

# Culture-specific diabetes care for Surinam South Asians with a low socio-economic position: who benefits?

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## Abstract

The South Asians in The Netherlands have a high diabetes prevalence in combination with a low socio-economic position. A new, culture-specific type of care was developed. This intervention study investigates which patient characteristics are associated with success and whether those in the lowest socio-economic position have been reached. Before and after the end of the intensive guidance, the HbA<sub>1c</sub> of the patients ( $n = 101$ ) was measured. The following variables were significantly related to success (defined as a decrease in HbA<sub>1c</sub>  $\geq 0.8\%$ ): a high initial HbA<sub>1c</sub>, a low BMI and presence of complications. The average improvement in HbA<sub>1c</sub> was significant only in the group with a higher socio-economic position. Although the patients with the lowest socio-economic position did not sufficiently benefit from this intervention, an overall improvement was achieved in this poorly educated study population. The further improvements in the care after the completion of this study should be evaluated.

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## 1. Introduction

By far the most South Asian inhabitants of The Hague are immigrants from Surinam, a former Dutch colony in South America. About a century ago their ancestors came from the Indian sub-continent to Surinam as contract labourers, employed by the colonists after the abolishment of slavery. Mainly after the independence of Surinam (1975) and the subsequent politically troublesome years, many people from Surinam came to The Netherlands. They represent various ethnic groups, including African, South Asian, Chinese and Indonesian. For some unknown reason, a large majority of the South Asians settled in The Hague. Approximately 75% of the Surinam inhabitants of the city are South Asians.

Until recently, no culture-specific diabetes care was provided for South Asian Surinam patients living in The Netherlands. In view of the high prevalence of diabetes in this population [1], there was an urgent need to fill this gap. Within the framework of a joint project carried out by Home Care and the Municipal Health Service in The Hague, two South Asian dietary experts developed a new type of care [2]. It

was expected that this provision would be of most benefit to the patients who had the poorest proficiency in Dutch and the lowest level of education. It is this specific category of patients who are, in any case, the most detached from the normal care that is provided for the general population.

Illiteracy is fairly common among the older South Asian patients and this was taken into account in the development of the materials to be used in the new type of care. For instance, the patients took home an audio-cassette, on which general diabetes information was recorded in Sarnami, the Surinam South Asian language. This included a description of the profile of the disease, the causes, the treatment, the complications and how to avoid them, the importance of compliance with the therapy and social acceptance of the guidelines for diabetes patients (in particular in the direct environment of the patient). The new type of care was provided by specialist nurses and dieticians who had received specific training, focusing on the South Asian cultural and culinary traditions. In addition to the audio-cassette, the nurses also provided the patients with a dietary information booklet, adapted to Surinam South Asian cookery and a carbohydrate variation list containing South Asian dishes and products.

The effectiveness of this intervention has been studied in a Randomised Controlled Trial. In the study, the metabolic control of the intervention patients was compared with the

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metabolic control of (waiting list) control patients. Although the improvement was modest, the difference between intervention patients and controls was significant ( $P = 0.02$ ), justifying the conclusion of a significant improvement in metabolic control among the intervention patients. An explanation for this success should probably be sought in an improvement in the inter-action between care-providers and patients [3].

Subsequently, the waiting list controls were also given the opportunity to participate in the intervention and data on their metabolic control before and after the intervention were recorded. In the present study the data of both sub-groups have been combined. This study addresses the following two research questions:

1. Which patient's characteristics are associated with a greater chance of success of the intervention?
2. Do patients with the lowest socio-economic position, indeed, benefit most from the intervention?

## 2. Methods

The study was carried out among the Surinam South Asian diabetes patients in general practices (a total of eight general practitioners (GPs)) located in different under-privileged districts of The Hague and in the diabetes polyclinic of the inner-city hospital in The Hague. Included in the study were all patients ( $n = 104$ ) who in 1998, after referral by their GP or internist, visited the diabetes nurse for the first time.

The degree of success of the intervention was based on the degree of improvement in glycaemic control, reflected by a decrease in HbA1c. The HbA1c was measured during the first consultation with the diabetes nurse ( $t_0$ ) and at the end of the 3 months of intensive guidance provided by the nurse and the dietician ( $t_1$ ). If the patient dropped out before the end of the intervention and therefore there was no HbA1c measurement at  $t_1$ , this was scored as 'unsuccessful', unless the initial HbA1c was less than 7%. In the latter case, the patient was not included in the analysis. The cut-off point of the change in HbA1c was determined in such a way that 25% of the patients were scored as 'successful' and 75% as 'unsuccessful', which implies a limit of 0.8% improvement in HbA1c.

