

Perceived Usefulness of Exercise Information and Exercise Participation among Persons with Disabilities: Indirect Associations through Perceived Exercise Benefits

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[Abstract]

This study examined the association between perceived usefulness of exercise information and exercise participation among persons with disabilities and tested the indirect role of perceived exercise benefits in this association. Raw data from the 2024 National Survey on Sports Participation for Persons with Disabilities were used. The final analytic sample included 2,207 respondents who had been exposed to disability sport or exercise-related information and provided valid responses to the perceived exercise benefit items. The weighted population estimate was 335,316.6. Structural equation modeling was conducted in R using the lavaan package. Robust maximum likelihood estimation was used, and missing data were handled using full information maximum likelihood. Perceived usefulness of exercise information was positively associated with all four perceived exercise benefits including physical-function improvement, stress-relief, daily-life-function improvement, and medical-cost reduction. However, only perceived stress-relief and medical-cost-reduction benefits were positively associated with exercise participation. Significant positive indirect associations between perceived usefulness of exercise information and exercise participation were also observed through these two perceived benefits.

▶ **Key words:** Disability, usefulness of exercise information, exercise benefits, exercise participation

[요 약]

본 연구는 장애인의 운동정보 유용성 인식과 운동참여 간의 관계를 살펴보고, 이 관계에서 운동편익 인식의 간접적 역할을 검증하였다. 분석에는 2024년 장애인 생활체육조사의 원시자료를 활용하였다. 장애인 스포츠 및 운동 관련 정보에 노출된 경험이 있고 운동편익 인식 문항에 유효하게 응답한 2,207명이 최종 분석에 포함되었다. 가중치를 적용한 모집단 추정치는 335,316.6명이다. 구조방정식모형 분석은 R의 lavaan 패키지를 사용하여 수행하였다. 모수 추정에는 강건 최대우도법을 적용하였으며, 결측치는 완전정보최대우도법으로 처리하였다. 분석 결과, 운동정보 유용성 인식은 신체기능, 스트레스 완화, 일상생활기능 및 의료비 절감의 네 가지 운동편익 인식과 모두 유의한 정적 관련성을 보였다. 그러나 이 가운데 스트레스 완화 효과와 의료비 절감 편익만이 운동참여와 유의한 정적 관련성을 보였다. 또한 운동정보 유용성 인식과 운동참여 간에는 스트레스 완화 효과와 의료비 절감 편익을 통한 유의한 정적 간접 연관성이 나타났다.

▶ **주제어:** 장애, 운동정보 유용성, 운동편익, 운동 참여

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 - Received: 2026. 06. 04, Revised: 2026. 08. 18, Accepted: 2026. 08. 19.

I. Introduction

1. Need for the study

Promoting exercise participation among persons with disabilities remains an important public health and sport policy objective since regular physical activity may support physical functioning, psychological well-being, independence in daily life, and long-term health[1]. Nevertheless, persons with disabilities generally engage in less physical activity than persons without disabilities. Their participation is constrained by multiple barriers, including inaccessible facilities, transportation difficulties, health limitations, low confidence, and limited opportunities for adapted physical activity[2-3]. In addition, limited access to relevant information about exercise opportunities, how to exercise, and potential health benefits may also constitute one of several barriers to physical activity participation among persons with disabilities[1]. However, exposure to exercise information alone may not be sufficient to influence behavior. Previous research suggests that information is more likely to be accepted when it is perceived as useful, and that messages judged to be effective are more likely to produce persuasive outcomes[4-6]. Accordingly, exercise information may have greater behavioral relevance when recipients perceive it as useful and applicable to their circumstances.

Research involving adults with physical disabilities showed that perceived benefits of exercise differed significantly across stages of exercise behavior[7]. Longitudinal evidence further indicated that both initial levels of perceived exercise benefits and changes in these perceptions were associated with changes in physical activity over time[8]. Similarly, a study of adults with multiple sclerosis found that perceived exercise benefits remained significant predictors of physical activity even after disability level was taken into account[9]. More recent nationwide evidence from South Korea indicates that persons with disabilities

who used sports facilities reported more favorable perceptions of exercise benefits related to health and fitness, stress relief, daily vitality, and happiness[10].

