

Identifying modifiable patient characteristics associated with low educational attainment in older cardiac surgery patients

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Abstract

Background: Limited health literacy has consistently been demonstrated to have far-reaching consequences. It is associated with an increased number of hospitalizations, rehospitalizations, mortality and morbidity. Less educated adults were found to demonstrate lower health literacy skills. The “PREvention Decline in Older Cardiac Surgery patients” (PREDOCS) consult is developed for older cardiac surgery patients to reduce postoperative complications. This intervention seems to be less successful in less educated patients. The PREDOCS consult should thus be optimized. For this optimization, it is necessary to identify the patient characteristics that are responsible for not obtaining, understanding and/or applying health information.

Aim: To determine if the patient problem solving, self-efficacy, motivation and patient participation is influenced by low educational attainment in older (≥ 65 years) elective cardiac surgery patients.

Method: A cross-sectional design was used. This study focuses on the patient characteristics: self-efficacy, problem solving, motivation and patient participation. Three validated surveys, namely the Dutch General Self-Efficacy Scale (GSES), the Patient Activation Measure (PAM) and Self-Management Screening (SeMaS) are used to measure the modifiable patient characteristics. Conclusion is drawn based on multiple analysis.

Results: In total, 41 patients consented to participate. Of these patients, 22 (53.7%) were less educated patients and 19 (46.3%) normally educated. The total score of GSES significantly differs between less educated and normally educated patients ($P=0,043$). However, when the data are corrected for age and gender, there is no significant association between education level and the PAM, SeMaS and GSES.

Conclusion and recommendations: No significant associations were found between low educational attainment and modifiable patient characteristics in older (≥ 65 years) elective cardiac surgery patients. Further research focus on additional personal characteristics of less educated patients affecting health outcomes.

Keywords Educational attainment, patient characteristics, health literacy, cardiac surgery, older patients

Het identificeren van beïnvloedbare patiëntkenmerken geassocieerd met laag opleidingsniveau in oudere cardio chirurgische patiënten.

Samenvatting

Achtergrond: Beperkte gezondheidsvaardigheden hebben vergaande consequenties voor patiënten. Patiënten met beperkte gezondheidsvaardigheden zijn bekend met meer opnames in een ziekenhuis, meer heropnames, een hogere mortaliteit en meer morbiditeit. Laagopgeleide volwassenen zijn vaker bekend met lagere gezondheidsvaardigheden. Het verpleegkundig PREvention Decline in Older Cardiac Surgery patients (PREDOCS) consult is ontwikkeld om postoperatieve complicaties te reduceren in oudere cardio chirurgische patiënten. Deze interventie lijkt minder succesvol bij laagopgeleiden. Het is daarom van belang om het PREDOCS consult te optimaliseren. Hiervoor is het noodzakelijk om eerst patiëntkenmerken te identificeren die verantwoordelijk zijn voor het verkrijgen, begrijpen en toepassen van informatie.

Doel: Vaststellen of het vertrouwen in eigen kunnen, probleemoplossend vermogen, motivatie en mate van participatie wordt beïnvloed door een laag opleidingsniveau van oudere (≥ 65 jaar) cardio chirurgische patiënten.

Methode: Er is gebruikt gemaakt van een cross-sectioneel design. De studie focust zich op de volgende patiëntkenmerken: vertrouwen in eigen kunnen, probleemoplossend vermogen, motivatie en mate van participatie. Drie gevalideerde vragenlijsten zijn gebruikt om de patiëntkenmerken te meten: Dutch General Self-efficacy Scale (GSES), the Patient Activation Measure (PAM) en Self-Management Screening (SeMaS). Multipole analyse is gebruikt om inzichtelijk te maken of er sprake is van een associatie.

Resultaten: In totaal namen 41 patiënten deel, waarvan 22 (53.7%) laagopgeleid en 19 (46.3%) normaal opgeleid waren. De totaalscore van de GSES verschilde significant tussen laag- en hoogopgeleide patiënten ($P=0.043$). In een multipole analyse zijn geen significante associaties gevonden tussen de PAM, GSES en SeMaS en opleidingsniveau gecorrigeerd voor leeftijd en geslacht.

Conclusie en aanbevelingen: Er zijn geen significante associaties gevonden tussen laag opleidingsniveau en probleemoplossend vermogen, patiënt participatie, motivatie en vertrouwen in eigen kunnen van oudere (≥ 65 jaar) cardio chirurgische patiënten. Vervolgonderzoek naar overige patiëntkarakteristieken van laagopgeleide patiënten die gezondheidskuitkomsten beïnvloeden is aanbevolen.

Keywords: Opleidingsniveau, patiëntkenmerken, gezondheidsvaardigheden, cardiochirurgie, oudere patiënten

Introduction

Patients nowadays are increasingly challenged to understand health information and make healthy decisions. However, patients are not being prepared and supported well by health professionals in this pursuit⁽¹⁾. Especially people with limited health literacy experience difficulties with these tasks⁽²⁾. More than one third of adults in Europe have problematic health literacy⁽³⁾. Limited health literacy skills have consistently been demonstrated to have far-reaching consequences⁽⁴⁾.

Limited health literacy is associated with an increased number of hospitalizations and rehospitalizations, increased mortality and premature death⁽⁵⁻⁷⁾. Individuals with limited health literacy are more likely to deal with chronic diseases such as, cancer, heart disease, diabetes and respiratory disease⁽²⁾. According to the American Institute of Medicine (IOM)⁽⁸⁾, health literacy is defined as *“the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”* The effect of limited health literacy skills is influenced by social, cultural, and personal characteristics^(9,10). Examples of social and cultural characteristics are educational attainment, social support, ethnicity, and age⁽¹⁰⁾. Personal characteristics that influence an individual's health literacy are self-efficacy, problem solving, motivation, patient participation, beliefs and knowledge/skills^(9,11). These characteristics are considered important factors for maintaining and improving health. The personal characteristics are to a certain extent learnable and affect how patients obtain, understand and apply health information and make appropriate health decisions⁽²⁾.

