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Effect of Type D Personality on Short-Term Cardiac Rehabilitation in Patients With Coronary Artery Disease

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Objective To investigate the effect of type D personality on cardiac rehabilitation (CR) participation rates and the effect of a short-term CR program.

Methods Study participants included patients diagnosed with acute coronary syndrome who underwent percutaneous coronary intervention. Patients completed the Type D personality Scale (DS-14) and the Hospital Anxiety and Depression Scale (HADS) at program entry. Subjects were recommended participation in 6 weeks of CR exercise training. Cardiopulmonary exercise test (CPET) was conducted before and after completion of the training. CR participation refers to completion of the 6-week CR exercise program and performance of the secondary CPET. Drop-out refers to the subjects who were unable to participate in the 6-week CR exercise program or to perform the secondary CPET.

Results At baseline, type D personality was evident in 21 of 63 patients (33.3%). Type D patients were more often depressed (57.1%) and anxious (38.1%) than non-type D patients (31.0% and 9.5%, respectively). At baseline, participants with type D personality showed a decreased body mass index (24.6 vs. 26.1 kg/m^2, p=0.025). The type D group displayed a lower CR participation rate (5/21, 23.8%) compared with the non-type D group of (22/42, 52.4%). Logistic regression analysis revealed the association of type D personality with CR drop-out rate (odds ratio=3.87; 95% confidence interval, 1.2–12.5; p<0.05).

Conclusion Type D personality was independently associated with drop-out from CR program and with significantly higher levels of anxiety and depressive mood.

Keywords Cardiac rehabilitation, Coronary artery disease, Exercise test, Type D personality

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INTRODUCTION

Ongoing studies, including studies of psychological risk factors, are designed to identify and reduce risk factors of coronary artery disease (CAD). In the past, the type A behavioral pattern (TABP) was recognized as a CAD risk factor, along with hypertension, smoking, and dyslipidemia. However, a 25-year follow-up study reported that the hostility trait in TABP is not associated with CAD [1].

In the 1990s, the type D personality (TDP), which differs from TABP, was proposed as a risk factor for CAD. Components of TDP include negative affectivity (NA) and social inhibition (SI). NA refers to the tendency to experience distress, regardless of time or place [2]. SI refers to the suppression of negative emotions in social interactions [3].

TDP can affect the prognosis and condition of CAD patients following stenting [3,4]. No reports exist on the effects of TDP on short-term cardiac rehabilitation (CR) or on the CR participation rate in Korea. Accordingly, the present study investigated these topics to determine whether TDP affects the CR participation of CAD patients in Korea, and to raise awareness of TDP.

MATERIALS AND METHODS

Subjects

The participants were patients diagnosed with acute coronary artery syndrome who had undergone percutaneous coronary intervention at the cardiovascular center in our hospital. Most of these patients were referred to the CR clinic on day 2 after the procedure. The patients performed low-intensity (2–3 metabolic equivalents) treadmill exercise to determine the presence of adverse cardiovascular events. Patients were educated on the need for CR and the management of CVD risk factors. The patients were provided with an explanation of the objectives and procedures of the present study and were requested to fill out a voluntary informed consent form. Patients who consented to participate were required to complete the TDP scale and the Hospital Anxiety and Depression Scale (HADS) questionnaire. Patients were excluded if they failed to complete the cardiopulmonary exercise test (CPET) due to underlying problems, such as musculoskeletal or neurological diseases, did not sign the consent form, or did not understand the questionnaire due to mental/cognitive impairment. A schematic flow of the study is provided in Fig. 1.

Methods

This was a prospective cohort study. The research protocol, explanation sheets, and consent forms were approved by the Institutional Review Board of Inje University Sanggye Paik Hospital (no. 2015-07-027-001). Patients who consented to participate were required to complete the TDP scale and the HADS questionnaire during hospitalization. The participants' first outpatient visit occurred within 1–2 weeks of discharge. In this study, CR participation was confirmed in subjects who completed the 6-week CR exercise program and performed the secondary CPET. Drop-out was indicated in subjects who were unable to participate in the 6-week CR exercise program or to perform the secondary CPET.