Despite these findings, previous research has rarely integrated perceived usefulness of exercise information, multidimensional exercise-benefit perceptions, and exercise participation within a single explanatory model. The present study addresses this gap by examining whether perceived usefulness of exercise information is associated with exercise participation through distinct dimensions of perceived exercise benefits.

2. Hypothesis Development

This study is grounded primarily in the Health Belief Model(HBM) and persuasive-message research. The HBM identifies perceived benefits as important cognitive factors associated with health behavior[11]. Persuasive-message research further suggests that recipients' evaluations of information or messages are associated with subsequent attitudes, intentions, and persuasive outcomes[5-6][12]. Taken together, these perspectives suggest that exercise information is more likely to influence behavior when recipients perceive it as useful and believe that exercise will produce outcomes they value. Previous research also suggests that information matched to recipients' characteristics and circumstances is more likely to attract attention and be perceived as personally relevant[13-15]. By extension, perceiving exercise information as useful may be associated with stronger beliefs about the benefits of exercise.

Perceived exercise benefits and exercise outcome expectations have been conceptualized as multidimensional constructs[10][16-17]. Sechrist et al.[16] suggested that exercise benefits include life-enhancement, physical-performance, psychological-outlook, social-interaction, and preventive-health dimensions, whereas Wójcicki et al.[17] indicated that exercise outcome expectations include physical, social, and self-evaluative

dimensions. In particular, a nationwide study in South Korea assessed health and fitness, stress relief and psychological stability, daily vitality and motivation, and perceived medical-cost savings as distinct domains of exercise benefits among persons with disabilities[10]. Consistent with this multidimensional perspective, the present study operationalized perceived exercise benefits as four dimensions including physical-function, stress-relief, daily-life-function, and medical-cost-reduction benefits.

H1. Perceived usefulness of exercise information is positively associated with perceived exercise benefits.

Studies involving persons with disabilities or chronic health conditions have shown that exercise outcome expectations and perceived benefits are associated with physical activity participation [9][18-19]. Perceived physical benefits, including improved conditioning, functioning, and performance, may support greater exercise participation[9][18-19]. Malone et al.[20] also identified physical performance and psychological outlook as important perceived exercise benefits among adults with physical disabilities or chronic health conditions. Psychological benefits, such as stress relief, may also support participation, consistent with evidence that physical activity reduces depression and anxiety and that autonomous motivation and intrinsic motives are positively associated with exercise behavior[21-22]. Perceived medical-cost-reduction benefits may likewise represent a practical incentive for exercise participation. This expectation is theoretically relevant because perceived benefits are considered important determinants of health behavior adoption, and medical-cost savings have been identified as a distinct perceived exercise benefit among persons with disabilities[10-11].

H2. Perceived exercise benefits are positively associated with exercise participation.

Meanwhile, persons with multiple sclerosis who were not currently exercising identified a need for

guidance on personalizing exercise and for information about appropriate local exercise opportunities[23]. Similarly, persons with disabilities have emphasized the importance of knowledgeable professionals and navigation services that can connect them with appropriate adaptive sport and recreation opportunities[24]. Intervention evidence further suggests that providing individualized exercise-related information through counseling and computer-tailored messages may promote physical activity among persons with spinal cord injury and those with or at risk of long-term health conditions[25-26]. Collectively, exercise information perceived as useful may support participation by clarifying what activities are available, how they can be performed, and how they can be adapted to individual circumstances.

H3. Perceived usefulness of exercise information is positively associated with exercise participation.

The proposed indirect association follows from the combination of the H1 and H2 pathways. Health communication research suggests that personally relevant information may enhance cognitive processing and shape subsequent beliefs[13][15]. Disability exercise research further indicates that perceived exercise benefits and outcome expectations are associated with physical activity participation[9][18]. Therefore, these findings suggest that perceived usefulness of exercise information may be associated with exercise participation indirectly by strengthening perceived exercise benefits.

H4. Perceived usefulness of exercise information will have a positive indirect association with exercise participation through each dimension of perceived exercise benefits.