Individuals with a lower level of education were found to demonstrate lower health literacy skills^(9,12-16). Recently, health literacy has been put forward as a potential link between level of education and health outcomes^(12,17). Health literacy acts as a facilitator between education level and health outcomes^(18,19). The theoretical relationships between, education, literacy skills and health outcomes are presented in a health-literacy conceptual model⁽¹⁷⁾(Figure 1).

In the Netherlands, approximately 31.4% of the population has a low level of education⁽²⁰⁾. A lower education level has been demonstrated to have similar adverse outcomes as limited health literacy⁽²⁾. A lower education level is more common among the elderly. In the Netherlands, approximately 58% of the elderly (≥ 75 years) population has a low level of education⁽²⁰⁾. The fact that the older population has relatively poor reading skills is important because they also have a high prevalence of chronic diseases and thus need to understand health-related information⁽²⁾.

Currently, older and higher-risk patients can undergo cardiac surgery^(21,22). Although frail older patients can now safely undergo the surgical procedure, they are at a higher risk of developing postoperative complications. The nursing consult PREvention Decline in Older

Cardiac Surgery patients" (PREDOCS) was developed to reduce postoperative complications in older cardiac surgery patients⁽²³⁾(Figure 2). This consult is currently implemented in 12 cardiac surgery centres. The PREDOCS consult, which is given two to five weeks prior to surgery, includes a comprehensive geriatric nursing approach aimed at preventing four postoperative complications: delirium, depression, pressure ulcers and infections^(23,24). In this consult patients play an important role in preparing themselves for the admission and reducing the risk of complications⁽²⁴⁾.

The effect of the PREDOCS intervention on postoperative complications is still being studied. Preliminary results show that the PREDOCS consult seems to be less successful in less educated patients. The results of the effect study of PREDOCS show a statistically significant ($P=0.006$) higher risk of death in the intervention group. However, significantly ($P=0.002$) more patients died in the control group. So, PREDOCS may have a protective effect. The intervention group had a higher educational level, so the expectation is that these patients are more adaptive for PREDOCS.

To better reach the less educated patients, the PREDOCS consult should be optimized. This study focuses primary on the personal characteristics of health literacy which are learnable and therefore modifiable. In this study modifiable characteristics are characteristics which can be changed during the PREDOCS consult. The focus of this study is on the following modifiable characteristics: problem solving, patient participation, self-efficacy and motivation. The research question can therefore be stated as follows: Are problem-solving, patient participation, self-efficacy and motivation influenced by low educational attainment in older (≥ 65 years) elective cardiac surgery patients?

(Figure 1)

(Figure 2)

Methods

Aim

To determine if the patient problem solving, self-efficacy, motivation and patient participation is influenced by low educational attainment in older (≥ 65 years) elective cardiac surgery patients.

Educational attainment is used as a proxy for health literacy.

Design

A cross-sectional design is used. Regarding to the aim, this study is only conducted for the purpose of examining if the modifiable characteristics are influenced by education level. During the PREDOCS consult patients need the modifiable characteristics to obtain, process and understand health information. Therefore, this study purposes to gain insight in education level and the modifiable characteristics at the moment of the PREDOCS consult. This can be measured at one moment and therefore a cross-sectional design is appropriate⁽²⁵⁾. Only quantitative data was gathered.

Population and setting

The study population consists of elective cardiac surgery patients over the age of 65 years. These patients are receiving the PREDOCS consult. Exclusion criteria are the following: unable to speak Dutch, participating in another conflicting study, and diagnosed with dementia or an intellectual disability.

Data is gathered in the hospital Isala, Zwolle in the Netherlands. This hospital is a cardiac surgery centre. Approximately 1200 patients undergo cardiac surgery there each year.

Data collection

Modifiable characteristics

The modifiable characteristics influencing health literacy are self-efficacy, problem solving, motivation, patient participation, beliefs and knowledge/skills⁽⁹⁾. These characteristics are modifiable because these are learnable to a certain extent and can be changed during the PREDOCS consult. The PREDOCS consult takes approximately one hour. Once it is known to what degree the patient exhibits these characteristics, the consult can be optimized based on these results.

This study focuses on the characteristics self-efficacy, problem solving, motivation and patient participation. The design focuses on the modifiable patient characteristics which can be quantitatively measured. The patient characteristics beliefs and knowledge/skills are depending on content of the PREDOCS consult. These characteristics need to be measured

over time to determine the patient's knowledge/skills at the moment of admission. Besides that, self-efficacy, problem solving, motivation and patient participation, are essential to obtain, process and understand the health information received in the PREDOCS consult.

The four characteristics in this study are operationalized(Figure 3). Patient problem-solving ability is defined as cognitive processing directed at achieving a goal when no solution method is obvious to the problem solver⁽²⁶⁾. Motivation is defined as a psychological force that moves a person to act to meet a need or achieve a goal⁽²⁷⁾. Furthermore, patient participation is defined as the involvement of the patient in decision making or expressing opinions about different treatment methods, which includes sharing information, feelings and signs and accepting health team instructions⁽²⁸⁾. Lastly, self-efficacy is the belief that a person is capable of exhibiting a behaviour or developing a competency⁽²⁹⁾.

(Figure 3)

Three validated surveys were used to measure the four modifiable characteristics(Figure 4). The surveys and their domains focuses on one or more of the four modifiable patient characteristics. Together the surveys will provide a complete overview of the characteristics.

The first quantitative survey is the Patient Activation Measure(PAM). Regarding to the four characteristics, statements in this survey are related to the patient motivation and problem solving. The PAM consists of 13 statements with a 4-point scale. The PAM provides a total score and four stages: believing the patient has an important role, having the confidence and knowledge necessary to take action, actually taking action to maintain and improve one's health, and staying the course even under stress⁽³⁰⁾. The PAM is a valid, highly reliable scale that reflects a developmental model of activation⁽³⁰⁾. In this validating study the respondents were cardiac rehabilitation patients and employees of large health system in a second community⁽³⁰⁾.