At  $t_0$ , the following variables were also recorded for all patients:

- age;
- gender;
- marital status;
- Body Mass Index (BMI);
- presence of diabetes complications (cardiovascular diseases, micro-albuminuria, nephropathy, retinopathy, neuropathy, diabetes foot);
- present duration of the diabetes; and
- any possible family history of diabetes mellitus and/or cardiovascular diseases.

A number of other variables indicating the socio-economic position and/or the degree of integration in the Dutch society were also recorded:

- level of education;
- reading ability;
- proficiency in Dutch; and
- length of stay in The Netherlands.

For the analysis, certain categorical variables were dichotomised, due to the small number included in one category.

To answer the first research question, the Odds Ratios (ORs) for 'success' of all the above-mentioned variables were univariately calculated with the corresponding  $P$ -value. The variables with a statistically significant OR ( $P < 0.05$ ), plus the variables of age and gender were entered in a (multivariate) logistic model. Subsequently the likelihood ratio test was applied to determine whether the inclusion of any of the other variables would make a significant contribution to the predictive value of the model. Variables without a significant contribution were not included in the final logistic model. Thus, for the variables that were finally included in the logistic model, the ORs were calculated, adjusted for the influence of the other included variables.

To answer the second research question, logistic regression was also applied to investigate the relationship of the socio-economic and integration variables with 'success'. This analysis was performed for each of these (four) variables separately: at first univariately and subsequently also after adjustment for all variables that were included in the above-mentioned final logistic model.

With regard to the socio-economic and integration variables, a stratified analysis (applying the  $t$ -test) was also performed, in which the cut-off point for the continuous variable 'length of stay in The Netherlands' was determined in such a way that 25% of the patients would be included in the group with the shortest length of stay.

## 3. Results

Of the 104 patients included in the study, three were not included in the analysis, due to premature drop-out with an initial HbA1c of less than 7%. For 89 of the remaining 101 patients, both the  $t_0$  and the  $t_1$  HbA1c measurements were available. Of these 89 patients, 26 had a decrease in HbA1c of at least 0.8% ('successful') and 63 either had a decrease in HbA1c of less than 0.8% or an increase in HbA1c ('unsuccessful'). The other 12 patients were also scored as 'unsuccessful', due to premature drop-out with an initial HbA1c of 7% or higher.

The average age of the patients was 53.2 years. Table 1 presents some relevant characteristics of the 46 male and 55 female patients. Males were somewhat younger, more often had diabetes complications, were thinner and had higher HbA1c levels both before and after the intervention.

Table 1  
Comparison between male and female patients with regard to certain variables

Variable	Males ( <i>n</i> = 46)	Females ( <i>n</i> = 55)
Average age (in years)	52.7	53.7
Presence of at least one diabetes complication at <i>t</i> <sub>0</sub> (%)	41	17
Average BMI at <i>t</i> <sub>0</sub> (kg/m <sup>2</sup> )	26.0	29.2
Average HbA1c value at <i>t</i> <sub>0</sub> (%)	8.73	8.21
Average HbA1c value at <i>t</i> <sub>1</sub> (%)	8.29	7.94

Of the 84 patients whose level of education was known, 70 (83%) had achieved a maximum of lower vocational education.

The first section of Table 2 presents the ORs with a *P*-value of less than 0.05 in the univariate analysis (presence of diabetes complications, BMI and HbA1c at *t*<sub>0</sub>), plus those for age and gender. On inclusion, no other variable was found to make any significant contribution to the predictive value of the model (likelihood ratio test). In the rest of this article these five variables (included in the first section of Table 2) will be referred to as ‘the variables in the logistic model’. A greater chance of success was found among the men, when no diabetes complications were present at *t*<sub>0</sub>, the BMI was low and the initial HbA1c was high.

In view of the fact that inclusion in this study took place at the moment when the patient visited the nurse and in combination with the fact that there were nine lesser men than women included, there is a possibility of self-selection (asymmetrically between men and women). Therefore, the OR for gender (0.16, see Table 2) was also calculated for the hypothetical situation that nine more ‘unsuccessful’ men had been included. The result was not very different (OR = 0.21; *P* = 0.003, data not shown).