II. Material & methods

1. Data Source and Analytic Sample

This study used de-identified raw data from the 2024 National Survey on Sports Participation for

Persons with Disabilities, administered by the Ministry of Culture, Sports and Tourism and the Korea Paralympic Committee[27]. The survey employed a stratified multistage sampling design based on disability type, disability severity, region, sex, and age and included 10,000 registered persons with disabilities aged 10–69 years. The final sampling weight supplied with the dataset was applied throughout the present analyses to account for unequal selection probabilities and improve population representation. The analytic sample was defined in two prespecified stages according to the conceptual applicability of the study variables and the measurement requirements of the parallel mediation model.

First, perceived usefulness of exercise information could be meaningfully assessed only among respondents who had previously encountered disability sport-related information. The analytic domain was therefore restricted from the full survey sample of 10,000 respondents to 3,083 information-exposed respondents. This restriction represented a conceptually defined subpopulation analysis rather than exclusion based on the respondents' observed values or study outcomes.

Second, 876 of the information-exposed respondents had no valid response to any of the four perceived exercise-benefit variables: physical-function, stress-relief, daily-life-function, and medical-cost-reduction benefits. In other words, these respondents did not have observed data for any of the four mediator variables, rather than having an isolated missing response on one or more benefit items. Respondents with no data on any of the four mediators were excluded because they could not contribute to the proposed indirect pathways. The final analytic sample comprised 2,207 respondents, representing 71.6% of the information-exposed subsample and a weighted population estimate of 335,316.6.

Following these eligibility restrictions, all variables included in the final structural equation

model had complete observed values. Although full-information maximum likelihood estimation was specified as the missing-data procedure, no item-level missingness remained in the final analytic dataset; accordingly, the model contained a single complete-data pattern. The weighted analytic sample consisted of 68.9% men and 31.1% women. Respondents aged 60 years or older comprised 47.5% of the weighted sample, followed by those in their 50s(26.3%), 40s(12.0%), 30s(6.2%), 20s(5.5%), and teens(2.5%).

2. Measures

All survey items used in this study were taken from the raw data of the 2024 National Survey on Sports Participation for Persons with Disabilities. The original item content was retained, but selected variables were coded or recoded to fit the analytic purpose of the present study.

Perceived usefulness of exercise information was used as the independent variable. This construct was assessed with a single item administered only to information-exposed respondents, asking whether disability sports information was useful enough to help them initiate exercise participation. Responses were coded on a five-point scale ranging from 1=not helpful at all to 5=very helpful, with higher scores indicating greater perceived usefulness.

Perceived exercise benefits were specified as mediating variables linking perceived usefulness of exercise information to exercise participation. Four observed items assessed physical-function, stress-relief, daily-life-function, and medical-cost-reduction benefits(1=not effective at all to 5=very effective).

Exercise participation was modeled as a latent outcome indicated by exercise frequency, duration, and intensity. Exercise frequency was coded as an ordinal weekly participation variable: 0=no exercise, 1=irregular participation, and 2–8=one to seven times per week. Exercise duration was coded as 0=no exercise, 1=less than 30 min, 2=30 min to less than 1h, 3=1h to less than 1.5h, 4=1.5h to less than

Table 1 Descriptive statistics and Pearson correlations among study variables

Variable	<i>M</i>	<i>SE</i>	1	2	3	4	5	6	7	8
1. Perceived usefulness of exercise information	3.57	.021	–							
2. Perceived physical-function benefit	4.14	.018	.210 ^a	–						
3. Perceived stress-relief benefit	4.11	.020	.169 ^a	.596 ^a	–					
4. Perceived daily-life benefit	4.00	.021	.226 ^a	.568 ^a	.511 ^a	–				
5. Perceived medical-cost reduction benefit	3.82	.020	.308 ^a	.508 ^a	.471 ^a	.501 ^a	–			
6. Exercise frequency	6.03	.049	–.035	.035	.072 ^b	.021	.020	–		
7. Exercise duration	2.39	.027	.078 ^b	.138 ^a	.113 ^a	.139 ^a	.155 ^a	.103 ^a	–	
8. Exercise intensity	1.46	.014	.060 ^b	.063 ^b	.108 ^a	.067 ^b	.137 ^a	.059 ^a	.307 ^a	–

Weighted population estimate= 335,316.6, *M* and *SE* are weighted estimates, weighted Pearson correlation coefficients are presented below the diagonal, ^b $p < .05$, ^a $p < .001$.

