



Original Article

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Translation, Cultural Adaptation, and Validation of a Korean Version of the Information Needs in Cardiac Rehabilitation Scale

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Objective: To translate and culturally adapt the Information Needs in Cardiac Rehabilitation (INCR) questionnaire into Korean and perform psychometric validation.

Methods: The original English version of the INCR, in which patients are asked to rate the importance of 55 topics, was translated into Korean (INCR-K) and culturally adapted. The INCR-K was tested on 101 cardiac rehabilitation (CR) participants at Kangwon National University Hospital and Seoul National University Bundang Hospital in Korea. Structural validity was assessed using principal component analysis, and Cronbach's alpha of the areas was computed. Criterion validity was assessed by comparing information needs according to CR duration and knowledge sufficiency according to receipt of education. Half of the participants were randomly selected for 1 month of re-testing to assess their responsiveness.

Results: Following cognitive debriefing, the number of items was reduced to 41 and ratings were added to assess participants' sufficient knowledge of each item. The INCR-K structure comprised eight areas, each with sufficient internal consistency (Cronbach's alpha > 0.7). Criterion validity was supported by significant differences in mean INCR-K scores based on CR duration and knowledge sufficiency ratings according to receipt of education ($p < 0.05$). Information needs and knowledge sufficiency ratings increased after 1 month of CR, thus supporting responsiveness ($p < 0.05$).

Conclusion: The INCR-K demonstrated adequate face, content, cross-cultural, structural, and criterion validities, internal consistency, and responsiveness. Information needs changed with CR, such that multiple assessments of information needs may be warranted as rehabilitation progresses to facilitate patient-centered education.

Keywords: Cardiovascular diseases; Cardiac rehabilitation; Needs assessment; Health knowledge, attitudes, practice; Surveys and questionnaires

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INTRODUCTION

Cardiovascular diseases (CVDs) represent a significant global health burden [1]. The implementation of secondary prevention strategies for CVDs has demonstrated remarkable effectiveness [2]. However, successful secondary prevention relies on patients' knowledge and adoption of multiple health behavior changes [3]. Unfortunately, many patients do not achieve optimal risk reduction despite available interventions [4]. Therefore, it is crucial for healthcare providers to assess the information needs of cardiac patients to enhance treatment outcomes [5,6]. Nonetheless, accurately identifying patient information needs can be challenging for healthcare providers due to differences in perceived importance between clinical personnel and patients [7]. Moreover, patient information needs evolve over time, particularly as they transition back to their daily routines and incorporate various therapies [8]. Additionally, patient subpopulations may have diverse information needs based on factors such as sex, age, ethnicity, and socioeconomic status [7].

Extensive research has been dedicated to exploring patients' information needs following various cardiovascular events, such as revascularization [9], acute coronary syndrome [10], post-myocardial infarction [8], and heart failure [11]. Surprisingly, limited attention has been given to investigating information needs in the context of cardiac rehabilitation (CR), despite patient education being a fundamental element of CR programs that aim to assist patients in implementing secondary prevention recommendations [12]. It is therefore recommended that an assessment of patient information needs be conducted prior to initiating patient education within CR, enabling the customization of educational interventions to meet individual needs and optimize outcomes [13].

In order to facilitate the identification of specific information needs in CR patients, a self-administered questionnaire called the Information Needs in Cardiac Rehabilitation (INCR; [Appendix 1](#)) was developed and subjected to psychometric validation in a Canadian context [14]. The INCR has since undergone translation and cultural adaptation for Chinese, Spanish, and Portuguese populations [15-17]. In the Korean setting, limited research has been conducted on the information needs of individuals with cardiac disorders. While several instruments have been developed in medically advanced countries since the 1990s to assess the information needs of cardiac patients [10], the availability of locally developed tools in this area remains scarce in Korea. To address this gap, a recent study aimed to

translate the INCR questionnaire into Korean [18]. However, this study had certain limitations, particularly in terms of sample size, with only 45 participants, which was insufficient to establish the validity of the tool. Additionally, previous studies did not assess the construct and criterion validities of the translated INCR questionnaire.

The primary objective of the current study was to translate and culturally adapt the INCR tool for implementation in the Korean context and subsequently conduct a comprehensive psychometric validation involving a participant sample size of over 100 individuals. Furthermore, the study aimed to determine the participants' highest priority information needs using the questionnaire.

METHODS

Design

This study was conducted in two stages. First, the INCR was translated and cross-culturally adapted into Korean version of the Information Needs in Cardiac Rehabilitation (INCR-K). Based on the COSMIN taxonomy [19], this first stage was to establish face, content, and cross-cultural validities of the scale. Face and content validities assess the extent to which a questionnaire accurately reflects its intended measurements. Several methods were employed to demonstrate face and content validities during translation, including cognitive debriefing, qualitative semi-structured interviews for feedback, and reviews conducted by an expert committee. The second step was the psychometric validation of the INCR-K through a cross-sectional survey, with repeated administration of the INCR-K in a random subsample. Structural validity, internal reliability, criterion validity, and responsiveness were assessed. This study was reviewed and approved by the Institutional Review Boards of Kangwon National University Hospital (IRB No. A-2022-01-005-002) and Seoul National University Bundang Hospital (IRB No. B-2207-769-303), and each participant provided informed written consent.

Materials

The INCR tool, developed and validated in English, assesses the information needs of patients undergoing CR. It consists of 55 items across 10 areas [14]. The 10 areas identified were the heart (physiology, symptoms, and surgical treatments), nutrition, exercise/physical activity, medication, work/vocational/social, stress/psychological factors, general/social concerns,

emergency/safety, diagnosis and treatment, and risk factors. Each item in the INCR-K, which assesses information needs, is rated on a 5-point Likert scale of 1 (really not important) to 5 (very important). The tool can be used to tailor educational interventions for patients undergoing CR, with higher scores indicating higher information needs. Furthermore, the tool can be used regardless of the CR participation duration.

Translation and cross-cultural adaptation of the INCR

The translation and cross-cultural adaptation of the INCR followed the Patient-Reported Outcomes Translation and Linguistic Validation Task Force guidelines by the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) [20], which include the following steps: (1) forward translation, (2) reconciliation, (3) back translation and review, (4) harmonization, (5) cognitive debriefing, (6) review of cognitive debriefing results and finalization, and (7) proofreading and final report.

Two independent translators (one was a medical doctor involved in the study and the other was not medical doctor) forward translated the INCR into Korean. Afterward, the two translations were reviewed for ambiguities, and any discrepancies were reconciled. Back translation was performed by two bilingual native English speakers fluent in Korean and blinded to the original English version. One translator was a healthcare provider, whereas the other was not.

An expert committee consisting of eight health professionals and translators compared the back translations to the original instrument for harmonization; in addition, the committee reviewed translations for linguistic, semantic, technical, and conceptual consistencies. This process resulted in the prefinal version of the INCR-K.

Regarding cognitive debriefing, the prefinal version was tested with five Korean patients from Kangwon National Uni-

versity Hospital receiving outpatient CR. The time required to complete the questionnaire was recorded, and patients were asked to provide feedback through qualitative semi-structured interviews. The patients were asked to rate the readability, length, and clarity of the questionnaire through 10 items, eight of which (Table 1) were rated through a visual analogue scale of 0–100 mm; 0 meaning not usable at all and 100 meaning very usable (i.e., higher scores denote more positive perceptions of the scale). These were analyzed using descriptive statistics. The remaining two questions (“If any of the questions in the survey are unclear, please tell us what they are” and “If any of the questions in the survey are duplicated, please tell us which one is the question”) were open-ended.

In the review of the input from cognitive debriefing by the expert committee, any ambiguous and redundant expressions were modified after a discussion. Finally, the refined version of the INCR-K was set for psychometric validation (Appendix 2).