The second survey is the Self-management Screening(SeMaS). The SeMaS questionnaire provides specific information about the capacity for self-management. SeMaS consists of 10 domains and 27 questions⁽³¹⁾. Domains in this survey directly regarding to the four modifiable characteristics are, willingness to self-care, self-efficacy, problem solving and influence on health. The SeMaS is a short, validated tool that can signal potential barriers for self-management. This tool is validated in the primary care in chronically ill patients⁽³¹⁾.

The last survey is the Dutch General Self-Efficacy Scale(GSES). The scale was created to assess a general sense of perceived self-efficacy. The GSES consists of 10 statements with a 4-point scale. Several studies have shown that the GSES has high reliability, stability, and construct validity⁽³²⁾. The operationalization of GSE measurement that was used was designed

for use in Dutch adolescents⁽³³⁾ and based on Rosenberg's Self Esteem Scale⁽³⁴⁾ and Schwarzer's Generalized Self-Efficacy Scale⁽³³⁾.

(Figure 4)

Education level

Education level was measured to gain insight into the patient's level of education and to make a distinguishing between less educated and normally educated patients. The following scale was used: primary school, secondary school, low vocational education, secondary vocational education, higher education and university. Patients with elementary school, secondary school or low vocational education will be categorized as less educated. These categories and threshold are similar used by the Central Bureau for Statistics (CBS)⁽²⁰⁾ and the effect study of the PREDOCS consult. The variable education level is dichotomized for the analysis. If all six categories were included, the necessary sample size would increase significantly.

Educational attainment is used as a proxy for health literacy. Regarding to the preliminary results of PREDOCS consult, educational attainment seems to influence how patients adapt health information. There are several surveys for measuring health literacy but completing a survey can be challenging for low educated patients⁽²⁾. Moreover, lower educational attainment is found to demonstrate lower health literacy skills⁽¹²⁻¹⁶⁾. For these reasons, the groups are divided based on educational level instead of health literacy.

Baseline demographics

The following baseline demographics are collected: age, gender, body mass Index(BMI), social support, migration background, vision problems and hearing problems. These characteristics are influencing the level of health literacy⁽⁹⁾. These characteristics are non-modifiable because they cannot be changed during the PREDOCS consult.

Statistical analysis

Descriptive statistics were used to present the baseline demographics. For the continuous data, the mean and standard deviation (SD) were presented in case of normal distribution (based on skewness and kurtosis). In case of an uneven distribution, median and quartiles were presented. Categorical data is presented as number of cases and frequencies.

Independent sample t-test, Mann-Whitney and the Fisher's exact tests were used to compare differences between less and normally educated patients. The Fisher's exact test was chosen because of the limited sample size⁽³⁵⁾. In case of normal distribution (based on kurtosis and skewness), the independent sample t-test was used, if not the Mann Whitney was used.

Regression analysis was conducted to explore if there is an association between the modifiable patient characteristics and education attainment. The dependent variables are problem solving, motivation, self-efficacy and patient participation. The independent variable is education level. Multiple analysis was conducted for each questionnaire corrected for age and gender to measure if there is an association with education level.

The conclusion is drawn based on multiple analysis. In daily practice, patient characteristics are interacting to some extent. Therefore, this correction ensures that the results come closer reality. A p -value ≤ 0.05 was considered statistically significant. Data were analysed using the SPSS software (SPSS version 22, SPSS Inc., Chicago, IL, USA).

In this study there are three variables per model. The use of at least 10 events per variable (EPB) is advised for calculating the needed sample size⁽³⁶⁾. The study required a sample size of at least 60 cases. Thus, 30 cases in the less educated group and 30 cases in the normally educated group.

Missing data

Missing data was reduced because a researcher was available to check all the surveys after they were completed. There were only two missing items in the data set (<1%). Therefore, these were imputed using single predictive mean matching⁽³⁷⁾ in SPSS software. Imputation was chosen as method to maintain full sample size⁽³⁸⁾.

Procedures

Patients are informed by a letter sent to their home address. The information in this letter had to be understandable for less educated patients. Therefore, the letter was developed with support of the Patient Education Materials Assessment Tool (PEMAT)⁽³⁹⁾. Many patients with low functional literacy are ashamed of this⁽⁴⁰⁾ and therefore may want to avoid this study⁽⁴¹⁾. So, only essential general information will be given in normal/large font type. Otherwise there is a risk these patients will not participate. Patients had one-week time to decide if they wanted to participate and could ask questions on the day of the consult. Informed consent and the questionnaires were obtained directly after the PREDOCS consult.

Ethical issues

The study, following the Helsinki Declaration, was approved by the Medical Ethical Committee (METC) of the Utrecht University Medical Centre (UMC) and the METC decided that this study did not fall under the Medical Research Involving Human Subjects Act (WMO)^(42,43). All participants provided informed consent.

Results

Study recruitment was carried out between February 2018 and June 2018. During this period, 50 patients were screened for eligibility. Of those, three (6.0%) did not fit the inclusion criteria. Seven patients did not participate for several reasons. Figure 5 presents a flow chart of the recruitment and participation of patients. A total of 41 (82.0%) patients gave their consent. Of these patients, 22 (53.7%) patients were less educated and 19 (46.3%) were normally educated patients.

(Figure 5)

Baseline demographics

Table 1 shows baseline demographics of less educated compared with normally educated patients. The mean age of the less educated patients was 74 years, with a range from 65 to 82. Within this group, exactly half of the patients were males. In the less educated group, almost all patients (90.9%) received much social support in case of health problems.

Of the normally educated patients, seventeen (89.5%) were males. The mean age in the normally educated patients was 72.1 with a range from 65 to 82 years. Of these patients everyone received much social support in case of health problems.

