

The determinants of using Digital Health Solutions in people living with type 1 and type 2 diabetes in France



Paco Cerletti¹, Julie Laurent², Norbert Hermanns³

¹Roche Diagnostics, Basel, Switzerland ;

²Careny, Paris, France

³FIDAM - Research Institute Diabetes-Academy & Diabetes Centre Mergentheim, Bad Mergentheim, Germany

Background & Aims

Digital Health Solutions (DHS) bear great potential to support People with Diabetes (PwD) in their daily diabetes management aiming to lower their diabetes distress and increase quality of life¹. However, there is still lacking and controversial evidence around the determinants of using DHS, specifically involving the direct perspective of PwD. Patient-centricity has gained vast importance due to the misalignment on what patients deem important for their disease management and the data collected and reported². In this study, we integrated the perspective of PwD in assessing DHS use and potential determinants in a French cohort using a patient-centered cross-sectional survey.

Material & Methods

We conducted this survey from April to July 2022 including 280 PwD (T1D n=130; T2D; n=150) living in France. A three-step process was applied to develop the survey and identify relevant outcome themes to PwD. After an initial literature review, PwD and representatives of diabetes advocacy organizations were engaged through workshops, individual meetings and virtual collaboration. The survey was then finalized after a cognitive debriefing with a separate group of PwD to test for coherence and acceptability. Together with PwD, we created three categories of DHS, aiming to cover most existing solutions in the market as following: (1) DHS to access general information, education, and support related to your health and your diabetes; (2) DHS to collect and use your own health data to help with daily self-management; (3) DHS to obtain remote care and share information between you and your health care professionals. Selected potential determinants for using DHS were age, sex, diabetes type, duration, health status, glucose monitoring, treatment regimen and comorbidities. The sample was weighted according to the age distribution of the French population (INSEE Report 2021) to increase the representativeness of the sample. Multiple logistic regression models were performed to test the association of the predictor variables and the usage of DHS.

Results

The sample characteristics are described in table 1. Figure 1 shows that information solutions were most commonly used (53%), compared to self-management solutions (46%) or remote care solutions (35%). There was no big difference between diabetes types. Results in Figure 2 suggest that the usage of information solutions (1) was significantly associated with the good perceived health status with an odds ratio of 0.76 (95%CI: 0.58; 0.98, p = 0.04). Starting from very good health, the likelihood of using such health solutions decreased by 24% with each decrease in the health assessment (very good, good, medium, poor health). The likelihood of using self-management solutions (2) was significantly increased by 29% in people on intensified insulin therapy but decreased by 30% when complications occurred. The use of remote management solutions (3) was also significantly increased by 27 % with intensified insulin therapy and by 9 % per 5 years of diabetes duration.

Table 1: Sample characteristics

Characteristic	All N=280	Type 1 Diabetes N=149	Type 2 Diabetes N=131	p	
Age group:					
18 - 35 years, n (%)	17 (6,1)	15 (10,1)	2 (1,5)	< 0.001	
36 - 45 years, n (%)	21 (7,5)	16 (10,7)	5 (3,8)		
46 - 60 years, n (%)	98 (35,0)	61 (40,9)	37 (28,2)		
>60 years, n (%)	144 (51,4)	57 (38,3)	87 (66,4)		
Diabetes duration					
< 1 year, n (%)	6 (2,1)	6 (4,0)	0 (0,0)	< 0.001	
1 - 4 years, n (%)	25 (8,9)	9 (6,0)	16 (12,2)		
4 - 9 years, n (%)	38 (13,6)	11 (7,4)	27 (20,6)		
≥ 10 years, n (%)	211 (75,4)	123 (82,6)	88 (67,2)		
Sex					
Female, n (%)	147 (52,5)	86 (57,7)	61 (46,6)	0.100	
Male, n (%)	132 (47,1)	62 (41,6)	70 (53,4)		
No binary, n(%)	1 (0,3)	1 (0,7)	0 (0)		
Paid 5- score, mean (SD)	11,0 (±4,5)	11,3 (±4,6)	10,6 (4,4)		
Treatment					
No treatment, n (%)	3 (1,1)	0 (0,0)	3 (1,1)	<.001	
Lifestyle, n (%)	49 (17,5)	10 (6,7)	39(29,8)		
Oral medication, n(%)	77 (27,5)	17 (11,4)	60 (45,8)		
GLP	5 (1,8)	1 (0,7)	4 (3,1)		
Insulin via Pen, n (%)	76 (27,1)	60 (40,6)	16 (12,2)		
Insulin Pump, n (%)	60 (21,4)	53 (35,6)	7 (5,3)		
Automatic Insulin Delivery, n (%)	10 (3,6)	8 (5,4)	2 (1,5)		
Perceived health status					
Excellent	5 (3,4)	5 (3,4)	0 (0,0)		0.011
Very good	31 (11,1)	22 (14,8)	9 (6,9)		
Good	137(48,9)	76 (51,0)	61 (46,6)		
Intermediate	75(26,8)	32(21,5)	43(32,8)		
Poor	32 (11,4)	14 (9,4)	18 (13,7)		
Number of Complications					
No	180 (64,3)	110 (61,1)	70 (53,4)	<.001	
At least 1 complication	65 (23,2)	21 (32,3)	44 (33,6)		
> than 1 complication	35 (12,5)	18 (12,1)	17 (13,0)		

