/or more illness concern (5.3 vs 4.6; $P<0.001$). Living with diabetes had a higher emotional impact (emotional representation 3.8 vs 2.9; $P<0.001$) on them than on people in the no/minimal change group, and they had formulated goals with their physician or nurse during the consultation more often (94.5% vs 71.7%; $P<0.001$). Three disease-related factors also differed between the more intensive vs no/minimal change groups, namely HbA_{1c} [53 vs 51 mmol/mol (7.0% vs 6.8%); $P=0.030$], comorbidities (2 vs 1; $P=0.006$) and insulin use [33.4% vs 22.6%; $P<0.001$ (P values not shown in Table 1)].

The less intensive care group (Table 1) had a better reported health status (EQ-5D: median 1.00 vs 0.84; $P=0.015$), and/or had less diabetes distress (PAID: 1 vs 3, $P<0.001$) than the no/minimal change group. They experienced fewer consequences of the disease (mean 3.3 vs 4.0; $P=0.018$) and/or the disease had a lower emotional impact (emotional representation: 2.0 vs 2.9; $P=0.002$). Compared with the no/minimal change group, they more often experienced very poor social support (6.4% vs 1.6%; $P=0.015$). Their median HbA_{1c} was lower [49 vs 51 mmol/mol; $P=0.033$ (P values not shown in Table 1)].

Intended healthcare use

Table 2 shows the monitoring frequency and referrals to other healthcare providers for the three different intended intensity of care groups. People in the more intensive group more often had a planned monitoring frequency of >4 times in the coming year compared with the no/minimal change group (19.2% vs 1.6%; $P<0.001$), and they intended to be referred more often to a physiotherapist (11.6% vs 4.3%; $P<0.001$), dietitian (34.8% vs 15.2%; $P<0.001$), psychologist (5.1% vs 0.9%; $P<0.001$), or lifestyle coach [5.5% vs 1.4%; $P<0.001$ (P values not shown in Table 1)].

People in the less intensive group more frequently had a planned monitoring frequency of <4 times a year compared to those with no/minimal change (72.6% vs 18.4%; $P<0.001$), and/or would more often be referred to a psychologist [4.8% vs 0.9%; $P=0.014$ (P values not shown in Table 1)].

Factors mentioned by diabetes care providers that may influence the intended intensity of care

Diabetes care providers reported the factors that influenced intended care for the coming year in 1267 of the 1284 consultations (98.7%). Decisions on the intensity of diabetes care in all categories were most frequently influenced by the same six factors; people's quality of life, lifestyle, preferences, motivation, glycaemic control and self-management possibilities (Table 3).

Relationship between person and disease-related factors and intensity of care

Before imputation, 36.9% of the participants had missing values and in total 7.0% of all values were missing. After adjustment for confounders, the following person-related factors were associated with more intensive care: a higher educational level (odds ratio 1.65, CI 1.07 to 2.53; $P=0.023$), concern about illness and having set goals (odds ratio 6.53, CI 3.79 to 11.27; $P<0.001$). People with more intensive care vs no/minimal change were more likely to have illness concerns [odds ratio (OR) 1.08, CI 1.00 to 1.17; $P=0.045$]. Regarding disease-related factors, people with more comorbidities were more likely to plan more intensive care with their care provider (OR 1.12, CI 1.00 to 1.24; $P=0.041$) and individuals with oral blood glucose-lowering medication were less likely to do so (OR 0.59, CI 0.39 to 0.89; $P=0.011$). However, diabetes distress level was the only factor that was statistically significant in the multivariable model; the higher the distress level, the lower the chance that an individual would plan less intensive care in the year after the consultation (PAID: OR 0.87, CI 0.79 to 0.97; $P=0.009$).

[Table 2] [Table 3]

Using blood glucose lowering medication was associated with less intensive vs no/minimal change, although it was only statistically significant at a 10% level (Table 4).

Discussion

In the present study almost 30% of the participants with Type 2 diabetes changed the intensity of care after a person-centred annual monitoring visit. Shared decision-making that led to more intensive diabetes care was mostly associated with person-related factors including educational level, concern about illness, and goal-setting together with the care provider. Two disease-related factors that were associated with more intensive care were the number of comorbidities and the use of blood glucose-lowering medication. Individuals with the lowest diabetes distress level were more likely to choose, together with their care provider, less intensive diabetes care in the year after the consultation.