Primary CPET

A CPET was conducted according to the Modified Bruce Protocol. Based on the CPET, the following parameters were measured and recorded: peak heart rate (HR_{peak}),

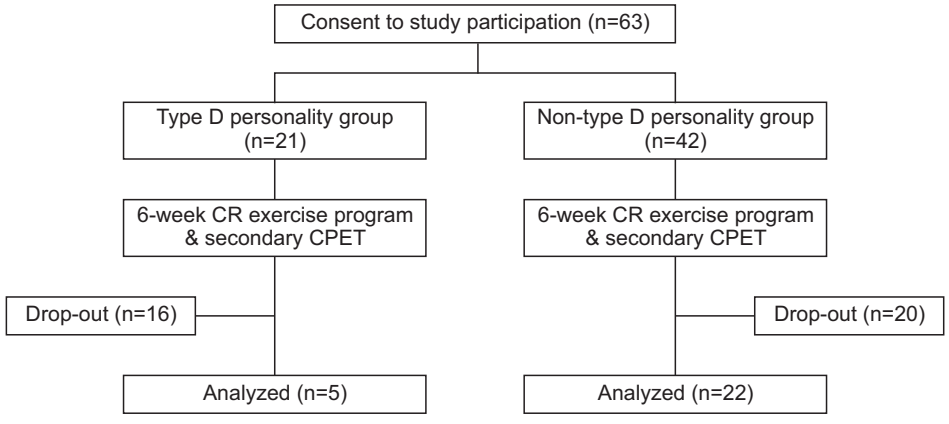

Fig. 1. Flow diagram outlining progress of subjects in the study. CR, cardiac rehabilitation; CPET, cardiopulmonary exercise test.

resting heart rate (HR_{rest}), systolic blood pressure (SBP), diastolic blood pressure (DBP), rate of perceived exertion (RPE), respiratory exchange ratio (RER), oxygen consumption (VO_2), and exercise time. The equipment used for the tests included a Q4500 12-channel real-time ECG stress test system (Quinton Instrument, Boston, MA, USA), QMC respiratory gas analyzer (Quinton Instrument), model 412 automatic blood pressure and pulse meter (Quinton Instrument), and a Medtrack ST55 treadmill (Quinton Instrument). The CPET was completed according to the guidelines of the American College of Cardiology and the American Heart Association [5]. The RPE was assessed using a 6–20 Borg scale, with the patients being instructed prior to the test to express their level of exertion during exercise as a numeric value [6].

Exercise program

The Karvonen formula, i.e., $(HR_{peak}\text{-}HR_{rest})\times\%intensity + HR_{rest}$, was used to determine the exercise intensity [7]. With respect to the %intensity of the target heart rate (THR), exercise was performed at 60% intensity in the first 2 weeks, 70% intensity during weeks 3 and 4, and 85% intensity during weeks 5 and 6 [6]. The exercise program consisted of 10 minutes of warm-up exercise (5 minutes stretching followed by 5 minutes light walking), 30 minutes of main exercise (combination of treadmill and bicycle ergometer use), and 10 minutes of cooling down (5 minutes light walking followed by 5 minutes stretching) [8]. Patients with difficulties participating in the hospital-monitored exercise program were trained to perform the exercise on their own, following the same times and procedures. Two patients underwent the home exercise program.

Secondary CPET

A follow-up test using the same procedures as the primary CPET was conducted with participants in the 6-week CR exercise program.

Research tools

TDP scale

The Korean version of Type D Personality Scale-14 (DS-14) [9] (Supplementary Table S1) was used for the TDP scale, with sufficient internal consistency and construct validity. The TDP scale was developed in Belgium for patients with heart disease and has been used as a tool to assess NA and SI, as components of TDP. The TDP scale consists of the NA and SI subscales. Each subscale contains seven items. Each item is graded on a scale of 0–4 points and the scores from each item are summed. Each subscale has a score range of 0–28 points. If a participant scores ≥10 on both subscales, the participant is classified as having a TDP. A score <10 indicates the absence of TDP [10].

Hospital Anxiety and Depression Scale

Zigmond and Snaith [11] used anxiety and depression, as generally observed in the hospital environment, to develop the HADS for the measurement of anxiety and depression levels in patients. HADS can be used to assess the level of anxiety and depression in patients admitted to hospital. Standardization and validity of this scale outside Korea has been confirmed. In Korea, a standardization version of HADS [12] has been used to measure anxiety and depression with high validity. The scale, which was used in the present study, consists of 14 items, with 7 odd-numbered items comprising the anxiety subscale (HAD-A) and 7 even-numbered items comprising the depression subscale (HAD-D). Each item is graded on a 4-point scale (0–3 points). The cut-off point for each subscale is 8 points.