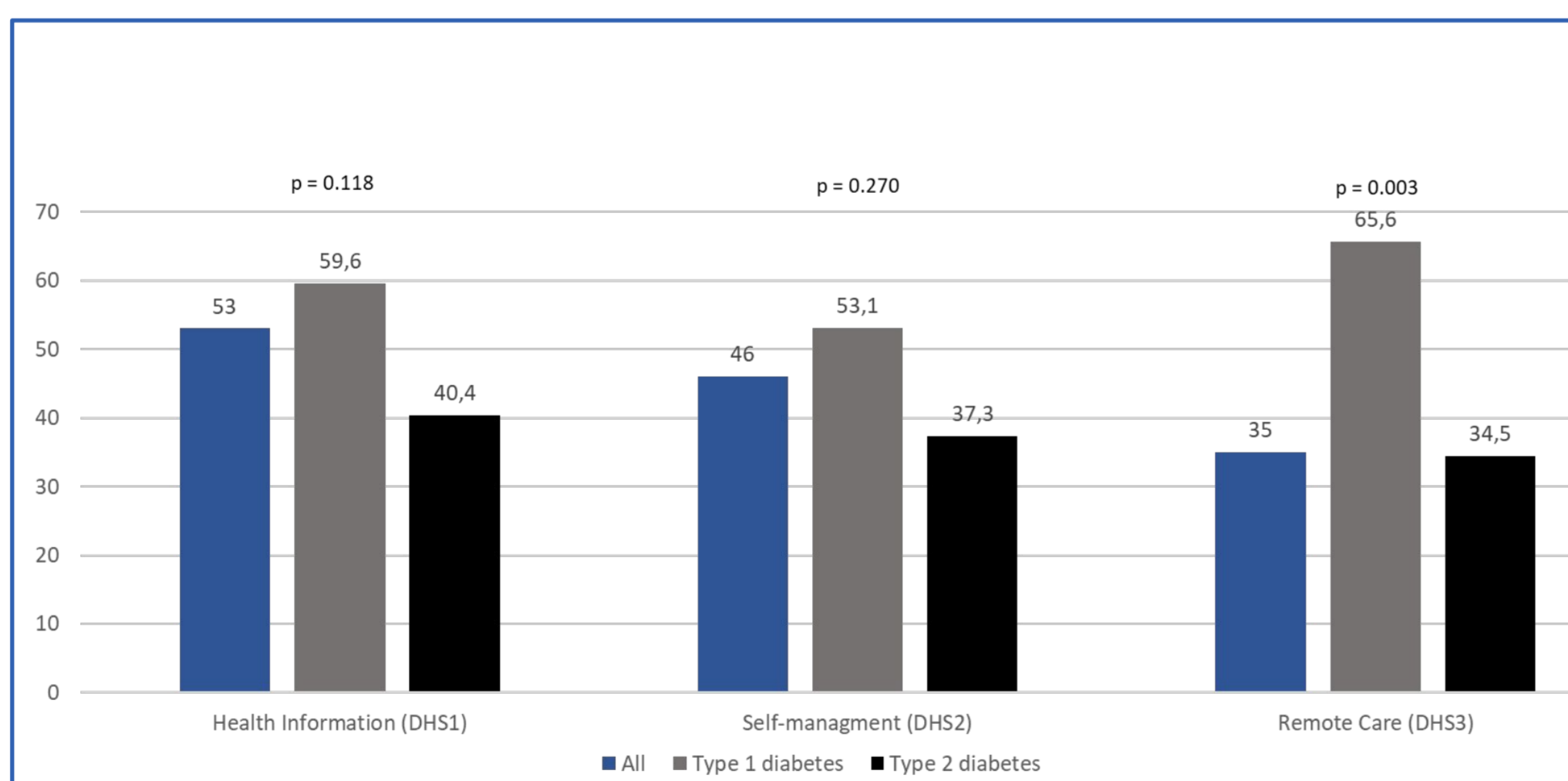


Figure 1: Use of digital health in people with type 1 and type 2 diabetes

Together with people with diabetes, possible reasons for not using these digital health solutions were collected and presented to the study sample. Figures 3 a-c show how users and non-users differ in their assessment of such barriers. People who are not using digital health information fear information overload more frequently or feel overwhelmed by diabetes demands. People who do not use digital health information are more likely to fear information overload or feel overwhelmed by the demands of diabetes.