Overall, the characteristic gender differed significantly ($P=0.008$) between less educated ($n=11$ men, 50,0%) and normally educated patients ($n=17$ men, 89.5%).

(Table 1)

Educational level

The percentages in each category of educational level is presented in table 2. Most patients had completed lower vocational education (22.0%) or secondary vocational education (24.4%).

(Table 2)

Modifiable patient characteristics

Table 3 presents an overview of the total- and domain scores of the GSES, PAM and SeMaS. Regarding to the PAM total score, the less educated group (43.7, 5.6) scored lower than the normally educated group (44.8, 4.9). Also the SeMaS total score was lower in the less educated (25.5, 3.1) patients in comparison with the normally educated patients 26.7 (2.1). These differences in total scores of the PAM and SeMaS were not statistically significant.

However, the total GSES scores did show a significant difference ($P=0.043$) between less educated patients (31.5, 5.3) and normally educated patients (34.6, 4.1).

(Table 3)

The results of multiple analysis are presented in Table 4. In model 1, no significant association was found between the GSES score and educational attainment corrected for age and gender. However, a significant association between gender and GSES was found ($P=0.014$).

In the second model no significant association was found between the PAM score and educational attainment corrected for age and gender. Now were any of the other variables significantly associated with the PAM score.

Model 3 shows no significant association between educational attainment and the SeMaS score corrected for age and gender. The other variables, age ($P=0.017$) and gender ($P=0.029$), were both significantly associated with educational attainment.

(Table 4)

Discussion

This study examined the association between modifiable patient characteristics and educational attainment in older (≥ 65 years) elective cardiac surgery patients. Regarding to the modifiable characteristics, there is a significant difference found in self-efficacy between less and normally educated patients. Furthermore, no association was found between problem-solving, motivation, patient participation, self-efficacy and low educational attainment. In this study educational attainment is used as a proxy for health literacy.

A systematic review was published about the association between health literacy and patient characteristics as disease related knowledge, beliefs and self-efficacy⁽⁴⁴⁾. Studies included showed conflicting results, one study found that higher health literacy was associated with higher self-efficacy⁽⁴⁵⁾, whereas the other studies found no association^(46,47). These conflicting results are in accordance with our results. This study did not show an association between self-efficacy and educational attainment. However, there is found a significantly difference in total score between the two groups.

Another recent study examined that there was a significant correlation between health literacy and patient participation scores⁽⁴⁸⁾. Hereby, willingness for participation was taken into account. Health literacy was examined as the most important predictor of patient participation⁽⁴⁸⁾. Our study did not show an association or significant difference in score between motivation, patient participation and educational attainment.

Furthermore, a study presented that the socioeconomic background of patients was strongly correlated with their psychosocial characteristics⁽⁴⁹⁾. This previous study identified the socioeconomic, psychosocial and behavioural characteristics of patients hospitalized with cardiovascular disease⁽⁴⁹⁾. Also this study showed that self-efficacy and health literacy was significantly lower in patients with low educational attainment⁽⁴⁹⁾.

This study hypothesised that the modifiable characteristics would be influenced by educational attainment, which is supported by recent literature^(9,49). This research did not found an association between the modifiable characteristics and educational attainment. Also previous literature shows conflicting results for these characteristics. This implies that it is still unknown which personal characteristics are specifically associated with lower educational attainment in older cardiac surgery patients. Based on literature and this study, educational attainment may be influencing self-efficacy in older cardiac surgery patients. Therefore, interventions regarding to self-efficacy may positively influence the success of the PREDOCS consult for less educated patients.

However, there were some limitations. This study did not achieve the required sample size, which may make the results less reliable. The limited sample size was caused in part by a decrease in the number of planned PREDOCS consults. Therefore, the inclusion criteria

have been extended. Currently, only internal patients are receiving the PREDOCS consult. The external patients are referred from another hospital because cardiac surgery is not performed in these hospitals. All elective cardiac surgery patients 65 years and older were eligible for the PREDOCS consult and therefore external patients were also included.

Educational attainment is used as a proxy for health literacy. A Lower educational level is found to demonstrate lower health literacy skills⁽¹²⁻¹⁶⁾. However, low health literacy skills also occurs in higher educated patients. Health literacy is not only dependent of educational attainment but also of social influences. This may mean that also patients with normal health literacy skills are included in the less educated group and therefore the results show probably small differences between the groups.

There are no validated Dutch questionnaires specifically for each modifiable characteristic separately. Therefore, the questionnaires are used together to provide a complete view of the four modifiable patient characteristics. This makes it more difficult to determine which modifiable characteristic is specifically responsible for the effect. Besides that, the GSES and SeMaS are not validated in cardiac surgery patients^(31,33). The PAM is validated in patients with cardiac diseases⁽³⁰⁾.

Completing a survey can be challenging for less educated patients⁽²⁾. Therefore, one of the strengths is that there was always a researcher available to answer questions. So, there was control that the patients were filling in the questionnaires themselves and not by a family member(s). This increased the reliability of the results. Another strength is the low number of missing data (<1%), this also makes the results more reliable.

In conclusion, no significant association was found between low educational attainment and problem solving, patient participation, motivation and self-efficacy in older (≥65 years) elective cardiac surgery patients.

Beside the four modifiable characteristics in this study, there are more patient characteristics that influence health literacy skills. Examples of these characteristics are beliefs, knowledge and skills^(2,9). Previous research in heart-failure patients showed lower disease knowledge in patients with low health literacy⁽⁴⁵⁾. These characteristics are content dependent and has to be measured over time and therefore not taking into account in this study. Further research should provide insight into other characteristics that influence health literacy.