Statistical analyses

The recorded results were statistically analyzed using SAS version 4.2 (SAS Institute Inc., Cary, NC, USA). A χ^2 test was performed to analyze the inter-group differences of sex; smoking status; prevalence of diabetes, hypertension, and dyslipidemia; percentage of angina pectoris and myocardial infarction; and number of occluded coronary arteries. The paired t-test was performed to analyze within-group differences in body mass index (BMI), left ventricular ejection fraction (LVEF), and age. Mean and standard deviation for all items from the CPET were calculated. The Kolmogorov-Smirnov test and the Shapiro-Wilk test were used to test for the normality of each item. The mean between-group difference for each item was compared using an independent t-test, while the mean within-group difference over time was compared using a paired t-test. However, as the sample size of patients who completed the CR in the TDP group was small and did not show normality, the Wilcoxon rank sum test

was used. A repeated-measures ANOVA model was used to examine the group-period interaction of peak oxygen consumption (VO_{2peak}). A linear mixed model test was performed to examine the group-period interaction of VO_{2peak} adjusted for various demographic characteristics. The statistical significance level was set to $p<0.05$.

Table 2. Participants' baseline demographic characteristics: type D vs. non-type D personality

Characteristic	Type D (n=21)	Non-type D (n=42)	p-value
Age (yr)	62.2±11.6	58.6±10.8	0.218
Sex			0.698
Male	14	30	
Female	7	12	
BMI (kg/m^2)	24.6±2.5	26.1±2.7	0.038*
LVEF (%)	49.6±13.3	52.6±13.6	0.409
Smoking			
Non-smoker	6 (28.6)	17 (40.5)	0.205
Current smoker	8 (38.1)	19 (45.2)	0.205
Ex-smoker	7 (33.3)	6 (14.3)	0.205
Diagnosis			
UA	7 (33.3)	8 (19.0)	0.209
AMI	14 (66.7)	34 (81.0)	0.209
DM	10 (47.6)	13 (31.0)	0.195
Hypertension	13 (61.9)	26 (61.9)	1
No. of diseased vessel			0.81
One	10 (47.6)	27 (64.3)	
Two	7 (33.3)	13 (31.0)	
Three	4 (19.0)	2 (4.8)	
Dyslipidemia	5 (31.3)	11 (26.2)	0.838

Values are presented as mean±standard deviation or number (%).
BMI, body mass index; LVEF, left ventricular ejection fraction; UA, unstable angina; AMI, acute myocardial infarction; DM, diabetes mellitus.
*p<0.05, type D vs. non-type D.

RESULTS

Participant demographics

A total of 63 patients were classified into TDP (n=21) or non-TDP (n=42) groups based on the TDP scale. The group scores for the subscales of TDP scale are shown in Table 1. The TDP group had a BMI of 24.6 kg/m^2, which was significantly lower than in the non-TDP group BMI (24.6 vs. 26.1 kg/m^2; p=0.025). No other differences were observed between the two groups in terms of clinical characteristics, including age; sex-ratio; percentage of unstable angina and myocardial infarction; left ventricle ejection fraction (LVEF); prevalence of diabetes, hypertension, and dyslipidemia; and smoking status (Table 2).

Difference in mental health based on TDP

The depression and anxiety rates were significantly higher in the TDP group compared with the non-TDP group (Table 3). Logistic regression analysis showed that TDP was a statistically significant variable for depression and anxiety (Table 4).

Difference in CR participation rate according to TDP

A total of 63 participants consented and participated in the study. Of these, 27 (42.9%) completed the 6-week CR exercise program, while 36 (55.6%) participants dropped out. The CR participation rate was significantly lower in the TDP group than in the non-TDP group (5/21, 23.8% vs. 22/42, 52.4%; p<0.05). Logistic regression analysis

Table 3. Differences in anxiety and depression in type-D personality

	Type D (n=21)	Non-type D (n=42)	p-value
Depression	12 (57.1)	13 (31.0)	0.045*
Anxiety	8 (38.1)	4 (9.5)	0.014*

Values are presented as number (%).
*p<0.05, type D vs. non-type D.