2h, and 5=2h or more per session. Exercise intensity was coded as 0=no exercise, 1=low intensity, 2=moderate intensity, and 3=high intensity, based on perceived exertion.

Covariates included sex, age, household income, disability severity, and walking ability. Sex was coded from 0=male, 1=female. Age was coded from 1=teens to 6=60 years or older, and monthly household income was coded from 1=less than 1,000,000KRW to 6=5,000,000KRW or more. Disability severity was coded as 0=mild and 1=severe. Walking ability was coded ordinally as 1=fully assisted walking, 2=partially assisted walking, 3=independent walking.

3. Statistical analysis

Analyses were conducted in R using the lavaan package[28]. Robust maximum likelihood estimation was used, and missing data were handled using full information maximum likelihood[29]. The final sampling weights were applied in all analyses. Perceived usefulness of exercise information and the four perceived exercise benefit dimensions were measured using single items and entered into the model as observed variables. Perceived usefulness was specified as an exogenous observed variable,

whereas the four perceived benefit dimensions were specified as endogenous observed mediators. No reliability values were assumed, and no measurement-error variances were fixed for these variables. The residual variances of the four endogenous benefit variables were freely estimated, but item-specific measurement error was not modeled separately. Exercise participation was the only latent construct in the model. Model fit was evaluated with the chi-square statistic, CFI, TLI, RMSEA, and SRMR[30]. Indirect effects were tested using parameter constraints and delta-method z-tests[31].

III. Results

1. Descriptive Statistics and Correlations

Descriptive statistics and correlations among the study variables are presented in Table 1. Perceived usefulness of exercise information was positively correlated with all four perceived benefit dimensions. Correlations among the four benefit dimensions were moderate and positive.

2. Measurement of latent exercise participation

All three exercise participation loadings were significant, but the standardized loading for frequency was weak($\beta=.082$, $p=.025$) relative to duration($\beta=.456$, $p<.001$) and intensity($\beta=.682$, $p<.001$), indicating that exercise participation was represented more by duration and intensity(Table 2).

Table 2. Factor loadings for the latent exercise participation construct

Indicator	<i>B</i>	<i>SE</i>	95% CI	β
Exercise frequency	.127	.056	[.016, .238]	.082*
Exercise duration	.377	.033	[.311, .442]	.456***
Exercise intensity	.327	.031	[.266, .387]	.682***

* $p<.05$, *** $p<.001$, *B*=unstandardized factor loading, β =standardized factor loading

Table 3. Summary of direct effects

Path	B	SE	95% CI	β
Perceived usefulness $\rightarrow$ Physical-function benefits	.180	.022	[.137, .224]	.213***
Perceived usefulness $\rightarrow$ Stress-relief benefits	.158	.023	[.113, .204]	.168***
Perceived usefulness $\rightarrow$ Daily-life-function benefits	.213	.024	[.166, .260]	.229***
Perceived usefulness $\rightarrow$ Medical-cost-reduction benefits	.292	.026	[.242, .343]	.309***
Physical-function benefits $\rightarrow$ Exercise participation	-.037	.077	[-.187, .113]	-.022
Stress-relief benefits $\rightarrow$ Exercise participation	.158	.063	[.035, .281]	.104*
Daily-life-function benefits $\rightarrow$ Exercise participation	-.060	.070	[-.196, .077]	-.039
Medical-cost-reduction benefits $\rightarrow$ Exercise participation	.250	.066	[.121, .379]	.165***
Perceived usefulness $\rightarrow$ Exercise participation	.071	.055	[-.037, .180]	.050

* $p < .05$, *** $p < .001$, B=unstandardized coefficient, β =standardized coefficient.

3. Structural equation modeling

3.1. Model Fit

The weighted model showed good fit: $\chi^2(20)=93.185$, $p < .001$; CFI=.981; TLI=.940; RMSEA=.041, 90%CI[.033, .049]; SRMR=.020[30]. The model explained 25.4% of the variance in exercise participation and 5.5%, 3.4%, 6.8%, and 10.2% of the variance in physical-function, stress-relief, daily-life-function, and medical-cost-reduction benefits, respectively.