Psychometric validation

Participants

In total, 104 patients were recruited from the CR programs at Kangwon National University Hospital and Seoul National University Bundang Hospital in Korea (Fig. 1). Seoul National University Bundang Hospital is situated in an urban locale, while Kangwon National University Hospital is located in a rural area. Sample size calculation for psychometric analysis was based on the recommendation of Hair et al. [21], which stipulates a minimum of 100 participants. The inclusion criteria consisted of patients diagnosed with CVDs who underwent CR between February 2022 and December 2022. Exclusion criteria encompassed individuals under the age of 18 years, those with literacy problems, and those with severe visual, cognitive, or mental impairments that hindered their ability to complete the question-

Table 1. Perceptions of the usability of the prefinal version of the INCR-K (n=5)

No.	Item	Value
1	Is the questionnaire, in your opinion, useful to assess “information needs in cardiac rehabilitation”?	81.2±13.9
2	Do you feel that the questionnaire asks about your information needs in cardiac rehabilitation?	73.8±20.1
3	What is your opinion about the length of the questionnaire?	59.6±31.0
4	Are the questions stated in a clear way?	67.8±31.0
5	Is the questionnaire well organized?	71.8±17.0
6	What is your feeling about the readability of the questionnaire?	59.0±36.4
7	What is your opinion about level of difficulty of filling-in the questionnaire?	77.8±20.4
8	What is your opinion about the layout of the questionnaire?	75.6±20.7

Values are presented as means±standard deviation and rated on a visual analogue scale, with a range of 0–100. INCR-K, Korean version of the Information Needs in Cardiac Rehabilitation.

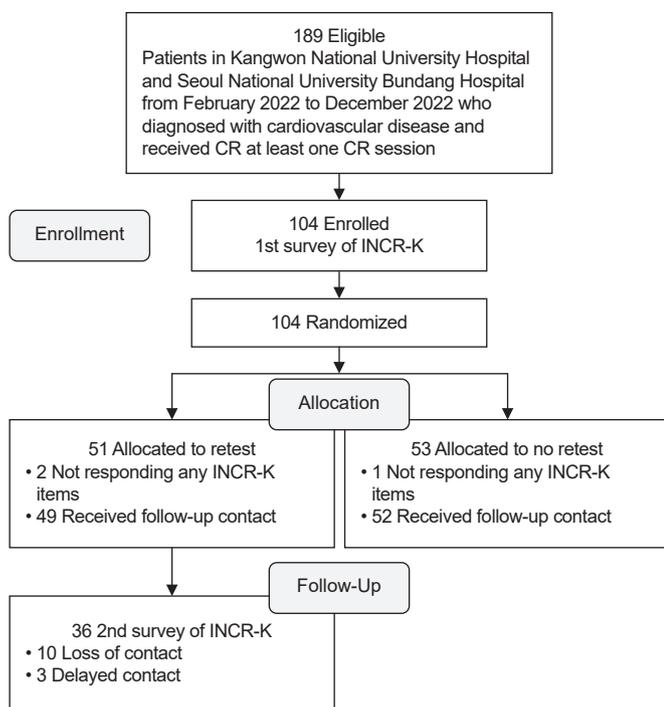


Fig. 1. Inclusion flowchart for the Korean Version of the Information Needs in Cardiac Rehabilitation (INCR-K) tool study. CR, cardiac rehabilitation.

naire. Upon enrollment, all participants underwent either a cardiopulmonary exercise test or an electrocardiogram-monitored exercise session. Additionally, all participants completed the CR education schedule, as documented in their medical records.

Measures

Participants completed the INCR-K questionnaire, and the scores of all items were averaged to determine the participants' total information needs. In addition, the average score per area was calculated. Data from participants who did not complete more than 20% of the items were excluded from analysis. In addition to completing the INCR-K, participants provided self-reported sociodemographic characteristics, such as sex, age, income, educational attainment, and work status. Although the participants completed their education sessions during CR, they were asked about their experience with receiving CR education in specific topics, including emergency, risk factor, exercise, and medication, with response options of "yes" or "no." The criterion for determining whether education had been received was based on the participants' self-report, regardless of the actual content or extent of education. In addition, the participants

were requested to indicate their preferred mode of education delivery (Appendix 3). Data on risk factors [22], diagnosed CVDs, comorbidities, treatment procedures, duration of CR, and number of CR sessions undertaken were obtained from the patients' medical charts.

Statistical analysis (psychometric validations and descriptive analysis)

Structural validity was assessed using principal component analysis. The suitability of the data for this analysis was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's sphericity test [23]. KMO values >0.60 were considered acceptable, and a p -value <0.05 in Bartlett's sphericity test was considered significant. Areas with eigenvalues >1.0 were extracted according to the Kaiser-Guttman criterion [24]. The matrix was interpreted using the varimax method with Kaiser normalization. Factor loading values >0.30 indicated representation in each area [25]. The internal consistency of each area was calculated using Cronbach's alpha, and a value >0.7 was considered to reflect satisfactory internal correlation between items of the same area [26].

Criterion validity was assessed using a t -test to compare the total INCR-K score (the mean of all items) among patients with different CR durations. The duration of CR was defined as the period starting from the initial of CR session, which could consist of either a cardiopulmonary exercise test or an electrocardiogram-monitored exercise session, up to the point of the completing of the questionnaire. The categorization of CR duration into two groups (≤ 1 week and >1 week) was motivated in the intention to observe potential changes in information needs between initial and subsequent participants after starting CR. The choice of using 1-week threshold was informed by that the average duration of phase 1 in CR is less than 1–2 weeks [27]. Furthermore, to assess the criterion validity of the newly introduced "knowledge sufficiency" scores, the INCR-K scores were compared to self-reported receipt of educational engagement.

To assess responsiveness, the questionnaire was re-administered 1 month after the first administration to half of the patients who were randomly selected using a computer-generated sequence. In our study, this 1-month interval was selected to correspond with the range of intervals (ranging from 3 weeks to 3 months) employed in previous studies [28,29]. Subsequently, the INCR-K scores for each area in the first and second administrations were compared using t -tests.

Descriptive statistics were used to describe the INCR-K scores

and determine whether patients had sufficient knowledge of each item. Data analysis was performed using IBM SPSS Statistics 25.0 (IBM Corp.). Statistical significance was set at $p < 0.05$.

RESULTS

Translation and cultural adaptation

Forward translation, reconciliation, back translation, and harmonization

During the forward translation of the INCR from English to Korean, appropriate consideration was given to the cultural implications of the Korean honorifics. After back translation, the discrepancies between the original and back-translated versions were identified and resolved. During harmonization, the expert committee decided to remove three items from the original questionnaire (original INCR items 37, 38, and 41) [14] because of the differences in medical systems between Canada and Korea. Afterward, the resulting prefinal version, consisting of 52 items, was subjected to cognitive debriefing.

Cognitive debriefing

The prefinal version of the INCR-K was tested on five patients. The researchers maintained a neutral stance throughout the self-administration process, encouraging the participants to complete all the questions. The questionnaire was completed in an average of 7 minutes and 44 seconds. The results of the subsequent semi-structured interviews showed high ratings of the INCR-K in terms of usefulness (mean score, 81.2 ± 13.9). In contrast, the INCR-K was rated as relatively difficult to read (59.0 ± 36.4), lengthy (59.6 ± 31.0), and possessing some unclear sentences (67.8 ± 31.0 ; Table 1). During the interviews, some participants commented that the medical terminology in the prefinal version was difficult to understand. Other participants expressed dissatisfaction with the number of items, redundant content, and vague expressions in the questionnaire.

Review of cognitive debriefing results and finalization

After reviewing the results of cognitive debriefing, the expert committee and the developer of the original INCR (Sherry L. Grace) revised the prefinal version; the revisions were as follows: (1) Incomprehensible expressions were modified to make them easier to understand; (2) Items with redundant or less relevant content were deleted, thus reducing the total number of items from 52 to 41; and (3) Vague expressions were clarified. Details of each change are provided below.