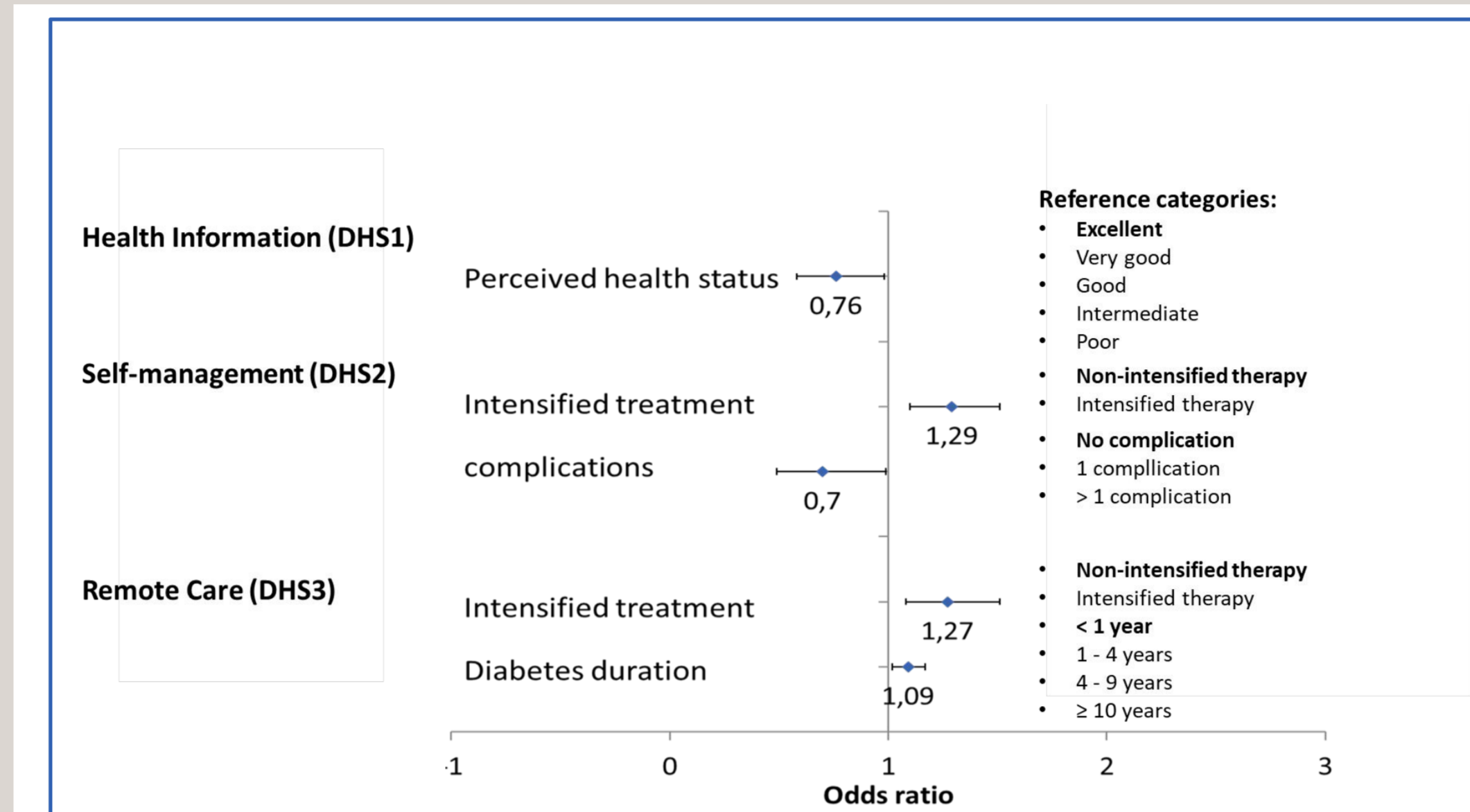


Figure 2: Medical and psychosocial predictors of using digital health solutions

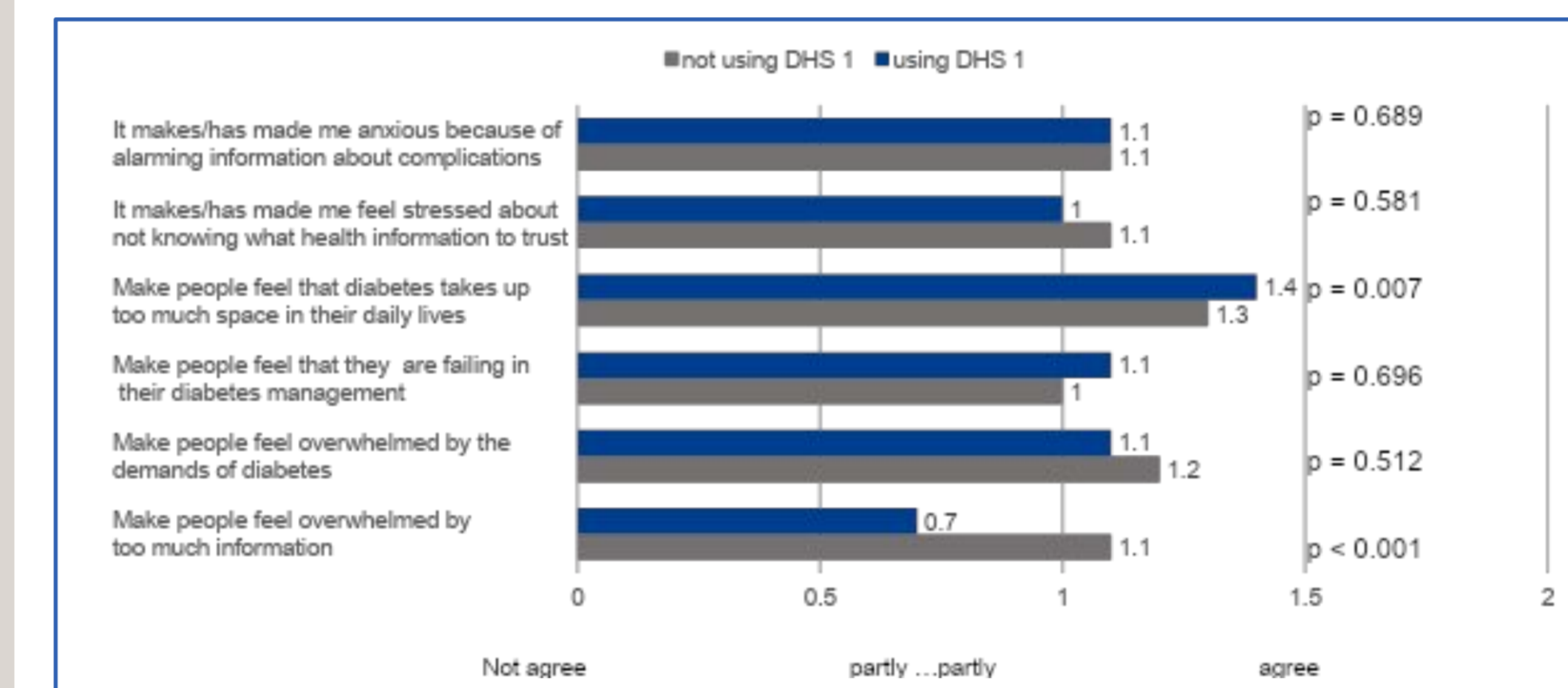


Figure 3a: Barriers to access health information

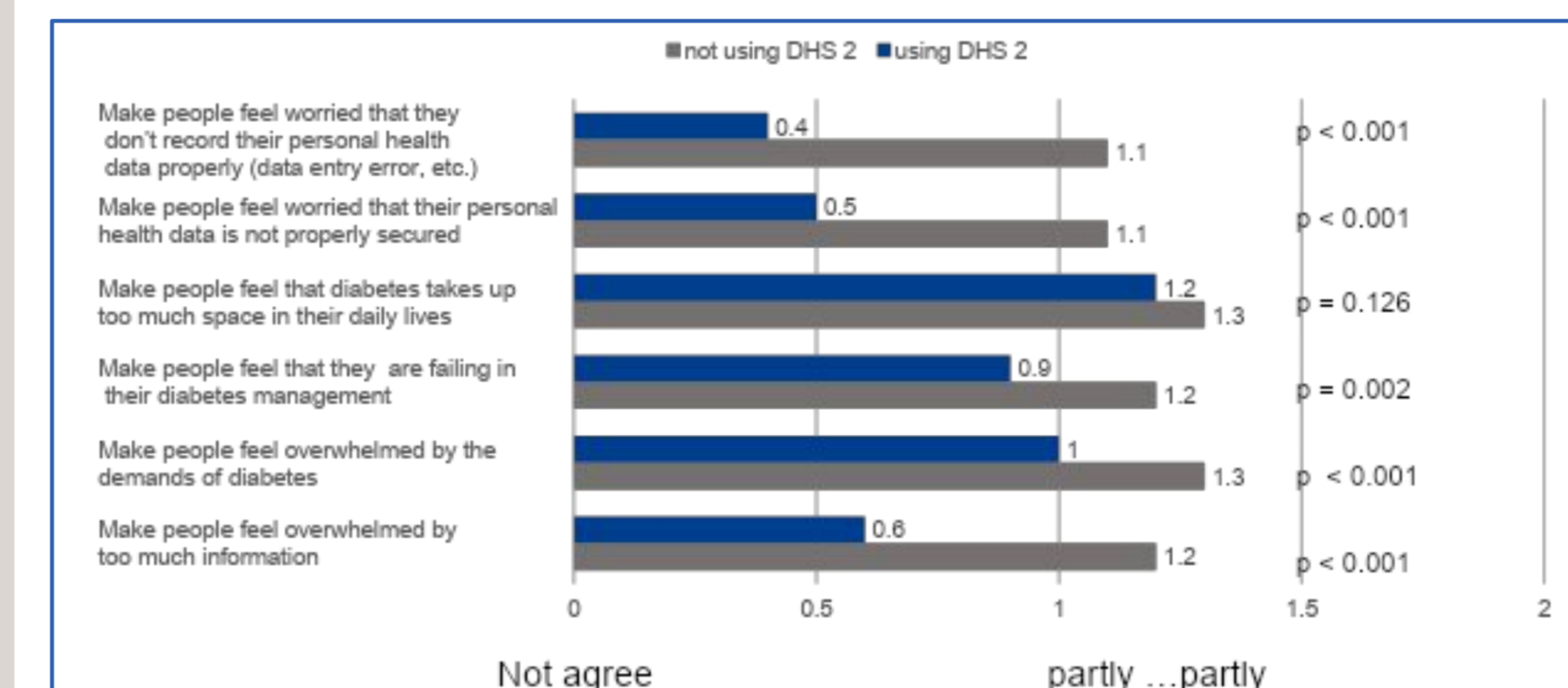


Figure 3b: Barriers to collect health and self-management data

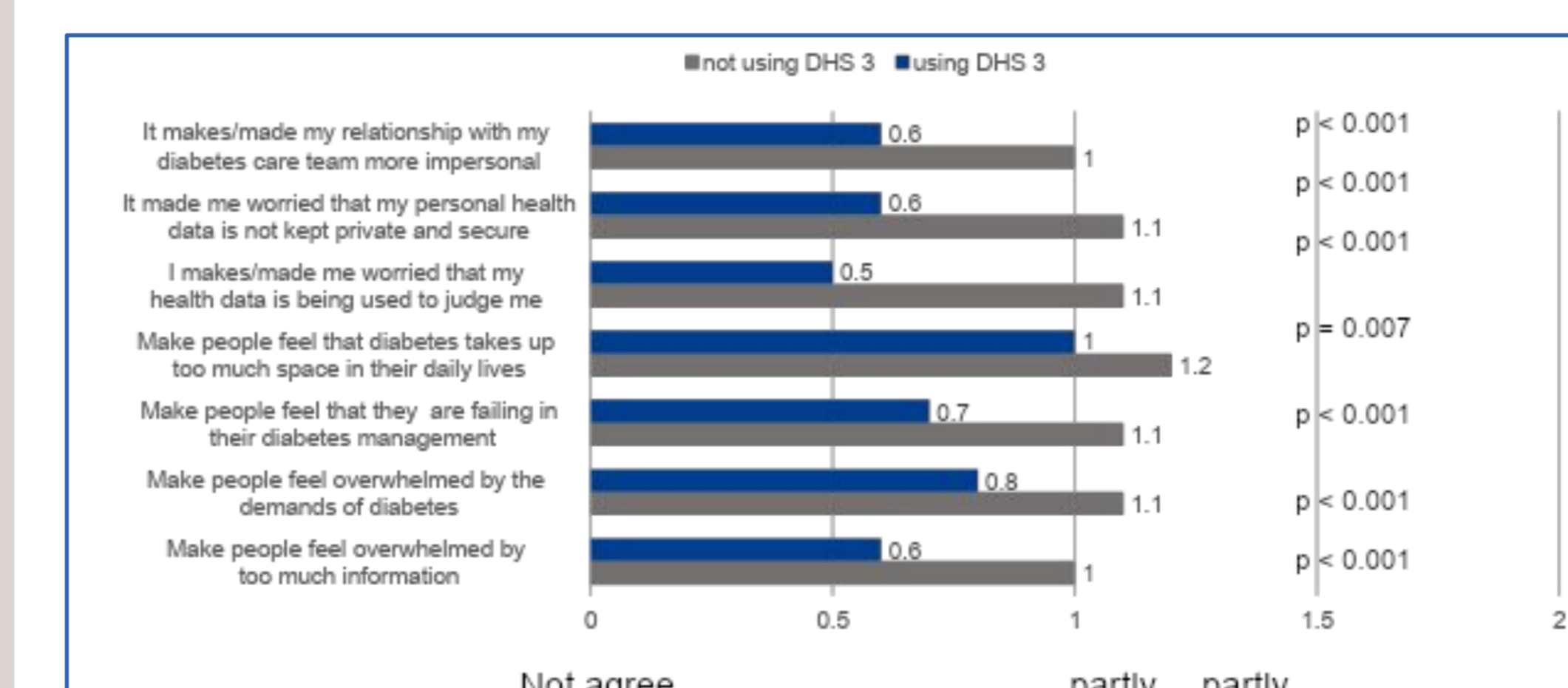


Figure 3c: Barriers to use remote care solutions