As could be expected in this context, the average initial HbA1c of patients with a minimum of one diabetes complication was higher than that of patients with no complications (9.2% versus 8.0%; *P* = 0.005, data not shown).

Adjustment for the socio-economic and integration variables had very little influence on the OR for gender (OR = 0.15; *P* = 0.002, data not shown). The OR for gender was higher and no longer significant after adjustment for the influence of the other variables in the logistic model (OR = 0.49; *P* = 0.28, see Table 2). This is in agreement with the finding that the initial HbA1c was higher among men than among women, the average BMI was lower and the percentage with at least one diabetes complication was higher (see Table 1). Adding the variable ‘partner yes/no’ to the model had no influence worth mentioning on the OR for gender, not even when the inter-action between gender and the variable ‘partner yes/no’ was included in the model (data not shown). The last two lines of Table 1 show that, although the decrease in HbA1c was greater among men than among women, the average HbA1c of the men at *t*<sub>1</sub> was still higher than that of the women at *t*<sub>0</sub>.

The lowest section of Table 2 shows the ORs for the chance of success of the socio-economic and integration variables. All point estimates are greater than one, indicating that a higher score of these variables is related with a greater chance of success. However, none of these ORs differ significantly from one. Adjustment for the variables in the logistic model (right two columns) does not essentially change the picture.

The size of the point estimates for the ORs of the socio-economic and integration variables gives rise to the question of whether the intervention was successful for the patients with an unfavourable score on these variables. Therefore, within the group of patients (*n* = 89) whose HbA1c measurements at *t*<sub>0</sub> and at *t*<sub>1</sub> were known, an analysis was performed to investigate what change there was in the HbA1c between *t*<sub>0</sub> and *t*<sub>1</sub> in sub-groups with a different socio-economic position and/or degree of integration in the Dutch society. Table 3 presents the results of this analysis. In each case the initial HbA1c is lower in the sub-group with the highest socio-economic score. The point estimates show that the HbA1c decreased in all sub-groups. The decrease is significant (about 0.4%) for the sub-groups with

Table 2  
Odds Ratios for the chance of success of the variables in the logistic model and of the socio-economic and integration variables; before and after adjustment for the variables in the logistic model (*n* = 101)

Variable	Before adjustment		After adjustment	
	OR	95% CI	OR	95% CI
Variables in the logistic model				
Age (in years)	0.99	0.95–1.04	1.00	0.94–1.07
Gender (M = 0, F = 1)	0.16	0.06–0.45	0.49	0.14–1.77
Presence of diabetes complications at <i>t</i> <sub>0</sub> (no = 0, yes = 1)	5.15	1.79–14.81	3.06	0.86–10.91
BMI at <i>t</i> <sub>0</sub> (kg/m <sup>2</sup> )	0.82	0.72–0.94	0.83	0.70–0.99
HbA1c at <i>t</i> <sub>0</sub> (%)	1.52	1.16–1.98	1.61	1.13–2.29
Socio-economic and integration variables				
Level of education (<elementary education = 0, ≥elementary education = 1)	2.82	0.87–9.15	1.97	0.39–10.10
Reading ability (poor/moderate = 0, good = 1)	1.24	0.49–3.12	1.20	0.33–4.35
Proficiency in Dutch (poor/moderate = 0, good = 1)	1.81	0.61–5.42	2.14	0.44–10.39
Length of stay in The Netherlands (in years)	1.06	0.99–1.13	1.02	0.92–1.13

Table 3

Average improvement in HbA1c for sub-groups with a different socio-economic position and/or a different degree of integration in the Dutch society

Sub-group		<i>n</i>	Average HbA1c at <i>t</i> <sub>0</sub> (%)	Average HbA1c at <i>t</i> <sub>1</sub> (%)	Average improvement in HbA1c (%)	<i>P</i> -value <sup>a</sup>
Level of education	≥Elementary education	58	8.37	7.99	0.38	0.004
	<Elementary education	26	8.41	8.28	0.13	0.49
Reading ability	Good	47	8.31	7.90	0.41	0.001
	Moderate/poor	39	8.53	8.38	0.15	0.40
Proficiency in Dutch	Good	63	8.39	7.99	0.39	0.001
	Moderate/poor	24	8.45	8.38	0.07	0.75
Length of stay in The Netherlands (years)	≥17	65	8.37	8.00	0.37	0.001
	<17	22	8.55	8.47	0.07	0.77

<sup>a</sup> *t*-test.

the more favourable score on the socio-economic and integration variables and not significant (about 0.1%) in the other sub-groups.