Respondents in the cognitive debriefing phase commented that several items were difficult to understand, particularly the item “What is angioplasty?”, which is an unfamiliar medical term to many patients. To address this problem, the word “stent” was added, making it #6 “What is angioplasty and stent placement?”. The term “stent” is a well-known term to patients.

To address the issue of length in the prefinal version and improve the overall readability of the questionnaire, we removed items that contained overlapping content. Three items regarding drug intake were identified to be similar; thus, the items “How do I remember to take my medication?” and “Are there foods I should avoid while taking these medications?” were deleted, leaving only item “How do I take my medication in the right way?” (INCR-K#21). Three items regarding stress were had overlapping content, and the items “How does stress affect my heart?” and “What can I do to reduce stress in my life?” were deleted, leaving only item “How can I cope with stress?” (INCR-K#27). Furthermore, two items on angina and chest pain were identified to have similar meanings, and the item “How do I recognize angina symptoms?” was deleted, leaving item “What should I do if I feel angina or chest pain?” (INCR-K#30) in the questionnaire. Three items regarding risk factors were similar in content; thus, the items “What are the risk factors that I cannot control?” and “What are the risk factors that I can control?” were deleted. The remaining item “What can I do to bring my risk factors under control?” (INCR-K#36) was retained. Finally, three similar items regarding tobacco use were evaluated and items “What are the benefits of quitting smoking?” and “What supports are available to help me quit smoking?” were deleted, leaving INCR-K#40, “How does tobacco affect the heart?” in the questionnaire.

Items with vague expressions were rephrased. For example, the item “When should I stop physical exercise?” was revised to “When should I stop exercise for safety?” (INCR-K#18) to better convey the intent of the question, which was to assess patients’ knowledge of the symptoms that should prompt the cessation of exercise during CR. To enhance clarity and comprehension, the item “What are the effects of complementary and alternative medications?” was revised to “Are complementary and alternative therapies (health supplements, Chinese medicine/acupuncture, massage, etc.) effective?” (INCR-K#23). This revision aimed to provide a clearer understanding of “complementary and alternative therapies.” To ensure the relevance of the questionnaire to the Korean context, specific examples such as “health supplements, Chinese medicine/acupuncture,

massage, etc.” were thoughtfully selected from two studies that specifically investigated the role of complementary and alternative treatments in CR [30,31]. These examples were carefully incorporated into the study to ensure that the questionnaire accurately reflected the Korean context. Finally, item “What feelings are common after a heart attack?” was revised to “What feelings are common after a heart attack? (Can I seek help if I feel depressed or anxious?)” (INCR-K#25) to clarify the intent of the question, which was to check for depression and anxiety that may occur after a heart attack.

Furthermore, to streamline the questionnaire, questions that were not applicable to all participants were excluded. This decision was primarily made to avoid an unnecessarily lengthy questionnaire, which could result in reduced response rates, respondent fatigue, and compromised data quality. Questions regarding specific topics such as preventing low blood sugar during exercise, caring for the feet during an exercise program, returning to an old job, or driving after a heart condition were removed. Instead, the questions focused on information needs relevant to a broader patient population, allowing for the development of a concise and efficient questionnaire. This approach improved the response rates and enhanced the overall quality of the collected data.

In the harmonization phase, two items were initially deleted because of differences between the Canadian and Korean medical systems. However, after revising the items to be appropriate for the Korean medical system, these two items were reintegrated into the INCR-K as “Is there a support system that can help patients with heart disease?” (INCR-K#29) and “When (in what cases) do I need to make an outpatient appointment or go to the emergency room?” (INCR-K#31). Initially, these questions were phrased as “What services, support organizations and groups are available?” and “When should I call the doctor?”, respectively.

Finally, in addition, respondents were asked to rate not only the importance of each item, but also whether they perceived they already had sufficient knowledge of the topic area (yes/no). Thus, in CR programs, the focus of the medical staff education can be on the areas where the patients require more knowledge. The total knowledge sufficiency score was calculated based on the percentage of “yes” responses for all items.

Proofreading and final report

The final version of the 41-item INCR-K is provided in [Appendix 2](#).

Psychometric validation

Characteristics of the participants

Initially, 104 patients provided informed consent to participate in the study; however, three patients were excluded from the analysis owing to failure to answer any of the items in the INCR-K, resulting in a total of 101 participants included in the study. As shown in [Table 2](#), the item completion rates were high.

[Table 3](#) shows the sociodemographic and clinical characteristics of the participants. Half the participants had recently started receiving CR. Approximately half of the participants had received heart education, but less than 25% had received education regarding medication at the time of survey administration.

Factor analysis and internal consistency

Through translation and adaptation, the original 55 items of the INCR were reduced to 41 items in the final INCR-K. To assess structural validity, a factor analysis was conducted on the 41 items of the INCR-K using principal component analysis. The results showed that the data was suitable for factor analysis, with a KMO index of 0.824 (above 0.60) and a Bartlett's test of sphericity of $\chi^2=2,880.63$ ($p < 0.001$).

Eight areas were extracted, which accounted for 70.8% of the total variance. [Table 4](#) presents the factor loading for the 41 items in the INCR-K. These areas included the heart, food and self-management, exercise, medication, emotion and return to previous roles, treatment and diagnosis, risk factors 1, and risk factor 2. The internal consistency of each area was assessed using Cronbach's alpha of 0.73–0.88. All areas were considered internally consistent ($\alpha > 0.70$), as shown in [Table 4](#).

Criterion validity

As shown in [Fig. 2A](#), the mean INCR-K scores were compared based on CR duration. For CR durations categorized as ≤ 1 week ($n=51$, 50.5%) and > 1 week ($n=50$, 49.5%), the mean INCR-K scores were 4.27 ± 0.49 and 4.51 ± 0.32 , respectively. The results showed that patients with a longer CR duration perceived information as more important ($p=0.005$). Among 51 patients who had CR duration ≤ 1 week, 32 were inpatients, while the remaining 19 were outpatients. All 50 patients with CR duration > 1 week were all outpatients.

In addition, the criterion validity of the added knowledge sufficiency ratings was supported because the receipt of heart education was significantly related to these ratings of knowledge sufficiency ($p < 0.05$), as shown in [Fig. 3](#). Moreover, the criterion