This study focused on the capacity of the patients themselves. In the PREDOCS consult patients have an important role in preparing themselves. The health care provider also has an essential role, namely providing the patient of health information. It is known that health professionals often overestimate the health literacy level of patients⁽²⁾. By overestimating the capabilities, they may not match with the level of health literacy of patients. Hence it is

recommended to determine how information is provided by the health professionals during the PREDOCS consult.

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Figures and Tables:

Fig. 1: Conceptual model of the relationship between educational attainment and health outcomes.

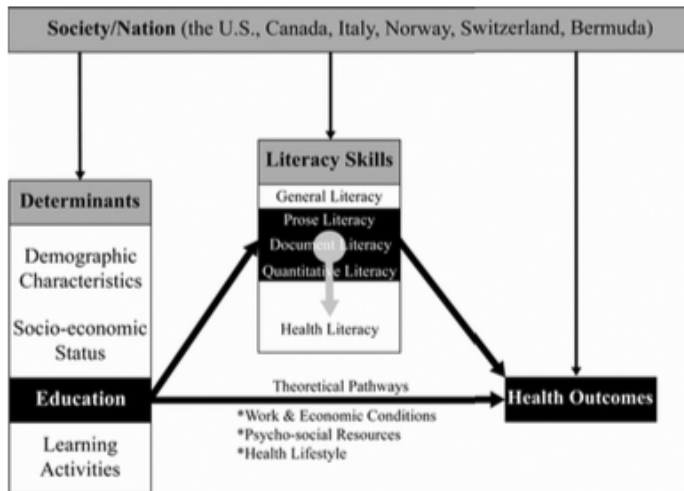


Fig. 2: The PREDOCS consult.

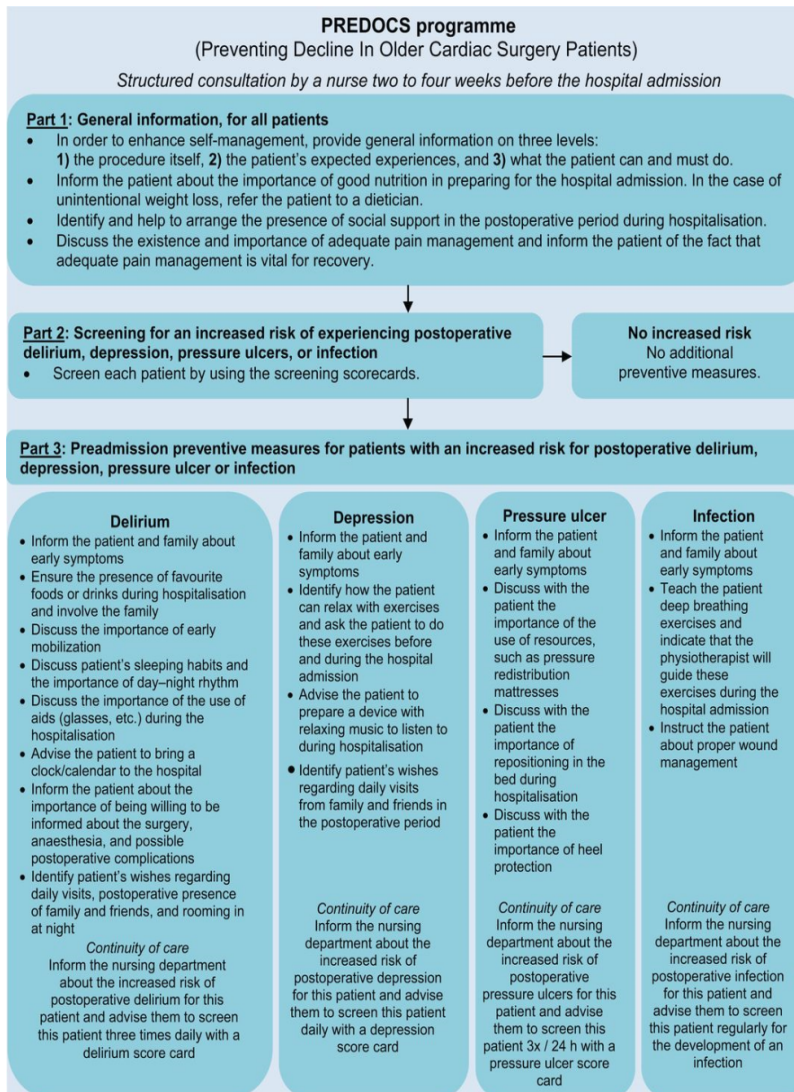


Fig. 3: Definitions and application of the modifiable characteristics.

Characteristic	Definition	Application in PREDOCS consult
Self-efficacy	The belief that a person is capable of accomplishing a behaviour or developing a competency(29).	Changing behaviour by the patient is an important element. Therefore, self-efficacy seems necessary to complete the preventive interventions.
Problem-solving	Cognitive processing directed at achieving a goal when no solution method is obvious to the problem solve(26).	The information is often new for patients and therefore they have to find out how to apply the preventive interventions.
Motivation	A psychological force that moves a person to act to meet a need or achieve a goal(27).	As mentioned before motivation is one of the components of changing behaviour(50). Therefore, motivation is essential to complete the preventive interventions.
Patient participation	Involvement of the patient in decision making or expressing opinions about different treatment methods, which includes sharing information, feelings and sign and accepting health team instructions(28).	Patient participation is necessary to adapt the preventive interventions for that specific patient.

Fig. 4: Three surveys for measuring modifiable patient characteristics

Measurement instrument	Structure	Measurement level	Domains	Total score range	Time to complete
GSES	10 statements	4-point scale	N.A.	Between 10 - 40	5 minutes
PAM	13 statements	4-point scale	N.A.	Between 13 - 52	5 minutes
SeMaS	27 questions	4-point scale 5-point scale 10-point scale	10 domains	Between 11 - 30	10 - 15 minutes

Fig. 5: Flowchart of the selection process for the study population.