#### 4. Conclusion and discussion

There was no support for the assumption that the patients with the lowest socio-economic position and the lowest degree of integration would benefit most from the intervention. The relevant ORs rather suggest the opposite picture. Moreover, the average improvement in HbA1c was significant only in the group with a higher socio-economic position.

##### 4.1. Discussion

It is debatable whether in this study population the 'length of stay in The Netherlands' can be considered as a good indication of the degree of integration. Assuming that integration mainly takes place in the first years, the vast majority of the patients had already reached a stable stage. However, limiting the analysis to patients who had only been in the country for a very short time resulted in an insufficient number of patients to make the analysis worthwhile.

Men have benefited more from the intervention than women. This difference is mainly explained by the fact that the men were thinner, they more often had a minimum of one diabetes complication and on average they had a higher initial HbA1c. These three variables show a strong relationship with the chance of success. After controlling for the influence of these variables, the difference between the genders is no longer significant.

The chance of success increases with a higher initial HbA1c. This is obvious, because with a low initial value for this parameter an improvement of 0.8% is naturally more difficult to achieve. Moreover, high initial HbA1c levels tend to decrease and low initial levels tend to increase, in connection with regression to the mean.

The presence of complications increases the chance of success. This can be associated with the role that this infor-

mation plays in the guidance provided by the nurse and the dietician and the threat that the patient feels as a result.

A high BMI is associated with insulin resistance [4,5]. As a result, it is well possible that in obese patients—even if the intervention has led to a significant improvement in compliance with the therapy—the glycaemic control does not improve. This could explain why the intervention was more successful in patients with a low BMI. On the other hand, it could be expected that patients with a high initial BMI would become slimmer during the intervention and thus achieve an improvement in their glycaemic control. During the intervention period, however, no significant decrease in the average BMI was achieved [3].

The average HbA1c values at *t*<sub>1</sub> were relatively high for both men and women. Although it is doubted whether strict glycaemic control has more advantages than disadvantages [6,7], possibly depending on the medication that is prescribed [8–12], there are many indications that poor or moderate glycaemic control in patients with diabetes is associated with an increased cardiovascular risk, in particular of developing microvascular complications [6,13–16]. South Asian patients with diabetes more often develop complications than European patients [17–21]. In the patient population of the present study, complications were also very frequently reported. Taking all these considerations into account, it is doubtful whether sufficient improvement in HbA1c has been achieved.

Various studies have reported problems in providing adequate diabetes education and glycaemic control for patients with a low level of education or patients who otherwise have a low socio-economic position [22–32]. In the present intervention study, too, the greatest difficulty was encountered in reaching the patients with the lowest level of education and those patients who were least integrated in the Dutch society. Maybe adding a more behaviour oriented approach would contribute to a more successful intervention. Much stress on a cognitive approach is probably not appropriate for illiterate and poorly educated people.

Nevertheless, it can be concluded that the intervention was successful in achieving a significant improvement in glycaemic control in a population with a low average socio-economic position.

#### 4.2. Practice implications

The use of culture-specific education materials by care-providers should be encouraged. However, with the new type of care evaluated by this study, the patients with the lowest level of education and/or integration have not been reached.

During the intervention, for the purpose of evaluation, telephone interviews were held with 15 participating patients and nine participating care-providers. As a result, the care has been adjusted, among other things by introducing a booklet containing photographs to illustrate the dietary information for (illiterate) South Asian patients with diabetes, the use of a video-recording for patient education and a brochure that can be given to the patients, in which the most important information is illustrated with pictures from the video-recording [33]. Re-evaluation, if possible including a greater number of patients, would make it clear whether these improvements have increased the success of the intervention.

Even so, the intervention is restricted to a mainly cognitive approach. In order to influence patients behaviour, one should involve the social context. Food habits and physical exercise, for example, probably only can be influenced when the general population (patients and non-patients) are involved. Hence, a collective preventive campaign aimed at the total South Asian population may offer a better approach for a successful treatment of South Asian diabetes patients.

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