Table 2. INCR-K responses including information needs and knowledge sufficiency

Area	Item	INCR-K information needs/ importance rating		Sufficient knowledge	
		Item score ^{a)} (mean±SD)	Item completion rate (%)	Yes (%)	Completion rate (%)
The heart	1. How does a healthy heart work?	4.66±0.55	96.2	59.6	98.0
	2. What is “coronary artery disease”?	4.56±0.67	96.2	52.5	98.0
	3. What is angina?	4.50±0.61	97.1	62.9	96.0
	4. What happens when someone has a heart attack?	4.75±0.56	95.2	79.2	100
	5. What is “bypass surgery”?	4.27±0.88	93.3	30.3	98.0
	6. What is angioplasty and stent placement?	4.49±0.77	95.2	70.0	99.0
Food and self-management	7. What foods should I eat for a healthy heart?	4.57±0.61	97.1	64.6	98.0
	8. How can I choose healthy foods at the grocery store?	4.21±0.74	97.1	52.5	98.0
	9. How can I choose healthy foods when dining out?	4.19±0.76	97.1	52.5	98.0
	10. How do I read food labels?	3.80±0.87	97.1	45.5	98.0
	16. What types of exercise equipment are available? (where?)	3.95±0.75	97.1	51.5	98.0
Exercise	17. How can I exercise at home safely?	4.24±0.74	97.1	60.6	98.0
	11. How will exercise help my heart condition?	4.61±0.58	97.1	79.6	97.0
	12. What are the components of a safe exercise program?	4.51±0.70	96.2	54.5	98.0
	13. What is cardiovascular or aerobic exercise?	4.46±0.66	95.2	78.8	98.0
	14. How should I exercise in hot or cold weather?	4.35±0.76	96.2	59.6	98.0
Medication	15. What is resistance training (i.e. exercise for strength)?	4.08±0.72	97.1	48.5	98.0
	35. What are the risk factors that I can control?	4.46±0.66	97.1	56.1	97.0
	18. When should I stop physical exercise for safety?	4.57±0.59	97.1	61.6	98.0
	20. What medications do I need to help my heart?	4.50±0.67	97.1	46.9	97.0
	21. How do I take my medication in the right way?	4.57±0.62	97.1	63.6	98.0
	22. Which side effects are possible with my medication?	4.45±0.66	96.2	35.7	97.0
Emotion and return to previous roles	23. Are complementary and alternative therapies (health supplements, Chinese medicine/ acupuncture, massage, etc.) effective?	3.54±1.06	97.1	34.3	98.0
	19. Is sexual activity safe for me?	3.76±1.01	96.2	43.4	98.0
	24. When can I return to work and to my old activities?	4.20±0.78	100	44.4	98.0
	25. What feelings are common after a heart attack? (Can I seek help if I feel depressed or anxious?)	4.15±0.84	97	50.5	96.0
Treatment and diag- nosis	27. How can I cope with stress?	4.57±0.57	97.1	54.1	97.0
	28. Do sleep problems affect my heart?	4.40±0.63	97.1	52.5	98.0
	30. What should I do if I feel angina or chest pain?	4.79±0.46	96.2	72.7	98.0
	31. When (in what cases) do I need to make an outpatient appointment or go to the emergency room?	4.64±0.63	96.2	74.7	98.0
	32. What are the tests used to diagnosis my heart condition?	4.28±0.76	97.1	38.4	98.0
	33. What treatments are available for my condition?	4.43±0.64	97.1	38.4	98.0
	36. What can I do to bring my risk factors under control?	4.47±0.63	97.1	41.4	98.0
Risk factor 1	26. How does stress affect my heart?	4.65±0.54	97.1	78.8	98.0
	37. How does cholesterol affect my heart?	4.53±0.64	97.1	67.7	98.0
	38. How does diabetes affect my heart?	4.55±0.59	97.1	68.7	98.0
	39. How does physical inactivity affect my heart?	4.38±0.66	97.1	62.6	98.0
Risk factor 2	29. Is there a support system that can help patients with heart disease?	4.07±0.92	100	12.1	98.0
	34. What are the risk factors for heart disease?	4.51±0.58	97.1	53.5	98.0
	40. How does tobacco affect my heart?	4.60±0.74	97.1	82.8	98.0
	41. How does alcohol affect my heart?	4.54±0.66	97.1	79.8	98.0
Total		4.38±0.43	99.5	55.3	97.8

INCR-K, Korean version of the Information Needs in Cardiac Rehabilitation; SD, standard deviation.

^{a)}Range, 1-5, with 5 being “very important.”

Table 3. Socio-demographic and clinical characteristics of the participants and health care receipt

Characteristic	Value (n=101)
Socio-demographic	
Hospital	
Kangwon National University Hospital (rural)	60 (59.4)
Seoul National University Bundang Hospital (urban)	41 (40.6)
Age (yr)	59.46±11.90
<65	67 (66.3)
≥65	34 (33.7)
Sex	
Male	82 (81.2)
Female	19 (18.8)
Work status	
Paid job	63 (62.4)
Retired	22 (21.8)
No job	15 (14.8)
No response	1 (1.0)
Education	
Elementary school	11 (10.9)
Middle school	9 (8.9)
High school	31 (30.7)
University	38 (37.6)
Postgraduate	11 (10.9)
No response	1 (1.0)
Monthly income (USD)	
<1,000	10 (9.9)
1,000–2,000	21 (20.8)
2,000–3,000	20 (19.8)
3,000–4,000	19 (18.8)
4,000–7,000	14 (13.9)
>7,000	9 (8.9)
No response	8 (7.9)
Clinical	
Risk factor	
Family history	10 (9.9)
Tobacco use ^{a)}	41 (40.6)
Sedentary lifestyle ^{b)}	52 (51.5)
Obesity ^{c)}	44 (43.6)
Hypertension	43 (42.6)
Diabetes	23 (22.8)
Dyslipidemia	53 (52.5)
Low high-density lipoprotein	91 (90.1)
Comorbidities	
Stroke	2 (2.0)
Chronic kidney disease	4 (4.0)
CR indication	
Acute myocardial infarction	84 (83.2)
Unstable angina	5 (4.9)
Heart failure	6 (5.9)
Peripheral artery disease ^{d)}	3 (3.0)
Arrhythmia	3 (3.0)
Cardiac procedure	
Percutaneous coronary intervention	84 (83.2)

(Continued to the next page)

Table 3. Continued

Characteristic	Value (n=101)
Bypass surgery	4 (4.0)
Valve surgery	4 (4.0)
Health service use	
Duration in CR (wk)	
≤1	51 (50.5)
>1	50 (49.5)
Received CR education	
Emergency response	46 (45.5)
Risk factor management	45 (44.6)
Exercise	56 (55.4)
Medication	17 (16.8)

Values are presented as number (%) or mean±standard deviation.

CR, cardiac rehabilitation.

^{a)}Current cigarette smokers or those who quit smoking within the previous 6 months or have been exposed to environmental tobacco smoke [37].

^{b)}Not participating in at least 30 minutes of moderate-intensity physical activity (40%–60% of oxygen consumption reserve) on at least 3 days of the week for at least 3 months [37].

^{c)}Body mass index≥25 kg/m².

^{d)}Patients with peripheral artery disease had cardiovascular risk factors.

validity was supported because a longer CR duration corresponded to a higher knowledge sufficiency (p=0.04; Fig. 2B).

Responsiveness

Of the randomly selected participants, 10 did not complete the INCR a second time and three completed the second questionnaire after more than 3 months (Fig. 1). Fig. 4 displays the INCR-K item scores per area at the first and second administrations. All areas were rated as more important during the second administration. There was a significant difference in information needs according to time in the following areas: the heart, exercise, and treatment and diagnosis. Specifically, during the first test, patients were most interested in learning about “the heart” and “treatment and diagnosis.” However, during the second test, participants reported their greatest information needs to be related to “the heart” and “exercise.”

Descriptive analysis of information needs and knowledge sufficiency and preferred educational delivery modes

The mean INCR-K score on the first administration was 4.38±0.43, with 85.1% of all participants rating the importance of the informational items as high (INCR-K score≥4). The three items with the highest ratings were as follows: #30 “What should I do if I feel angina or chest pain?” (4.79±0.46), #4 “What happens when someone has a heart attack?” (4.75±0.56), and #1