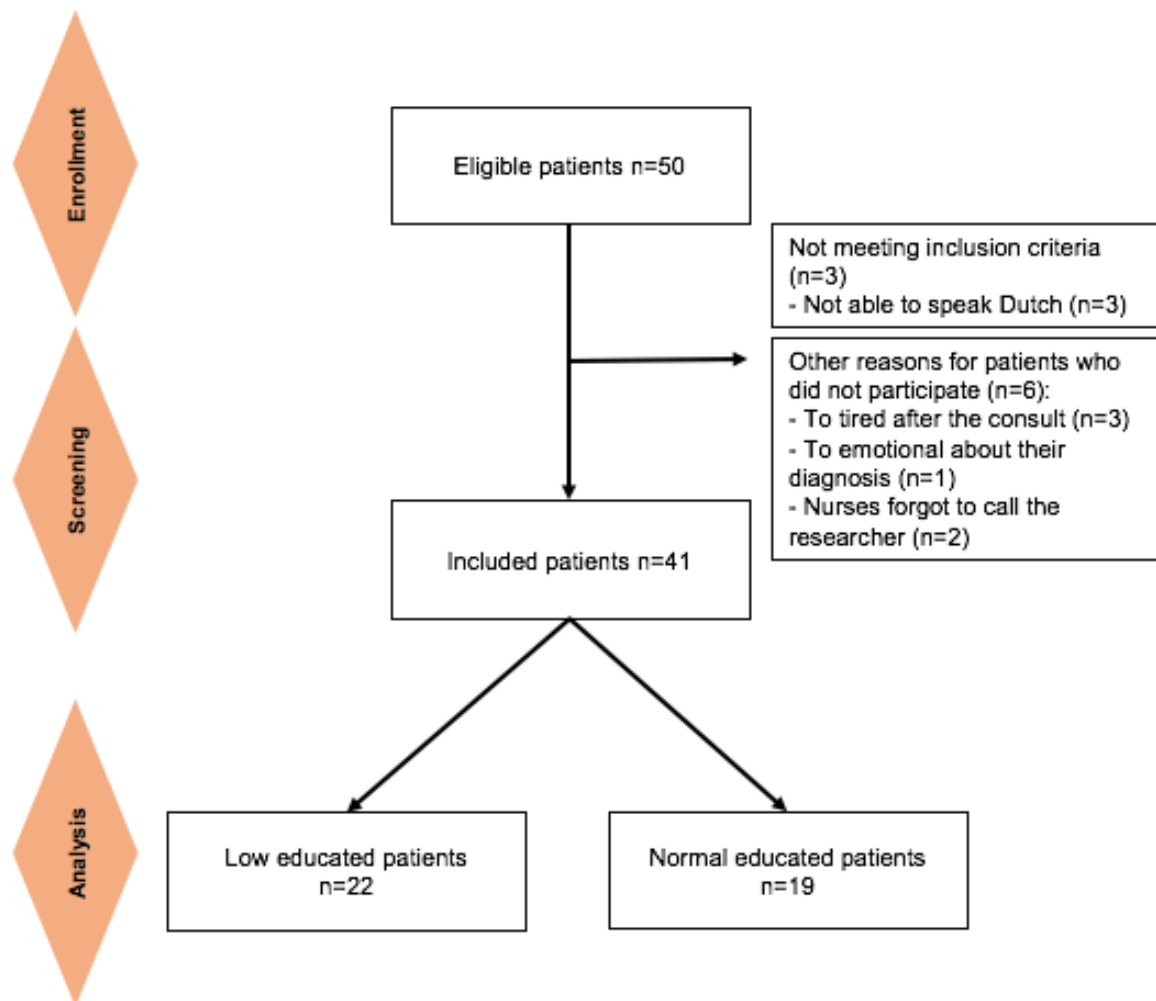


Table 1: Baseline demographics.

Characteristics	Less educated (N=22)	Normally educated (N=19)	P-value
Gender, n (%)			0.008*
Male	11 (50.0)	17 (89.5)	
Female	11 (50,0)	2 (10,5)	
Mean age (SD)	74.1 (5.3)	72.1 (4.8)	0.230
Mean BMI (SD)	27.8 (4.7)	26.3 (3.5)	0.253
Vision problems, n (%)	21 (95.5)	19 (100.0)	0.537
Hearing problems, n (%)	7 (31.8)	4 (21.1)	0.102
Migration background, n (%)	1 (4.5)	1 (5.3)	0.718
Social support, n (%)			0.282
Some help	2 (9.1)	0 (0)	
Much help	20 (90.9)	19 (100)	

Note: Less educated patients are those who have completed only primary school, secondary school or lower vocational education. Normally educated patients are patients who have completed secondary vocational education, higher education or university.

SD = Standard deviation. BMI = Body Mass Index. *: P<0.05.

Table 2: Educational level.

Educational level	N (%)
Primary school	5 (12.2%)
Secondary school	8 (19.5%)
Lower vocational education	9 (22.0%)
Secondary vocational education	10 (24.4%)
Higher education	7 (17.1%)
University	2 (4.9%)

Table 3: Results of the questionnaires GSES, PAM, SeMaS.