Table 1. Classification of type D and non-type D personalities using TDP scale

	Total	Type D (n=21)	Non-type D (n=42)	p-value
Negative affectivity	9.3±5.4	14.0±3.7	6.9±4.5	<0.001*
Social inhibition	9.1±5.2	14.5±3.5	6.3±3.6	<0.001*

Values are presented as mean±standard deviation.
TDP, type D personality.
*p<0.05, type D vs. non-type D.

Table 4. Results of logistic regression analysis predicting the CR drop-out rate, depression, and anxiety in type-D personality

	B	SE	Wald	Diff.	p-value	OR 95% CI
CR drop-out rate	1.354	0.60	5.11	1	0.024	3.87 (1.20–12.53)
Depression	1.090	0.55	3.89	1	0.049	2.97 (1.01–8.79)
Anxiety	1.766	0.69	6.52	1	0.011	5.85 (1.51–22.67)

CR, cardiac rehabilitation; SE, standard error; OR, odds ratio; CI, confidence interval.

Table 5. Exercise parameters pre-CR vs. post-CR

	Time	Type D group (n=5)	Non-type D group (n=22)
HR_{rest} (beats/min)	Baseline	68.6±10.8	68.2±11.9
	6 weeks	68.0±11.7	63.1±10.5
HR_{peak} (beats/min)	Baseline	130.6±21.7	138.4±18.9
	6 weeks	138.4±24.2	137.5±20.8
SBP_{rest} (mmHg)	Baseline	116.4±15.3	120.1±16.9
	6 weeks	120.6±11.3	122.3±15.6
DBP_{rest} (mmHg)	Baseline	83.8±7.6	81.7±7.8
	6 weeks	78.4±6.5	82.0±7.7
SBP_{peak} (mmHg)	Baseline	163.6±38.2	162.6±27.3
	6 weeks	174.2±25.2	176.5±23.2*
DBP_{peak} (mmHg)	Baseline	83.6±18.6	83.1±12.3
	6 weeks	88.6±11.9	86.2±13.0
ETT time (s)	Baseline	815.0±307.6	853.1±186.1
	6 weeks	937.0±140.5	936.3±169.4*
VO_{2peak} (mL/kg/min)	Baseline	26.1±12.0	26.7±7.9
	6 weeks	29.4±13.1	29.2±7.9*
ΔVO_{2peak} (%)	Baseline	-	-
	6 weeks	12.64	9.36
RPP at stage 3	Baseline	11,988±2,490	14,881±4,868
	6 weeks	13,497±2,725	13,464±2,563
RPE at stage 3	Baseline	9.8±2.2	10.4±2.6
	6 weeks	10.2±2.8	9.4±1.9
RER_{peak}	Baseline	1.13±0.17	1.10±0.10
	6 weeks	1.12±0.18	1.14±0.10

Values are presented as mean±standard deviation.
CR, cardiac rehabilitation; HR_{rest}, resting heart rate; HR_{peak}, peak heart rate; SBP_{rest}, resting systolic blood pressure; DBP_{rest}, resting diastolic blood pressure; SBP_{peak}, peak systolic blood pressure; DBP_{peak}, peak diastolic blood pressure; ETT, exercise tolerance test; VO_{2peak}, peak oxygen uptake; ΔVO_{2peak}, improvement rate of VO_{2peak}; RPP, rate pressure product; RPE, rated perceived exertion; RER_{peak}, peak respiratory exchange ratio.
*p<0.05, baseline vs. 6 weeks.

revealed a significant correlation between CR drop-out and TDP (Table 4). Depression, anxiety, BMI, and CR participation rate were not significant correlated, obviating the need for additional adjusted odds ratios (ORs). The OR of drop-out according to subscales of TDP was not significant for NA (OR=2.45; 95% confidence interval [CI], 0.88–7.09; p=0.09), whereas TDP was as a significant variable for SI (OR=3.07; 95% CI, 1.07–8.80; p<0.05).