Higher education, concern about illness and setting goals were associated with a move towards more intensive care. Highly educated individuals may be better at articulating needs and negotiating treatment [24] and people's concerns may become apparent through discussion. Recognizing signs of diabetes distress, and evaluating and managing patient distress appropriately may prove to be the best overall investment of time when developing a long-term treatment plan for a patient [25]. Setting goals appears to be the single most important factor predicting more intensive treatment. It is possible that people are more likely to set goals when they are frequently confronted with person- and/or health-related problems needing professional support compared to people whose care underwent no or minimal change.

Using oral blood glucose-lowering medication was also associated with less intensive care, albeit at a lower significance level, which may have been attributable to the small number of people in the

less intensive group. This suggests that using blood glucose-lowering medication may be an important factor influencing the shared decision-making process, whatever that decision proves to be.

Diabetes care providers generally agreed on the importance of person-related factors in the decision-making process. Previous studies have mainly focused on person- and disease-related factors associated with the use of diabetes care but not with intensity of diabetes care [26]. Just one study has focused on the intensity of diabetes care [27], based on the number of contacts with the general practice and the referrals to other healthcare providers, but this was in the context of protocolled care based on the guidelines from the Dutch College of General Practitioners [11]. Although many disease-related factors were analysed, only age and type of blood glucose-lowering medication were associated with the intensity of care [27]. Another study showed that comorbidities and poor self-reported health influenced the degree of diabetes care [28]. More recently, a Dutch study in a conventional, strictly protocolled diabetes management setting concluded that BMI, HbA_{1c} and triglycerides, as well as people's quality of life, determined the diabetes care provided [29].

Many people arranged a monitoring frequency of <4 times per year, even in cases where their diabetes care provider labelled the change in diabetes care as 'no/minimal' and when provision of more intensive care was intended. This outcome could be attributable to errors in reporting the monitoring frequency by the care provider; however, change in the intensity of care did not only depend on monitoring frequency, but also on referral(s). Another explanation could be that the question regarding intensity of care did not include an option to respond with 'more intensive in some aspects but less intensive in others'. Despite these irregularities, the effectiveness of the regimen and care provision might be enhanced by individualizing the monitoring frequency [5]. In the Netherlands, diabetes care providers have no financial incentive to increase the intensity of care, as they receive a lump sum for their diabetes-related work; however, that lump sum can be reduced if the average number of monitoring visits decreases.

[Table 4]

HbA_{1c} levels differed in the univariable analysis between the three intensity groups but were not independently associated with the intensity of care. People treated in hospital outpatient clinics were more likely to receive more intensive care compared to those treated by general practitioners. This is not surprising because, in the Dutch healthcare system, individuals with more complex Type 2 diabetes are referred to hospital outpatient clinics [9], and it underlines the fact that the complexity of diabetes plays an important role in person-centred Type 2 diabetes management. Thus far, the present study supports the global plea for person-centred diabetes care, with the necessary emphasis on factors such as illness perception, personal wishes and preferences, diabetes distress and social support, all of which are evidence-based factors influencing diabetes self-management [30]. However, the interactional process of the physician and patient is often suboptimal, which may lead to a provider-driven consultation [31]. In our previous study, we in fact showed that consultations with a physician were significantly more likely to change compared to consultations with a nurse [9].

An important strength of the present study is the broad range of disease- and person-related factors assessed by validated questionnaires and by care providers' judgement. As the model was implemented in general practices as well as hospital outpatient clinics, we expect the findings to be generalizable to the Dutch healthcare system and to many other healthcare systems. Furthermore, our study population was similar to the one described in our previous study, which we showed was a representative sample of care providers and patients [9].

Some limitations should be considered. Firstly, the subjective character of the general question about the intended intensity of care; however, as confirmed by the healthcare provider, people who

opted for more intensive care in the coming year indeed showed a higher monitoring frequency and were more frequently referred. Secondly, many questions are used, and there are also multiple comparisons for each question. We made no adjustment for multiple comparisons because adjustment might lead to errors of interpretation related to our data not being random but actual 'observations in nature' [32]. Thirdly, as all data were observational we could not assess whether annual diabetes check-ups without use of the consultation model would have led to changes in intensity of care and thus could not derive causal inferences. A cluster randomized controlled trial would be required to answer this question.