Table 4. Principal component analysis of 41 items of the INCR-K

Area	Item	Factor loading	Internal consistency (Cronbach's alpha)	Mean information needs score per area (mean±SD)	Knowledge sufficiency per area (%)
The heart	1. How does a healthy heart work?	0.687	0.88	4.54±0.70	59.1
	2. What is "coronary artery disease"?	0.747			
	3. What is angina?	0.617			
	4. What happens when someone has a heart attack?	0.704			
	5. What is "bypass surgery"?	0.658			
	6. What is angioplasty and stent placement?	0.697			
Food and self-management	7. What foods should I eat for a healthy heart?	0.546	0.87	4.16±0.78	54.5
	8. How can I choose healthy foods at the grocery store?	0.785			
	9. How can I choose healthy foods when dining out?	0.744			
	10. How do I read food labels?	0.820			
	16. What types of exercise equipment are available? (where?)	0.463			
Exercise	17. How can I exercise at home safely?	0.505	0.87	4.41±0.70	62.9
	11. How will exercise help my heart condition?	0.498			
	12. What are the components of a safe exercise program?	0.672			
	13. What is cardiovascular or aerobic exercise?	0.781			
	14. How should I exercise in hot or cold weather?	0.562			
	15. What is resistance training (i.e. exercise for strength)?	0.339			
Medication	35. What are the risk factors that I can control?	0.420	0.77	4.33±0.83	48.4
	18. When should I stop physical exercise for safety?	0.548			
	20. What medications do I need to help my heart?	0.830			
	21. How do I take my medication in the right way?	0.750			
	22. Which side effects are possible with my medication?	0.708			
Emotion and return to previous roles	23. Are complementary and alternative therapies (health supplements, Chinese medicine/acupuncture, massage, etc.) effective?	0.416	0.73	4.04±0.90	46.1
	19. Is sexual activity safe for me?	0.611			
	24. When can I return to work and to my old activities?	0.653			
Treatment and diagnosis	25. What feelings are common after a heart attack? (Can I seek help if I feel depressed or anxious?)	0.649	0.87	4.51±0.64	53.2
	27. How can I cope with stress?	0.538			
	28. Do sleep problems affect my heart?	0.527			
	30. What should I do if I feel angina or chest pain?	0.640			
	31. When (in what cases) do I need to make an outpatient appointment or go to the emergency room?	0.741			
	32. What are the tests used to diagnosis my heart condition?	0.537			
	33. What treatments are available for my condition?	0.379			
Risk factor 1	36. What can I do to bring my risk factors under control?	0.613	0.86	4.53±0.61	69.5
	26. How does stress affect my heart?	0.534			
	37. How does cholesterol affect my heart?	0.511			
	38. How does diabetes affect my heart?	0.709			
Risk factor 2	39. How does physical inactivity affect my heart?	0.492	0.74	4.43±0.76	57.1
	29. Is there a support system that can help patients with heart disease?	0.503			
	34. What are the risk factors for heart disease?	0.430			
	40. How does tobacco affect my heart?	0.733			
	41. How does alcohol affect my heart?	0.841			

INCR-K, Korean version of the Information Needs in Cardiac Rehabilitation; SD, standard deviation.

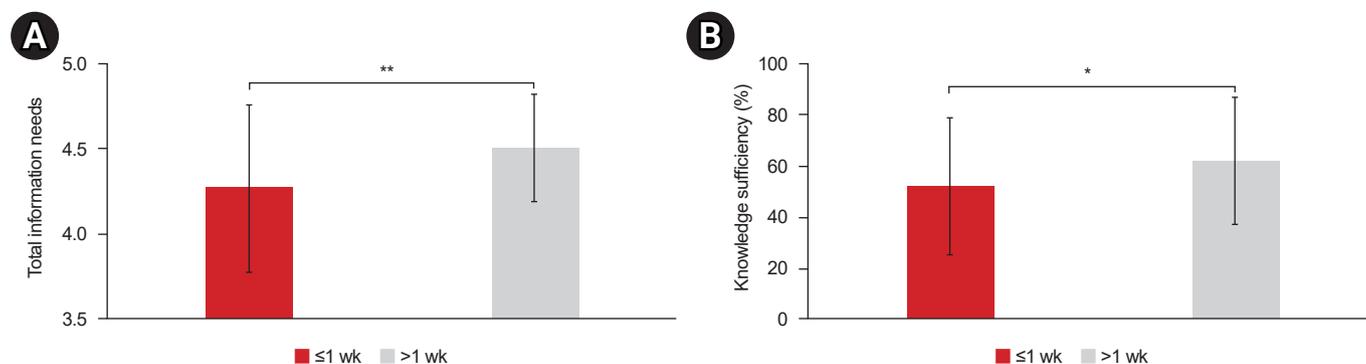


Fig. 2. Total information needs (range, 1-5) (A) and knowledge sufficiency (range, 0%-100%) (B) based on cardiac rehabilitation duration, n=101. Significant differences are indicated by asterisks (*p<0.05, **p<0.01).

“How does a healthy heart work?” (4.66 ± 0.55). Whereas, three items with the lowest information need were #23 “Are complementary and alternative therapies (health supplements, Chinese medicine/acupuncture, massage, etc.) effective?” (3.54 ± 1.06), #19 “Is sexual activity safe for me?” (3.76 ± 1.01), and #10 “How do I read food labels?” (3.80 ± 0.87 ; Table 2).

Among the eight areas of the INCR-K, participants rated “the heart” and “risk factor 1” (e.g., stress, cholesterol, diabetes, and physical inactivity) as the most important information needs (4.54 ± 0.70 and 4.53 ± 0.61 , respectively). Meanwhile, “emotion and return to previous roles” and “food and self-management” were rated as the lowest information needs (4.04 ± 0.90 and 4.16 ± 0.78 , respectively; Table 4).

Table 2 presents knowledge sufficiency, expressed as the percentage of “yes” responses for each item. Knowledge sufficiency was 12.1%–82.8%. Specifically, the items with the highest knowledge sufficiency were #40 “How does tobacco affect my heart?”, #41 “How does alcohol affect my heart”, and #11 “How will exercise help my heart condition?”. Prior to psychometric validation, we hypothesized that items demonstrating higher knowledge sufficiency would indicate a reduced need for additional information. However, information needs remained high among participants with prior knowledge. The mean INCR-K score was 4.53 ± 0.65 for participants with knowledge and 4.18 ± 0.81 for those without knowledge ($p < 0.001$).

Table 5 shows that the preferred method of educational delivery was face-to-face consultation with medical staff (53.5%). Conversely, the least preferred method was through audiovisual materials (4.0%).

DISCUSSION

Fulfilling the information needs of cardiac patients positively affects the patients’ quality of life, satisfaction with care, and health outcomes [6]. To effectively address these needs, healthcare providers must evaluate the information needs of patients with cardiac diseases participating in CR programs. To assess the information needs in Korea, we translated the original INCR into Korean, culturally adapted it, and validated its psychometric properties. An abridged version comprising 41 items was finalized. This revised version also incorporated knowledge sufficiency rating, which may prove helpful in the current era where many patients receive health information online. The results supported the face, content, cross-cultural, and criterion validities of the INCR-K as well as its internal reliability and responsiveness.

The INCR enables healthcare providers to effectively identify and address the information needs of patients undergoing CR, thus bridging the information gap between medical staff and patients and ultimately resulting in improved outcomes [5,6]. In a previous study, the original version of the INCR was employed to identify the information needs of patients and gaps in the educational curriculum of patients undergoing CR [32]. Modifying the curriculum based on these findings can enhance the effectiveness and efficiency of education. Hence, further studies in Korea are warranted to assess the effectiveness of implementing the INCR-K in patient education.