Comparison of CR effect according to TDP

A total of 27 participants (42.9%) completed the CR program: 5 were classified as TDP and 22 as non-TDP. In the baseline CPET prior to CR and CPET after CR, the two groups showed no differences in HR_{peak}, HR_{rest}, SBP, DBP, RPE at stage 3, RPE_{peak}, VO_{2peak}, and exercise time (Table 5). VO_{2peak} increased from pre-CR to post-CR by 12.6% (26.1 to 29.4 mL/kg/min) in the TDP group and 9.4% (26.7 to 29.2 mL/kg/min) in the non-TDP group. The non-TDP group showed a significant increase in VO_{2peak} from pre-CR to post-CR. However, despite the higher rate of increase in the TDP group, it was not statistically significant as the number of participants in the group was too small. Repeated-measures ANOVA results showed no significant differences in group-period interaction according to TDP, while a linear mixed model adjusted for anxiety, depression, and BMI also showed no significant differences in group-period interaction according to TDP.

DISCUSSION

Prevalence and mortality rates associated with CVDs remain at a high level, and studies continue to investigate the known CVD risk factors and psychosocial factors [13]. TDP refers to underlying traits in an individual, which do not change easily, unlike emotions. TDP induces negative states, such as depression and anxiety [14], with a continued influence on behavioral patterns, and negative biological responses in the body [4]. International studies have recently associated TDP with CVDs including heart failure, CAD, and hypertension [15,16]. Further relevant studies are required. Previous TDP-related studies have reported a high recurrence of cardiac events [17] and low quality of life [18] among patients diagnosed with coronary artery syndrome, while the negative effects of TDP in heart diseases manifest via specific behavioral patterns and biological pathways [19]. However, scant information is available concerning the direct comparison of effects based on exercise test results obtained from short-term CR and CR participation rates. The present study investigated the CR participation rate, effects on mental health, and effects of CR in CAD patients with TDP.

One-third of the participants were classified as TDP, similar to the previously reported frequency of 24%–37% in studies conducted outside of Korea [20-22]. Studies in Korea reported TDP rates of 27.4% and 38.0% [23,24].

With respect to demographic characteristics, the TDP group displayed lower BMI, which is contrary to the higher BMI reported in TDP subjects in a study from Iceland [25]. In that study, the demographic characteristics of 4,753 people randomly selected from the general population were investigated; and those with TDP showed a higher prevalence of hypertension, diabetes, waist circumference, and BMI. The present study had a smaller sample size and only analyzed CAD patients and not the general population.

In our study, the TDP group was associated with depression and anxiety, consistent with prior studies. A recent meta-analysis of the association between mental distress and TDP revealed a greater than 2-fold risk for mental health problems compared with subjects without TDP [26]. Moreover, various studies have also indicated positive correlations between TDP and anxiety and depression, even after adjusting for disease severity and demographic differences [27-29]. Anxiety and depression are common mental health issues among CVD patients, and increase the incidence of CVD, diminish the quality of life and attitudes to treatment, and increase the prognosis of death [30]. TDP reinforces a negative emotional state and increases the prevalence and mortality rates associated with CVD [31]. Therefore, management of TDP patients via psychological intervention for CVD and treatment of NA conditions should be carried out together with CR. The results of such interventions need further investigation and assessment.

Currently, no interventions or treatments are available to directly target TDP. Consequently, little is known about the practical methods for enhancing the prognosis of TDP patients [19]. Future interventions and treatments should focus on the mechanisms of TDP association with the poor prognosis of heart disease [32,33].

Concerning the negative effect of TDP on heart disease, two potential mechanisms involving behavioral patterns and biological pathways have been reported [34,35]. The behavioral pattern pathway of TDP in terms of specific health-risk behavior corresponds to an indirect mechanism, while the biological pathway represents a direct mechanism associated with direct physiological responses that occur when TDP patients experience chronic stress. Significant associations of TDP with the hypothalamus-pituitary-adrenal axis imbalance [36], hyper-activation of the cardiovascular system [37], in-

creased inflammatory and immune responses [38], and metabolite network dysfunction [39] suggest underlying biological mechanisms.

The present study attempted to identify changes according to TDP in relation to capacity for aerobic exercise based on CR. No difference was found between TDP and non-TDP subjects due to the small sample size. Conversely, the conflicting findings from prior studies may be related to attempts to identify the biological mechanism based on laboratory findings from blood tests, metabolites, and immune responses. Future studies should increase the number of participants and statistical power considering the high drop-out or loss rates.