In conclusion, the present study provided novel insights into the disease- and person-related factors that are relevant to the healthcare providers' decision-making process regarding the intensity of diabetes care in a person-centred setting.

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Competing interests

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Ethical approval

The study was approved by the Medical Ethics Committee of University Medical Centre Utrecht, Utrecht, the Netherlands, and informed consent was obtained from all participants. This research study was conducted in accordance with the guidelines of the Declaration of Helsinki.

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Tables

Table 1 Differences between the three intended intensity of care groups

Person-related factors	More intensive (group 1, n=293)		No/minimal change (group 2, n=907)		Less intensive (group 3, n=84)		P
	n		n		n		
Age, years Mean (sd)*	293	64.3 (9.3)	907	66.7 (9.8)	84	64.9 (9.9)	0.001
Median (IQR)	64	(58–70)	67	(61–74)	66	(57–71)	
Women, %	266	41.7	863	41.6	80	42.5	0.988
Ethnicity: white, %	266	93.2	860	92.3	80	97.5	0.220
Married or cohabitating, %	267	76.4	863	76.0	79	86.1	0.131
Educational level Low/Intermediate/High	263	29.3/46.4 /24.3	859	36.2/44.7 / 19.1	79	25.3/49.4/ 25.3	0.069
Employed*	258	34.5	836	26.0	80	32.5	0.020
Smoking habit, %	262	14.9	851	14.5	80	11.3	0.707
Alcohol consumption: yes, %	260	44.6	848	47.3	79	53.2	0.402
Mean (sd) PAM-13 total score†	250	58.0 (11.3)	788	58.9 (11.8)	74	61.9 (11.9)	0.039
SDSCA, mean (sd) days in last week							
General diet	248	4.6 (1.8)	796	4.7 (2.0)	79	5.0 (1.9)	0.138
Physical exercise	252	3.8 (2.1)	810	4.1 (1.9)	79	4.1 (1.9)	0.083
Blood glucose testing	242	1.7 (2.4)	767	1.3 (2.1)	74	1.4 (2.4)	0.050
Foot care	253	1.7 (2.2)	795	1.5 (2.0)	80	1.2 (1.7)	0.108
Median (IQR) EQ-5D score†‡	249	0.84 (0.78–1.00)	803	0.84 (0.78–1.00)	75	1.00 (0.81–1.00)	0.030
Median (IQR) ADDQoL score*†	258	−0.51 (−1.35– −0.13)	831	−0.33 (−1.13– −0.00)	80	−0.24 (−0.72– −0.01)	0.003
Median (IQR) PAID score**‡	259	4 (2–8)	843	3 (1–7)	80	1 (0–5)	<0.001
Mean (sd) BIPQ score Consequence**‡	262	4.7 (2.6)	839	4.0 (2.6)	79	3.3 (2.7)	<0.001
Timeline	254	8.5 (2.5)	823	8.5 (2.5)	74	8.2 (3.0)	0.906
Personal control*	262	6.6 (2.1)	838	6.9 (2.2)	79	6.8 (2.5)	0.018
Treatment control	256	7.5 (1.9)	832	7.5 (2.2)	79	7.3 (2.6)	0.670
Identity*†	262	4.0 (2.6)	839	3.4 (2.6)	79	2.8 (2.6)	<0.001
Illness concern**	262	5.3 (2.7)	841	4.6 (3.0)	79	4.0 (3.2)	<0.001
Coherence†	262	6.8 (2.2)	830	6.9 (2.3)	79	7.5 (1.8)	0.036
Emotional representation**	262	3.8 (3.1)	838	2.9 (2.8)	79	2.0 (2.6)	<0.001
Social support†‡, %	253		828		78		0.013
Very good		26.1		24.2		28.2	0.640
Good		66.8		68.6		62.8	0.537
Poor		6.7		5.7		2.6	0.383
Very poor†‡		0.4		1.6		6.4	0.002
Care provider who set goals with the patient*†, %	293	94.5	905	71.7	83	75.9	<0.001
Disease-related factors							
Median (IQR) HbA _{1c} **‡	282		867		82		0.006
mmol/mol		53 (46–62)		51 (46–57)		49 (44–55)	
%		7.0 (6.4–7.8)		6.8 (6.4–7.4)		6.6 (6.2–7.2)	
Mean (sd) SBP, mmHg,	278	136.5 (16.9)	866	136.3 (15.0)	81	136.7 (16.1)	0.953
Median (IQR) LDL cholesterol, mmol/l	269	2.3 (1.8–3.0)	854	2.3 (1.8–2.8)	81	2.1 (1.8–2.7)	0.183
Median (IQR) BMI, kg/m ³	280	30.2 (27.0–33.6)	864	29.2 (26.3–33.0)	81	29.4 (26.5–32.8)	0.171
Median (IQR) number of comorbidities*	261	2 (1–3)	847	1 (0–3)	79	1 (1–2)	0.020
Median (IQR) illness duration, years	254	9 (5–15)	832	10 (5–16)	77	7 (4–14)	0.482
Blood glucose-lowering medication*‡, %	293		907		84		0.002
No medication		19.8		18.3		26.2	0.203
Oral medication*		46.8		59.1		51.2	0.001
Oral medication with insulin/insulin only*		33.4		22.6		22.6	0.001
Lipid-lowering medication, %	292	76.0	907	78.4	84	82.1	0.454
Blood pressure-lowering medication, %	293	77.1	907	77.3	84	72.6	0.621