	Less educated N=22	Normally educated N=19	<i>P-value</i>
GSES, mean (SD)	31.5 (5.3)	34.6 (4.1)	.043
PAM, mean (SD)	43.7 (5.6)	44.8 (4.9)	.494
Level 1: No self-efficacy and no active role. n (%)	2 (9.1)	0 (0)	
Level 2: Building on knowledge and self-efficacy. n (%)	2 (9.1)	2 (10.5)	
Level 3: Knowing facts and taking action. n (%)	7 (31.8)	8 (42.1)	
Level 4: Have adopted new behaviour and trying to sustain. n (%)	11 (50.0)	9 (47.4)	
SeMaS, mean (SD)	25.5 (3.1)	26.7 (2.1)	.152
Domain 1: Experienced burden of disease, n (%)			
Less	3 (13.6)	2 (10.5)	
Average	17 (77.3)	15 (78.9)	
Much	2 (9.1)	2 (10.5)	
Domain 2: Computer skills, n (%)			
Less	9 (40.9)	3 (15.8)	
Some	8 (36.4)	10 (52.6)	
Good	5 (22.7)	6 (31.6)	
Domain 3: Functioning in groups, n (%)			
Difficult	1 (4.5)	1 (5.3)	
Reasonable	11 (50.0)	11 (57.9)	
Good	10 (45.5)	7 (36.8)	
Domain 4: Willingness to self-care, n (%)			
Not willing to	2 (9.1)	1 (5.3)	
Slightly willing to	11 (50.0)	8 (42.1)	
Willing to	9 (40.9)	10 (52.6)	
Domain 5: Influence on health, n (%)			
Dependent on others	2 (9.1)	0 (0)	
Some influence	12 (54.5)	9 (47.4)	
Independent	8 (36.4)	10 (52.6)	
Domain 6: Self-efficacy, n (%)			
Less	1 (4.5)	0 (0)	
Some	1 (4.5)	1 (5.3)	
Much	20 (90.9)	18 (94.7)	
Domain 7: Social support, n (%)			
Less help	0 (0)	0 (0)	
Some help	2 (9.1)	0 (0)	
Much help	20 (90.9)	19 (100)	
Domain 8: Problem solving n (%)			
Seeking distraction	5 (22.7)	2 (10.5)	
Expressing through emotions	4 (18.2)	1 (5.3)	
Solving a problem	13 (59.1)	16 (84.2)	
Domain 9: Anxiety, n (%)			
Often	1 (4.5)	0 (0)	
Sometimes	1 (4.5)	0 (0)	
Never	20 (90.9)	19 (90.5)	
Domain 10: Sombre n (%)			
Often	1 (4.5)	2 (10.5)	
Sometimes	0 (0)	1 (5.3)	
Never	21 (95.5)	16 (84.2)	

Note: SD = Standard deviation. GSES = General Self-Efficacy Scale. PAM = Patient Activation Measure. SeMaS = Self-Management Screening. Less educated patients are those who have completed only primary school, secondary school or lower vocational education. Normally educated patients are patients who have completed secondary vocational education, higher education or university.

Table 4: Multivariate analysis of the association between educational attainment and modifiable patient characteristics.

Multivariate						
	Model 1	GSES			95,0% confidence interval for B	
Variable	B	SE B	β	t	Lower bound	Upper bound
Age	-.252	.138	-.259	-1.829	-.532	.027
Gender	4.177	1.621	.395	2.576*	.892	7.462
Education	.993	1.539	.101	.645	-2.126	4.112
<i>F</i>	4.972*					
<i>R</i> ²	0.287					
<i>Adjusted R</i> ²	0.230					
	Model 2	PAM			95,0% confidence interval for B	
Variable	B	SE B	B	T	Lower bound	Upper bound
Age	-.324	.161	-.315	-2.019	-.649	.001
Gender	2.173	1.887	.194	1.152	-1.650	5.996
Education	-.342	1.791	-.033	-.191	-3.971	3.288
<i>F</i>	1.925					
<i>R</i> ²	0.135					
<i>Adjusted R</i> ²	0.065					
	Model 3	SeMaS			95,0% confidence interval for B	
Variable	B	SE B	B	T	Lower bound	Upper bound
Age	-.190	.076	-.357	-2.490*	-.345	-.035
Gender	2.042	.897	.353	2.276*	.224	3.860
Education	.055	.852	.010	.064	-1.671	1.781
<i>F</i>	4.553**					
<i>R</i> ²	0.270					
<i>Adjusted R</i> ²	0.210					

Note: *: p <.05, **: p <.01. GSES = General Self-Efficacy Scale. PAM = Patient Activation Measure. SeMaS = Self-Management Screening.

Appendix

Naam:

.....

Geboortedatum:

.....

Wat is uw leeftijd?

.....

Wat is uw geslacht?

Vrouw

Man

Wat is uw lengte?

.....cm

Wat is uw gewicht?

.....kg

Draagt u een gehoorapparaat?

Ja

Nee

Bent u op dit moment bekend met gehoorproblemen?

Ja

Nee

Draagt u een bril?

Ja

Nee

Zijn uw beide ouders in Nederland geboren?

Ja

Nee

Indien nee: Bent u zelf in Nederland geboren?

Ja

Nee

Wat is uw hoogst afgeronde opleidingsniveau?

Basisschool

Middelbare school

Lager beroepsonderwijs (lbo)

Middelbaar beroepsonderwijs (mbo)

Hoger beroepsonderwijs (hbo)

Universiteit

Hieronder volgen 10 stellingen over hoe u in het algemeen denkt en doet.
 Zou u aan willen geven in hoeverre u het oneens of eens bent met deze stellingen.
 Wilt u daartoe voor alle stellingen het antwoord aankruisen dat OP DIT MOMENT op u het meest van toepassing is.

Stellingen	Volledig onjuist	Nauwelijks juist	Enigszins juist	Volledig juist
1. Het lukt me altijd moeilijke problemen op te lossen, als ik er genoeg moeite voor doe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Als iemand mij tegenwerkt, vind ik toch manieren om te krijgen wat ik wil.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Het is voor mij makkelijk om vast te houden aan mijn plannen en mijn doel te bereiken.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Ik vertrouw erop dat ik onverwachte gebeurtenissen doeltreffend aanpak.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Dankzij mijn vindingrijkheid weet ik hoe ik in onvoorziene situaties moet handelen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Ik kan de meeste problemen oplossen als ik er de nodige moeite voor doe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Ik blijf kalm als ik voor moeilijkheden kom te staan omdat ik vertrouw op mijn vermogen om problemen op te lossen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Als ik geconfronteerd word met een probleem, heb ik meestal meerdere oplossingen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Als ik in een benarde situatie zit, weet ik meestal wat ik moet doen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Wat er ook gebeurt, ik kom er wel uit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hieronder staan enkele uitspraken die mensen soms doen over hun gezondheid. Geef voor elke uitspraak aan, in hoeverre u het ermee eens of oneens bent. Doe dit door het antwoord te omcirkelen dat het meest op uw persoonlijke situatie van toepassing is.