In the present study, the TDP group showed a significantly lower CR rate of participation than the non-TDP group, while the OR of CR loss according to TDP was 3.87, which is consistent with previous reports suggesting that TDP subjects have poor drug compliance and do not engage in healthy lifestyles [20,40]. The presence of TDP was the only variable associated with the CR participation rate. Depression and anxiety did not show such associations. In this context, among the subscales of TDP, SI but not NA was correlated with the CR participation rate. Based on this finding, it appears that TDP may probably induce NA frequently and promote other behavioral patterns unrelated to NA, which are mostly due to the underlying disposition to induce SI.

TDP patients are more likely to continue or revert to unhealthy at-risk behavior, and abstain from aerobic exercise, dieting, smoking cessation, drug compliance, and behavioral changes [20,29,40]. Because of such risky behaviors, TDP patients show passive responses towards the treatment of heart disease, with negative views on treatment efficacy and procedures. In the present study, TDP patients were monitored for their CR participation rate only, while an overall survey including dietary modification, aerobic exercise, transition from a smoker to a non-smoker, and adherence to prescription medication was not conducted. Future studies should conduct comprehensive surveys of health-risk behaviors in relation to TDP and a systematization of CR programs that includes correction of health risk behaviors and the need for relevant interventions.

CR is not simply a matter of engaging in aerobic training. It also includes abstinence from smoking and alcohol consumption, dietary management, stress reduction, education concerning and prescription of aerobic exercise, and eliminating barriers to exercise. All these measures should be reinforced during regular and scheduled follow-up sessions. Moreover, when a cardiac event is involved, CPET is initially performed within 2–3 months, and every 6–12 months thereafter, which provides feedback for encouraging dynamic participation from the patients. In the present study, differences were found in the CR participation rate and the mental health state according to TDP, but no difference in aerobic exercise capacity post-CR was detected. Therefore, in the long-term, the CR participation rate may decline among the TDP group due to their risky health behavior, resulting in a lack of aerobic exercise capacity, shift to a less healthy lifestyle, and lack of risk factor management. Such outcomes suggest a high recurrence rate of long-term cardiac events and a high mortality rate in the TDP group [35].

The limitations in the present study concern the number of participants lost to follow-up and the higher than anticipated drop-out during CR, which resulted in only a small number of participants completing the CR exercise program to analyze the effects of CR. As a result, statistical power was reduced. Moreover, the survey relating to the health behavior of the participants was not comprehensive, and failed to reflect individual differences in duration, intensity, and frequency of aerobic exercise. In the future, additional systematic studies that address these issues will be required.

In conclusion, CAD patients with TDP showed a low CR participation rate. Among those who completed the CR exercise program, no significant differences were detected in efficacy of CR according to TDP. Participants with TDP showed higher levels of anxiety and depression. Consistent with previous studies reporting the association between TDP and a negative prognosis in heart disease, the present study presents further evidence and identifies a potential behavioral pathway, while also confirming similar findings among the subcategories, with SI playing a key role. Currently, there is a strong interest in Korea for any evidence to increase the CR participation rate. Future studies that consider TDP, when developing and applying psychosocial interventions for increasing CR participation rates are needed. Increasing the CR participation rate of patients with heart disease in actual clinical settings should improve the long-term prognosis.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

SUPPLEMENTARY MATERIALS

Supplementary materials can be found via http://doi.org/10.5535/arm.2018.42.5.748. Table S1. The Korean version of Type D Personality Scale-14 (DS-14).

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SUPPLEMENTARY MATERIALS

Table S1. The Korean version of Type D Personality Scale-14 (DS-14)

Type D Personality Scale

아래는 사람들이 자신을 표현할 때 흔히 사용하는 문장들입니다. 각 문장을 읽고 자신에게 해당되는 정도에 따라 문항 옆의 숫자에 동그라미로 표시해 주십시오. 옳고 그른 것이 있는 것이 아니므로 떠오르는 대로 답을 해주시기 바랍니다.