The results of this study agrees with those of previous studies in some aspects but differ in others. First, similar to previous studies, this study established the criterion validity of INCR

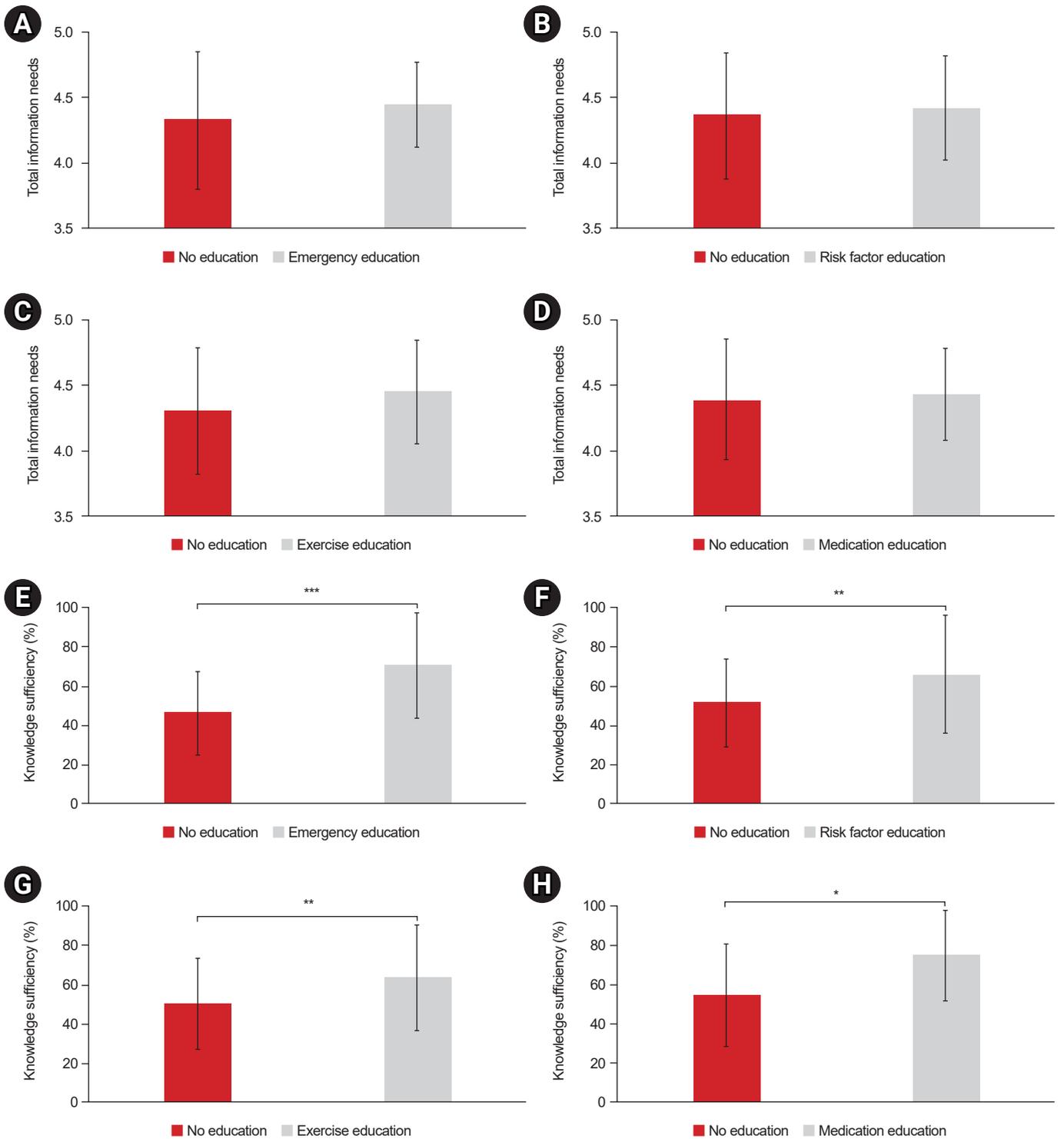


Fig. 3. Total information needs (range, 1-5) (A-D) and knowledge sufficiency (range, 0%-100%) (E-H) by receipt of cardiac rehabilitation education, by topic. Perceived knowledge sufficiency was significantly related to previous receipt of heart education, but there were no differences in information needs, suggesting that patients understood the importance of the topics. Significant differences are indicated by asterisks (*p<0.05, **p<0.01, ***p<0.001).

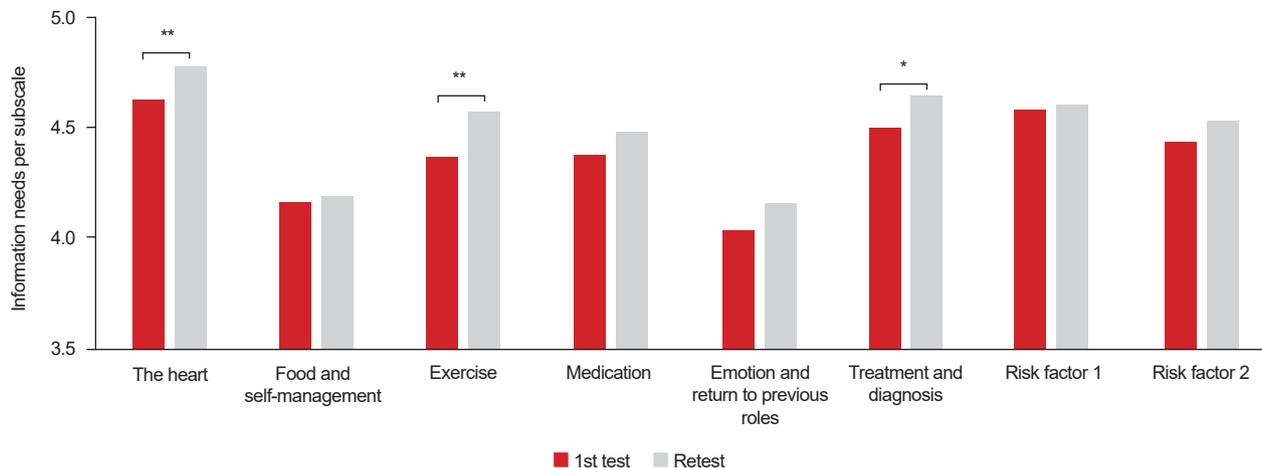


Fig. 4. Comparison of information needs (range, 1–5) per area for the first and second tests, n=36. Significant differences are indicated by asterisks (*p<0.05, **p<0.01).

Table 5. Preferred education delivery mode

	Value (n=101)
Face-to-face consultation with medical staff	54 (53.5)
Internet resources	46 (45.5)
Smartphone apps	41 (40.6)
Booklets	34 (33.7)
Face-to-face lecture	33 (32.7)
E-learning	13 (12.9)
Audiovisual materials	4 (4.0)

Values are presented as number (%).

based on CR duration [14,15]. Decker et al. [8] observed that as the duration of CR increased, there was a corresponding increase in patients’ information needs. Initially, patients depend heavily on the clinicians’ decisions, particularly when confronted with life-threatening situations. However, as the CR program progresses and their condition stabilizes, patients gradually become more involved in the decision-making process. Consequently, the increase in information needs is attributable to the growing number of questions related to decision making. According to Ghisi et al. [33], extended CR participation enhances knowledge sufficiency. Continuous engagement in a CR program allows patients to reinforce their knowledge through repeated training sessions.

Consequently, as the duration of CR increases, patients’ knowledge sufficiency improves. Second, the item (INCR-K#30) with the highest information needs was related to emergency and safety issues, which is consistent with the results of previ-

ous studies [6,34,35]. Emergency situations such as angina and heart attack were considered the most important, and this finding was consistent regardless of the stage of the patient in the CR program. Furthermore, it was observed that the “risk factor 1” area (e.g., stress, cholesterol, diabetes, and physical inactivity) demonstrated elevated information needs compared to other areas (Table 4). This finding aligns with those of previous studies reporting significant level of information need in this area [34,36]. The primary reason for heightened information needs in relation to risk factors may be attributable the intense fear of heart disease recurrence among individuals. This indicates that patients with a history of heart disease, particularly those who have had myocardial infarction, exhibit the highest level of concern regarding the possibility of recurrence and recognize the importance of managing risk factors for prevention [36]. Third, following translation and cultural adaptation, the number of items in the INCR questionnaire decreased from 55 to 41. Although these two areas were omitted, the overall structure of the INCR-K remained consistent with that of the original English version [14]. The initial version of the INCR encompasses 10 areas: heart, exercise/physical activity, medication, work/ vocational/social, stress/psychological factors, general/ social concerns, emergency/safety, diagnosis and treatment, risk factors, and barriers/goal setting. After translation and cultural adaptation, the INCR-K was created. It underwent a subsequent factor analysis, resulting in the identification of eight areas, namely heart, food and self-management, exercise, medication, emotion and return to previous roles, treatment and diagnosis,

risk factor 1, and risk factor 2. Despite the variation in area composition between the original INCR and INCR-K, both questionnaires share common areas such as Heart, Exercise, Medication, Treatment and diagnosis, and Risk factor; thus ensuring the overall consistency of the questionnaire.