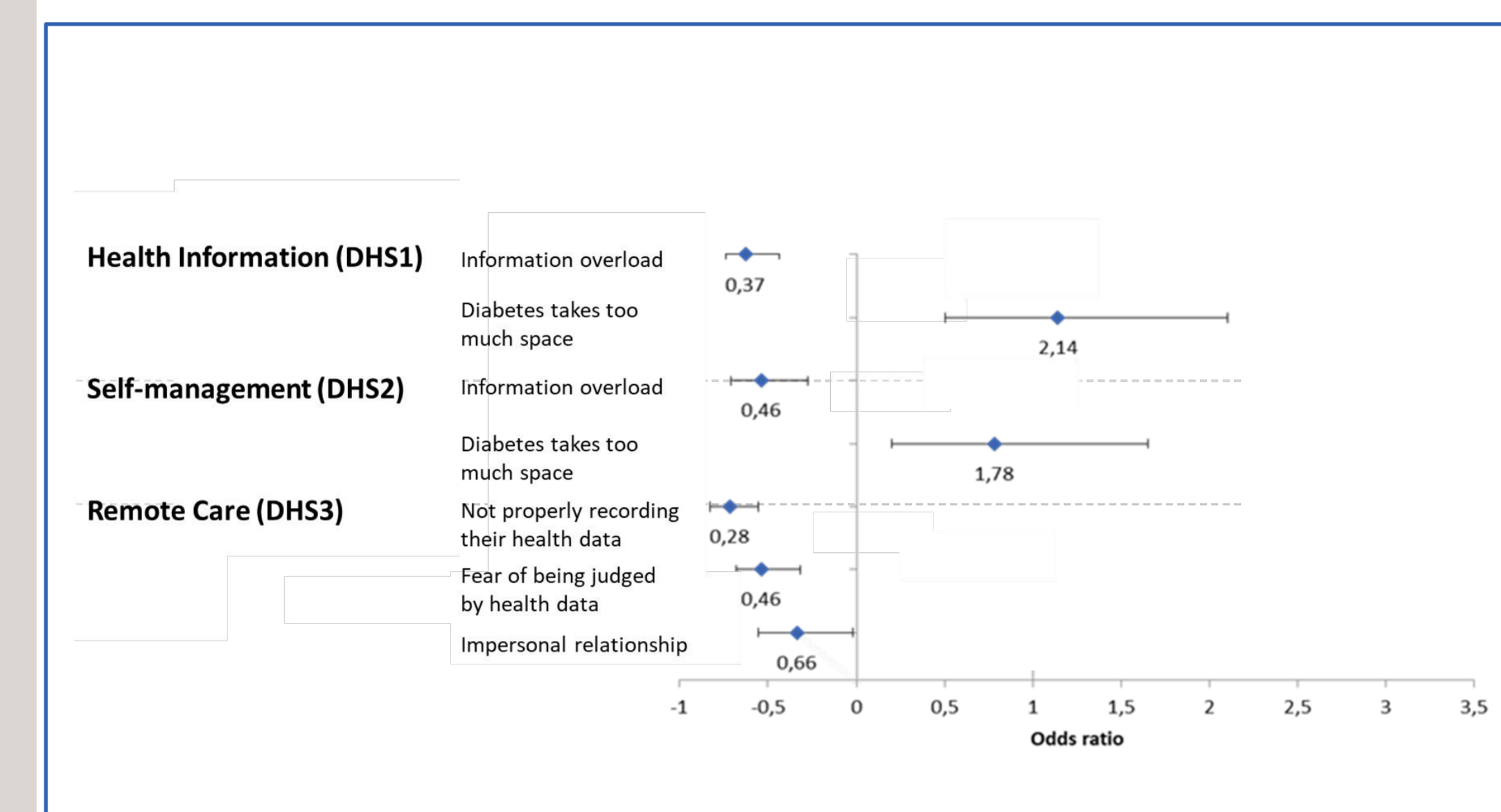


Figure 4: Barriers to use overall digital health solutions

Using stepwise multiple logistic regression, we analysed which barriers were associated independently with not using digital health information (see Figure 4).

Fear of information overload reduced the likelihood of using general information and collecting health and self-management data by 63% and 54% respectively, while feeling that diabetes takes too much time out of life increased the likelihood by 114% and 78% respectively. Data sharing and remote care were negatively influenced by the fear of being judged and the expectation that the relationship with the team would become more impersonal.

Conclusions

- The objective and content of this survey substantially integrated the view of people with diabetes on DHS.
- Half of people with diabetes use digital health information.
- The type of diabetes was only relevant for the use of remote care solutions.
- Intensified diabetes treatment and longer duration of diabetes seem to be relevant medical predictors for the use of DHS.
- Interestingly, PwD with comorbidities or a more negative perceived health status were less likely to use DHS, although they may have a greater need to use it.
- Fears of information overload and incorrect recording of results are independent barriers to using digital health solutions.
- A better understanding of the determinants of DHS use from the perspective of people with diabetes is needed to avoid a digital divide

Contact and conflict of interest

Paco Cerletti, PhD; paco.cerletti@roche.com
PC is an employee of Roche Diabetes Care
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