		아니다	약간 아니다	보통이다	약간 그렇다	그렇다
1.	사람들을 만나면 쉽게 친해진다	0	1	2	3	4
2.	종종 사소한 일에 어쩔 줄 몰라 한다	0	1	2	3	4
3.	많은 사람들을 만날 때 초조해진다	0	1	2	3	4
4.	불행하다고 느끼는 경우가 많다	0	1	2	3	4
5.	짜증이 나는 경우가 많다	0	1	2	3	4
6.	사람들과 어울릴 때 위축되는 경우가 많다	0	1	2	3	4
7.	사물을 비관적으로 본다	0	1	2	3	4
8.	대화할 때 먼저 말을 꺼내기 어렵다	0	1	2	3	4
9.	기분이 나쁜 경우가 많다	0	1	2	3	4
10.	폐쇄적으로 사는 편이다	0	1	2	3	4
11.	사람들과 거리를 두는 편이 더 낫다	0	1	2	3	4
12.	무엇인가에 대해 자주 걱정을 한다	0	1	2	3	4
13.	자주 의기소침해진다	0	1	2	3	4
14.	사람들과 어울릴 때, 적당한 이야깃거리를 찾기 힘들다	0	1	2	3	4

병원 불안 – 우울 척도

감정 상태는 당신의 질환이나 상태에 영향을 많이 줄 수 있습니다.
다음 글을 읽고 당신의 상태를 가장 잘 나타낸다고 생각되는 문항을 골라 "O"를 하십시오.

1) 나는 긴장감 또는 "정신적 고통"을 느낀다.
   0. 전혀 아니다.
   1. 가끔 그렇다.
   2. 자주 그렇다.
   3. 거의 그렇다.
2) 나는 즐겨오던 것들을 현재도 즐기고 있다.
   0. 똑같이 즐긴다.
   1. 많이 즐기지는 못한다.
   2. 단지 조금만 즐긴다.
   3. 거의 즐기지 못한다.
3) 나는 무언가 무서운 일이 일어날 것 같은 느낌이 든다.
   0. 전혀 아니다.
   1. 조금 있지만 걱정하지 않는다.
   2. 있지만 그렇게 나쁘지는 않다.
   3. 매우 분명하고 기분이 나쁘다.
4) 나는 사물을 긍정적으로 보고 잘 웃는다.
   0. 나는 항상 그렇다.

1. 현재는 그다지 그렇지 않다.
2. 거의 그렇지 않다.
3. 전혀 아니다.

5) 마음속에 걱정스러운 생각이 든다.
0. 거의 그렇지 않다.
1. 가끔 그렇다.
2. 자주 그렇다.
3. 항상 그렇다.

6) 나는 기분이 좋다.
0. 항상 그렇다.
1. 자주 그렇다.
2. 가끔 그렇다.
3. 전혀 그렇지 않다.

7) 나는 편하게 긴장을 풀 수 있다.
0. 항상 그렇다.
1. 대부분 그렇다.
2. 대부분 그렇지 않다.
3. 전혀 그렇지 않다.

8) 나는 기력이 떨어진 것 같다.
0. 전혀 아니다.
1. 가끔 그렇다.
2. 자주 그렇다.
3. 거의 항상 그렇다.

9) 나는 초조하고 두렵다.
0. 전혀 아니다.
1. 가끔 그렇다.
2. 자주 그렇다.
3. 매우 자주 그렇다.

10) 나는 나의 외모에 관심을 잃었다.
0. 여전히 관심이 있다.
1. 전과 같지는 않다.
2. 이전보다 확실히 관심이 적다.
3. 확실히 잃었다.

11) 나는 가만히 있지 못하고 안절부절 한다.
0. 전혀 그렇지 않다.
1. 가끔 그렇다.
2. 자주 그렇다.
3. 매우 그렇다.

12) 나는 일들을 즐거운 마음으로 기대한다.
0. 내가 전에 그랬던 것처럼 그렇다.
1. 전보다 조금 덜 그렇다.
2. 전보다 확실히 덜 그렇다.
3. 전혀 그렇지 않다.

13) 나는 갑자기 당황스럽고 두려움을 느낀다.
0. 전혀 그렇지 않다.
1. 가끔 그렇다.
2. 꽤 자주 그렇다.
3. 거의 항상 그렇다.

14) 나는 좋은 책 또는 라디오, 텔레비전을 즐길 수 있다.
0. 자주 즐긴다.
1. 가끔 즐긴다.
2. 거의 못 즐긴다.
3. 전혀 못 즐긴다.