ADDQoL, Audit of Diabetes Dependent Quality of Life; BIPQ, Brief Illness Perception Questionnaire; EQ-5D, EuroQol 5D (general health status); HbA_{1c}, glycated haemoglobin; PAID, Problem Areas In Diabetes Scale (diabetes distress); PAM-13, Patient Activation Measure; SBP, systolic blood pressure; SDSCA, Summary of Diabetes Self-Care Activities Measure. *Groups 1 and 2 differed significantly (P<0.05). †Groups 1 and 3 differed significantly (P<0.05). ‡Groups 2 and 3 differed significantly (P<0.05).

Table 2 Differences between the three intensity of care groups in the intended healthcare support for the year after the person-centred annual check-up

	More intensive, % ;Group 1 (n=293)		No/minimal change, % Group 2 (n=907)		Less intensive, % Group 3 (n=84)		P
	n		n		n		
Intended monitoring frequency in the upcoming year**‡	291		903		84		<0.001
<4 times		17.9		18.4		72.6	
4 times		62.9		80.1		27.4	
>4 times		19.2		1.6		-	
Referral to other healthcare providers in the next year	293		907		84		
Another physician		17.1		13.9		11.9	0.319
Physiotherapist*		11.6		4.3		4.8	<0.001
Dietician**†		34.8		15.2		10.7	<0.001
Psychologist**‡		5.1		0.9		4.8	<0.001
Podiatrist		4.1		5.2		6.0	0.694
Lifestyle coach**†		5.5		1.4		1.2	<0.001
Setting*	293		907		84		<0.001
General practice		81.9		90.8		88.1	
Hospital outpatient clinics		18.1		9.2		11.9	

*Groups 1 and 2 differed significantly (P<0.05). †Groups 1 and 3 differed significantly (P<0.05). ‡Groups 2 and 3 differed significantly (P<0.05).

Table 3 Factors, mentioned by the diabetes care provider after every consultation, that influence the decision regarding intended care in the three intensity of care groups

Factors*	More intensive (n=293)		No/minimal change (n=907)		Less intensive (n=84)	
	n	%	n	%	n	%
Person-related factors						
Age	10	3.4	59	6.5	4	4.8
Educational level	14	4.8	50	5.5	5	6.0
Ethnicity	-	-	4	0.4	-	-
Stage of life	18	6.1	45	5.0	2	2.4
Quality of life	55	18.8	177	19.5	18	21.4
Lifestyle	86	29.4	204	22.5	18	21.4
Pregnancy(wish)	1	0.3	0	0	-	-
Illness perception	30	10.2	66	7.3	8	9.5
Motivation	98	33.4	317	35.0	22	26.2
People's preference	102	34.8	390	43.0	40	47.6
Self-management possibilities	101	34.5	255	28.1	38	45.2
Social context	38	13.0	120	13.2	9	10.7
Disease-related factors						
Diabetes control	89	30.4	310	34.2	35	41.7
Cardiovascular risk factors	32	10.9	87	9.6	4	4.8
Complications	31	10.6	62	6.8	2	2.4
Comorbidities	43	14.7	85	9.4	5	6.0
Disease duration	8	2.7	33	3.6	7	8.3
Hereditary factors	-	-	11	1.2	1	1.2
Medication use	25	8.5	50	5.5	4	4.8
Results of previous treatments	26	8.9	55	6.1	10	11.9