	Helemaal niet mee eens	Niet mee eens	Mee eens	Helemaal mee eens	N.v.t.
1. Uiteindelijk ben ik zelf verantwoordelijk voor mijn gezondheid.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Een actieve rol op me nemen in de zorg voor mijn gezondheid, heeft de meeste invloed op mijn gezondheid.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Ik heb er vertrouwen in dat ik kan bijdragen aan het voorkomen of verminderen van problemen met mijn gezondheid.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Ik weet wat elk van mijn voorgeschreven medicijnen doet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Ik heb er vertrouwen in dat ik kan beoordelen of ik naar de dokter moet gaan of dat ik een gezondheidsprobleem zelf kan aanpakken.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Ik heb er vertrouwen in dat ik een dokter mijn zorgen durf te vertellen, zelfs als hij of zij daar niet naar vraagt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Ik heb er vertrouwen in dat het mij lukt om medische behandelingen die ik thuis moet doen uit te voeren.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Ik begrijp mijn gezondheidsproblemen en wat de oorzaken ervan zijn.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Ik weet welke behandelingen er zijn voor mijn gezondheidsproblemen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Ik heb veranderingen in mijn leefstijl (zoals gezond eten of bewegen) kunnen volhouden.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Ik weet hoe ik gezondheidsproblemen kan voorkomen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Ik heb er vertrouwen in dat ik zelf oplossingen kan bedenken voor nieuwe problemen met mijn gezondheid.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Ik heb er vertrouwen in dat ik veranderingen in mijn leefstijl (zoals gezond eten en bewegen) kan volhouden, zelfs in tijden van stress.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Kruis hieronder per vraag het hokje aan dat staat voor het meest passende antwoord.

Hoeveel last ervaart u meestal van uw ziekte(n)?

0 1 2 3 4 5 6 7 8 9 10
 Geen last Heel veel last

	Helemaal niet mee eens	Niet mee eens	Mee eens	Helemaal mee eens
3. Ik heb goede computervaardigheden (bijv. Zoeken op google, e-mail)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Ik functioneer goed in groepen (collega's, andere patiënten etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Ik ben bereid om aan zelfzorg te doen (bloeddruk meten, wegen, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Helemaal niet mee eens	Niet mee eens	Mee eens	Helemaal mee eens
6. Mijn gezondheid wordt in de eerste plaats bepaald door wat ik zelf doe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Wat betreft mijn gezondheid, kan ik alleen maar doen wat de dokter zegt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Of ik gezond blijf is een kwestie van toevallige gebeurtenissen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Helemaal niet mee eens	Niet mee eens	Mee eens	Helemaal mee eens
9. Ik denk dat ik in staat ben om op een gezonde manier te leven (bijv. gezond eten, voldoende bewegen, niet roken)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Ik heb de volgende personen in mijn omgeving:

Deze personen zijn behulpzaam wanneer ik gezondheidsproblemen heb:

			Volledig onjuist	Enigszins onjuist	Enigszins juist	Volledig juist
10. Als ik mij daarvoor inzet, lukt het mij om op een gezonde manier te leven (Bijv. gezond eten, voldoende slapen, niet roken)	<input checked="" type="checkbox"/> Nee	Ja →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kinderen	<input type="checkbox"/> Nee	Ja →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andere familieleden	<input type="checkbox"/> Nee	Ja →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buren	<input type="checkbox"/> Nee	Ja →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vrienden/kennissen	<input type="checkbox"/> Nee	Ja →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collega's	<input type="checkbox"/> Nee	Ja →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Wanneer mensen problemen of onplezierige gebeurtenissen tegenkomen, reageren mensen over het algemeen wat vaker op de ene dan op de andere manier. Geef achter iedere zin aan **hoe vaak u in het algemeen op de beschreven manier reageert** als u te maken krijgt met problemen of onplezierige gebeurtenissen.

	Nee	Soms	Regelmatig	Vaak	Heel vaak of voortdurend
12. Ik denk aan andere dingen die niet met het probleem te maken hebben (bijv. Boos, verdrietig).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Ik toon mijn gevoelens (Bijv. Boos, verdrietig).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Ik probeer mij op een of andere manier prettiger te voelen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Ik bedenk verschillende mogelijkheden om een probleem op te lossen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Ik zoek afleiding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Ik zoek troost en begrip.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Ik ga doelgericht te werk om een probleem op te lossen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Ik laat merken dat ik ergens mee zit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Ik grijp direct in als er moeilijkheden zijn.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bij de volgende vragen gaat het steeds om klachten en verschijnselen die u **de afgelopen week (de afgelopen 7 dagen met vandaag erbij)** hebt ervaren. Klachten die u daarvoor wel had, maar de afgelopen week niet meer, tellen niet mee. Geef per klacht aan hoe vaak u dit in de afgelopen week bij uzelf hebt opgemerkt, door het hokje aan te kruisen dat staat voor het meest passende antwoord.

	Nee	Soms	Regelmatig	Vaak	Heel vaak of voortdurend
Ik had de afgelopen week last van: 21. angst- of paniekaanvallen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ik had de afgelopen week: 22. angst om alleen het huis uit te gaan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ik was de afgelopen week: 23. angstig voor iets waarvoor ik helemaal niet bang zou hoeven te zijn (bijv. dieren, hoogten, kleine ruimten).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. bang om in verlegenheid te raken in gezelschap van andere mensen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ik had de afgelopen week het gevoel: 25. dat ik nergens meer plezier in kan hebben.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. dat alles zinloos is.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. dat het leven niet de moeite waard is.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>