This study has several implications. First, it highlights the need for direct knowledge assessment to determine knowledge sufficiency more accurately. In the INCR-K, knowledge sufficiency was evaluated indirectly by asking patients to provide “yes” or “no” responses. However, solely confirming knowledge without direct assessment does not guarantee a precise understanding of the information. Although healthcare providers should prioritize addressing information that patients consider important and areas in which their knowledge is lacking, ascertaining patients’ actual comprehension without direct assessment remains challenging. Therefore, it is essential to ensure that patients understand the information using direct assessment methods. Furthermore, a distinction was observed between the actual implementation of education and the patients’ perceptions of receiving education. All 101 patients (100%) had received education as documented in their medical records; however, only 14 of 101 patients (13.9%) reported that they had received the complete education. This discrepancy suggests that patients may not feel confident about receiving sufficient education, thus highlighting the need for continued educational efforts. We believe that enhancing the curriculum by reinforcing education that patients did not acknowledge will result in a more effective delivery of education. Finally, the findings of this study emphasize the importance of regularly assessing patient information needs throughout their CR program, as these needs may change over time. This continued assessment can ensure that information needs are met and support optimal patient self-management.

To ensure efficient patient education in clinical settings, it is crucial to prioritize two key areas: the “area with the highest information needs” and “area with the lowest knowledge sufficiency.” The area with the highest information needs corresponds to the topics that patients are most curious about, whereas the area with the lowest knowledge sufficiency relates to subjects that patients have the least understanding. Among the various areas examined, the “heart” area demonstrated the highest information needs, with a score of 4.54 ± 0.70 (Table 4). This result can be attributed to the significance of heart disease and patients’ priority of acquiring information and knowledge related to their heart health.

Therefore, it is recommended to develop and implement educational programs that specifically focus on the “heart” area in clinical practice to enhance the knowledge of heart health. In contrast, the area of “emotion and return to previous roles” displayed the lowest knowledge sufficiency (Table 4). Patients’ lack of knowledge in this area is attributable to their perception of heart disease, primarily as a physical ailment, resulting in an insufficient understanding of the emotional challenges and importance of resuming their previous roles. Comorbid psychiatric disorders are prevalent in CR patients and significantly affect their quality of life [37]. Therefore, it is essential to incorporate regular psychiatric assessments into CR programs and provide robust support for patients to resume their previous roles [37].

This study had some limitations. First, although this study met the minimum sample size of 100 participants, as recommended by Hair et al. [21], the same authors suggested a minimum of five subjects per item for factor analysis, which would require 205 participants for the 41-item INCR-K. However, the assumptions were met for the factor analysis, and the solution converged, assuaging the sample size concerns. However, a larger sample size would be required to establish construct validity, although this has been established in other INCR versions; thus, any concerns in this regard would be minimal. In addition, this study was performed in only two regions of Korea. Future studies in other regions are warranted to establish generalizability.

In conclusion, the INCR-K questionnaire has satisfactory psychometric properties; hence, it can be used to assess the information needs of Korean patients undergoing CR. The results provide evidence of the face, content, cross-cultural, structural, and criterion validities, internal consistency, and responsiveness of the INCR-K. The INCR-K tool can support healthcare professionals in determining the information needs of patients undergoing CR. Therefore, education can be tailored to their individual needs.

CONFLICTS OF INTEREST

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

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AUTHOR CONTRIBUTION

Conceptualization: Baek S, Kim WS, Grace SL. Formal analysis: Jeong S, Baek S. Investigation: Jeong S, Kim H, Cha S, Choi E. Methodology: Jeong S, Kim WS, Chang WK, Kim C, Grace SL, Baek S. Project administration: Baek S. Visualization: Jeong S, Baek S. Writing – original draft: Jeong S, Baek S. Writing – review and editing: Jeong S, Kim WS, Chang WK, Grace SL, Baek S. Approval of final manuscript: all authors.

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Appendix 1. Original version of the Information Needs in Cardiac Rehabilitation (INCR) and preferences for educational delivery formats



Information Needs Assessment for Cardiac Rehabilitation Patients

You are being invited to fill out this questionnaire because you are in the cardiac rehabilitation program. Knowledge about your condition, treatments and risk factors is an important component about management. We would like to have a sense of how important a topic may be to increase your knowledge about heart disease as you have been recovering from your heart event.

The purpose of this questionnaire is to:

- assess your needs for information regarding heart disease;
- identify specific topics about your condition that you want to learn about;
- identify your preferences for educational delivery formats.

This questionnaire is **confidential** and completely **voluntary**.
It should take about 10 minutes to complete.

Instructions for Completion:	
1.	Please answer as many items as you can;
2.	Rate each topic on a 5-item scale related to 'how important do you think this topic is to increase your knowledge about heart disease';
3.	After completing the questionnaire, please return to the researcher or reception.
4.	If you do not wish to fill out the questionnaire, please leave it blank and place it in the collection box or return to the researcher.

INFORMATION NEEDS ASSESSMENT IN CARDIAC REHABILITATION

Rate the importance of each topic to increase your knowledge about coronary artery disease

	Really not important	Not important	Neutral	Important	Very Important
1. How does a healthy heart works?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. What is "coronary artery disease"?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. What is angina?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. What happens when someone has a heart attack?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. What is "bypass surgery"?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. What is an angioplasty?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. What foods should I eat for a healthy heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. How can I choose healthy foods at the grocery store?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. How can I choose healthy foods when dining out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. How do I read food labels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. How will exercise help my heart condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. What are the components of a safe exercise program?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. What is cardiovascular or aerobic exercise?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. What can I do to improve or maintain flexibility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. How should I exercise in hot or cold weather?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. How do I prevent low blood sugar with exercise?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. How do I take care of my feet when in an exercise program?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. What is resistance training (i.e. exercise for strengthen)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. What types of exercise equipment are available? (where?)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. How can I exercise at home safely?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. When should I stop physical exercise?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Is sexual activity safe for me?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. What medications do I need to help my heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. How do I take my medication in the right way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Which side effects are possible with my medication?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Do the medications I am taking interfere with each other?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Are there foods I should avoid while taking these medications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. What are the effects of complementary and alternative medications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. When can I return to work and to my old activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Can I go back to my same job?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. When can I start driving again?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. What feelings are common after a heart attack?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. How does stress affect my heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. How can I cope with stress?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. What can I do to reduce stress in my life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Do sleep problems affect my heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. What services, support organizations and groups are available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. What support services are available to my family?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. How do I recognize angina symptoms?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. What should I do if I feel angina or chest pain?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. When should I call the doctor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. When should I call 911 or go to the emergency room?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

INFORMATION NEEDS ASSESSMENT IN CARDIAC REHABILITATION

Rate the importance of each topic to increase your knowledge about coronary artery disease

	Really not important	Not important	Neutral	Important	Very Important
43. What are the tests used to diagnosis my heart condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. What treatments are available for my condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. What are the risk factors for heart disease?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. What are the risk factors that I cannot control?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. What are the risk factors that I can control?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. What can I do to bring my risk factors under control?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. How does cholesterol affect my heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. How does diabetes affect my heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. How does physical inactivity affect my heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. How does smoking affect my heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. What are the benefits of quitting smoking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. What supports are available to help me quit smoking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. How does alcohol affect my heart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What other topics would you like to describe?