Bold values represent the six most commonly mentioned factors.*Three factors could be mentioned per consultation; a total of 3432 factors were mentioned in 1,267 (98.7%) of the 1284 consultations

Table 4 Person- and disease-related factors associated with the intended intensity of care, adjusted for diabetes care setting and diabetes care provider

	More intensive (vs no/minimal change; n=293 vs 907)			Less intensive (vs no/minimal change; n=84 vs 907)		
	OR	95% CI OR	P	OR	95% CI OR	P
Age (years)	0.99	0.97 to 1.01	0.223	0.98	0.95 to 1.01	0.284
Ethnicity: white	1.33	0.65 to 2.73	0.417	2.53	0.54 to 11.86	0.230
Educational level						
Low (reference)						
Intermediate	1.28	0.89 to 1.86	0.187	1.30	0.71 to 2.37	0.402
High	1.65	1.07 to 2.53	0.023	1.47	0.72 to 2.99	0.293
Having a job	1.26	0.81 to 1.96	0.302	1.25	0.66 to 2.36	0.501
PAM total	1.00	0.98 to 1.01	0.482	1.01	0.99 to 1.04	0.277
EQ-5D total	0.63	0.31 to 1.30	0.211	0.61	0.17 to 2.16	0.443
ADDQoL total	1.03	0.85 to 1.25	0.765	0.85	0.60 to 1.21	0.367
Paid total	0.96	0.91 to 1.02	0.195	0.87	0.79 to 0.97	0.009
IPQ						
Consequence	1.02	0.93 to 1.11	0.690	0.94	0.82 to 1.09	0.414
Personal control	0.94	0.86 to 1.04	0.211	0.93	0.83 to 1.04	0.200
Identity	1.01	0.92 to 1.11	0.824	0.99	0.84 to 1.15	0.850
Illness concern	1.08	1.00 to 1.17	0.045	1.06	0.95 to 1.18	0.294
Coherence	0.96	0.89 to 1.04	0.332	1.14	1.00 to 1.31	0.056
Emotional representation	1.07	1.00 to 1.15	0.054	0.95	0.82 to 1.10	0.451
Social support						
Poor/very poor (reference)						
Good	0.99	0.51 to 1.91	0.969	0.66	0.23 to 1.90	0.437
Very good	0.90	0.50 to 1.64	0.735	0.70	0.27 to 1.81	0.449
Care provider who set goals with the patient (yes vs no)	6.53	3.79 to 11.27	<0.001	1.13	0.64 to 1.97	0.680
HbA _{1c} (mmol/mol)	1.02	1.00 to 1.03	0.073	0.99	0.96 to 1.02	0.502
SBP (mmHg)	1.00	0.99 to 1.01	0.740	1.01	0.99 to 1.02	0.420
LDL cholesterol (mmol/mol)	1.05	0.89 to 1.25	0.565	0.76	0.56 to 1.03	0.080
BMI (kg/m ³)	0.99	0.96 to 1.02	0.450	1.00	0.95 to 1.05	0.917
Number of comorbidities	1.12	1.00 to 1.24	0.041	1.11	0.94 to 1.32	0.233
Illness duration	1.00	0.97 to 1.02	0.661	0.99	0.95 to 1.03	0.697
Blood glucose-lowering medication						
No medication (reference)						
Oral medication only	0.59	0.39 to 0.89	0.011	0.59	0.33 to 1.08	0.090
Oral medication with insulin or insulin only	0.93	0.53 to 1.62	0.786	0.75	0.30 to 1.84	0.523

ADDQoL, Audit of Diabetes Dependent Quality of Life; BIPQ, Brief Illness Perception Questionnaire; EQ-5D: EuroQol 5D (general health status); HbA_{1c}, glycated haemoglobin; OR, odds ratio; PAID, Problem Areas In Diabetes Scale (diabetes distress); PAM-13, Patient Activation Measure; SBP, systolic blood pressure; SDSCA: Summary of Diabetes Self-Care Activities Measure.
Significant difference: P<0.05.