PREFERENCES FOR EDUCATIONAL DELIVERY FORMATS

How would you prefer this information to be delivered?
You can mark as many options as you want.

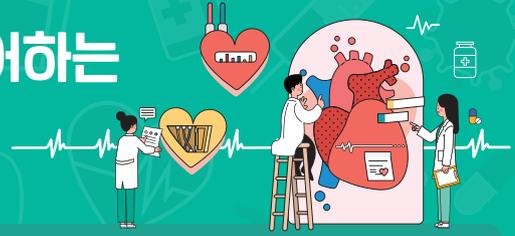
- 1. Printed book
- 2. Internet Resources (website, videos)
- 3. E-learning module (recorded lectures, slides)
- 4. Lectures
- 5. Audio: CD or "podcast"
- 6. Discussion during consultations with healthcare provider
- 7. Movies and videos that I can bring to home

Other ideas for formats of education that you think would be helpful?

Thanks for your participation!

Appendix 2. Korean version of the Information Needs in Cardiac Rehabilitation (INCR-K)

심장재활 대상 환자들이 알고 싶어하는 교육주제 설문조사



심장질환의 적절한 자기관리를 위하여 모든 심장질환 환자는 자신의 상태나 치료 및 위험인자에 대해서 잘 알고 있어야 합니다. 이 설문지는 귀하께서 심장질환에 대해 알고자 할 때, 어떤 정보를 얼마나 알고 싶어 하는지를 조사하기 위하여 시행됩니다.

이 설문지의 목적은 다음과 같습니다.

- 심장 질환에 대해 어떤 정보를 필요로 하는지 확인합니다.
- 귀하의 상태에 대해 알고 싶은 특히 알고 싶어하는 정보가 무엇인지 확인합니다.
- 선호하는 교육 방식을 확인합니다.

이 설문지는 자발적이며 원하지 않으시면 설문을 중단할 수 있습니다.

총 문항은 심장 재활에 대한 정보의 중요성 평가항목 41개,

교육 전달 방식에 대한 선호도 항목 7개로 소요시간은 약 10분입니다.

▶ 작성 지침

1. 가능한 한 많은 항목에 응답해 주세요.
2. 각 항목마다 해당 내용이 '심장 질환에 대한 지식을 높이는 데 얼마나 중요하다고 생각'하는지를 5단계의 척도로 평가해 주세요.
3. 설문지 작성 후 담당자에게 연락 주시기 바랍니다.

작성일 : _____



심장질환에 대한 당신의 지식을 늘리기 위해서, 각 항목의 정보가 얼마나 중요한지 (혹은 필요한지)를 평가해주세요.

또한 이미 각 질문을 잘 알고 있는 지를, '예' '아니오'로 표시해주세요.

	전혀 중요하지 않음	중요하지 않음	보통	중요함	매우 중요함	이미 이 내용을 잘 알고 있다.
1. 건강한 심장은 어떻게 작동하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	예 <input type="checkbox"/> 아니오 <input type="checkbox"/>
2. "관상동맥질환"이란 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
3. "협심증"이란 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
4. 심장마비가 발생하면 어떻게 되는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
5. "관상동맥우회로 이식술(bypass surgery)"이란 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
6. "풍선확장술(angioplasty)", "스텐트(stent)시술"이란 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
7. 건강한 심장을 위하여 어떤 음식을 먹어야 하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
8. 식료품 가게에서 건강에 좋은 식품을 고르는 방법은 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
9. 외식할 때 건강에 좋은 식사를 고르는 방법은 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
10. 식품 포장에 붙어 있는 영양성분표시는 어떻게 읽는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
11. 운동은 심장에 어떤 도움이 되는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
12. 심장에 안전한 운동은 어떻게 하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
13. 심혈관 운동 또는 유산소 운동이란 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
14. 덥거나 추울 때는 운동을 어떻게 해야 하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

심장재활 대상 환자들이 알고 싶어하는 교육주제 설문조사



심장질환에 대한 당신의 지식을 늘리기 위해서, 각 항목의 정보가 얼마나 중요한지 (혹은 필요한지)를 평가해주세요.

또한 이미 각 질문을 잘 알고 있는 지를, '예' '아니오'로 표시해주세요.

	전혀 중요하지 않음	중요하지 않음	보통	중요함	매우 중요함	이미 이 내용을 잘 알고 있다.
15. 저항 훈련(즉, 근력 운동)은 어떻게 하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	예 <input type="checkbox"/> 아니오 <input type="checkbox"/>
16. 어떤 종류의 운동기구들이 유용한가? (어디서 운동할 수 있는가?)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
17. 어떻게 하면 집에서도 안전하게 운동할 수 있는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
18. 운동 중 안전을 위해 운동을 중단해야 하는 경우는?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
19. 성행위는 나에게 안전한가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
20. 건강한 심장을 위하여 내게 어떤 약들이 필요한가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
21. 올바른 약물 복용법은?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
22. 약물 복용으로 어떤 부작용이 생길 수 있는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
23. 보완대체치료(건강보조식품, 한약/침술, 마사지 등)는 효과가 있는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
24. 언제쯤 직장(원래 하던 일)과 이전 수준의 활동으로 돌아갈 수 있는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
25. 심장마비 후 보통 어떤 감정이 드는가? (기분이 우울하거나 불안하면 도움을 받을 수 있는가?)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
26. 스트레스는 심장에 어떤 영향을 주는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
27. 심장 건강을 위해 스트레스에 어떻게 대처해야 하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
28. 수면장애는 심장에 어떤 영향을 주는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
29. 심장질환 환자에게 도움이 될 만한 지원제도가 있는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>



심장질환에 대한 당신의 지식을 늘리기 위해서, 각 항목의 정보가 얼마나 중요한지 (혹은 필요한지)를 평가해주세요.

또한 이미 각 질문을 잘 알고 있는 지를, '예' '아니오'로 표시해주세요.

	전혀 중요하지 않음	중요하지 않음	보통	중요함	매우 중요함	이미 이 내용을 잘 알고 있다.
30. 협심증이 의심되거나 흉통이 느껴지면 어떻게 해야 하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	예 <input type="checkbox"/> 아니오 <input type="checkbox"/>
31. 연제(어떤 경우에) 외래 진료를 예약하거나 응급실에 가야 하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
32. 심장 상태를 평가하기 위하여 시행되는 검사들은 어떤 것들이 있는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
33. 내가 받을 수 있는 치료에는 무엇이 있는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
34. 심장질환의 위험 인자는 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
35. 심장재활이란 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
36. 심장질환의 위험 인자를 조절하려면 어떻게 해야 하는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
37. 콜레스테롤이 심장에 어떤 영향을 미치는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
38. 고혈압이 심장에 어떤 영향을 미치는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
39. 신체 활동 부족이 심장에 미치는 영향은 무엇인가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
40. 담배가 심장에 어떤 영향을 미치는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
41. 음주가 심장에 어떤 영향을 미치는가?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

▶ 심장 질환을 잘 관리하기 위해서 더 알고 싶은 다른 주제가 있나요?

Appendix 3. Preferences for educational delivery formats (Korean version)교육 방식에 대한 선호도

교육이 어떻게 제공되기를 원하십니까?
중복해서 선택할 수 있습니다.

1. 책자	<input type="checkbox"/>
2. 인터넷 자료(웹사이트, 동영상)	<input type="checkbox"/>
3. 스마트폰 앱(어플리케이션)	<input type="checkbox"/>
4. E-러닝 (동영상 강의, 강의 슬라이드)	<input type="checkbox"/>
5. 대면 강의	<input type="checkbox"/>
6. 오디오 자료: CD, 오디오 방송("팟캐스트")	<input type="checkbox"/>
7. 의료진과의 대면 상담	<input type="checkbox"/>

교육제공 방식에 대한 보다 좋은 아이디어가 있으신가요?