3.2. Direct effects

Perceived usefulness of exercise information was positively associated with all four perceived exercise benefits: physical-function($\beta=.213$, $p < .001$), stress-relief($\beta=.168$, $p < .001$), daily-life-function($\beta=.229$, $p < .001$), and medical-cost-reduction($\beta=.309$, $p < .001$). However, only stress-relief($\beta=.104$, $p < .05$) and medical-cost-reduction benefits($\beta=.165$, $p < .001$) were significantly associated with exercise participation. The direct association of perceived

usefulness of exercise information on exercise participation was not significant($\beta=.050$, $p=.199$) (Table 3 and Fig. 1). The regression coefficients and significance levels for the covariates are presented in Table 4.

3.3. Indirect Effects

Indirect effects were significant through stress-relief($\beta=.017$, $p < .05$) and medical-cost-reduction benefits($\beta=.051$, $p < .001$), but not through physical-function or daily-life-function benefits. The total indirect effect was significant($\beta=.055$, $p < .001$), indicating that perceived usefulness of exercise information related to exercise participation primarily through stress-relief and medical-cost-reduction benefits(Table 5).

IV. Discussion

This study examined whether perceived usefulness of exercise information was associated with exercise participation among persons with disabilities, and whether this association occurred indirectly through distinct perceived exercise benefit dimensions. Consistent with the HBM[11] and persuasive-message research[6][12], the findings suggest that exercise information perceived as useful may be associated with participation primarily through beliefs about the benefits of exercise rather than through a direct association. Perceived usefulness of exercise information was positively associated with all four

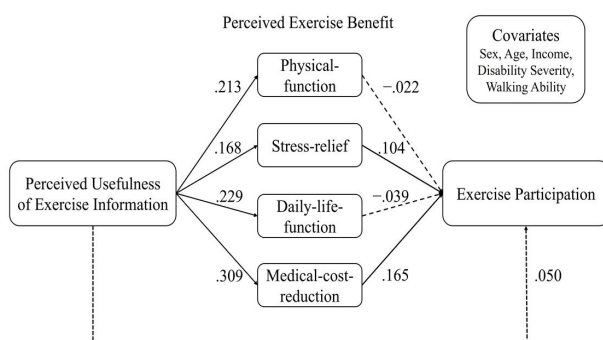


Fig. 1. Results of structural equation modeling. Solid lines indicate statistically significant paths, whereas dashed lines indicate non-significant paths. Standardized coefficients are presented.

Table 4. Regression coefficients for the covariates

Outcome	Covariate	<i>B</i>	<i>SE</i>	β
Physical-function benefit	Sex	-.077	.038	-.053*
	Age	.029	.012	.056*
	Income	.035	.013	.073**
	Severity	.025	.041	.018
	Walking	.049	.033	.037
Stress-relief benefit	Sex	-.057	.043	-.035
	Age	.004	.014	.007
	Income	.032	.015	.059*
	Severity	.000	.048	.000
	Walking	-.002	.041	-.001
Daily-life-function benefit	Sex	-.025	.044	-.015
	Age	.019	.015	.033
	Income	.057	.015	.107***
	Severity	-.056	.051	-.036
	Walking	.057	.043	.039
Medical-cost-reduction benefit	Sex	.016	.042	.010
	Age	-.008	.017	-.013
	Income	.035	.017	.064*
	Severity	-.047	.055	-.030
	Walking	.047	.034	.031
Latent exercise participation	Sex	-.268	.082	-.107**
	Age	-.082	.034	-.093*
	Income	.276	.041	.335***
	Severity	-.301	.097	-.126**
	Walking	.272	.083	.120**

* $p < .05$, ** $p < .01$, *** $p < .001$, *B*=unstandardized coefficient, β =standardized coefficient, income=household income, severity=disability severity, walking=walking ability

perceived benefit dimensions. However, only stress-relief and medical-cost-reduction benefits were significantly associated with exercise participation, and significant indirect associations were observed only through these two dimensions. The direct association between perceived usefulness and exercise participation was not significant after the benefit dimensions were included. Taken together, these findings suggest that disability sports information may become

behaviorally meaningful not merely when it is encountered, but when it is perceived as useful and is associated with personally salient beliefs about why exercise matters in everyday life.

First, perceived usefulness of exercise information was positively associated with perceived physical-function, stress-relief, daily-life-function, and medical-cost-reduction benefits, supporting H1. This pattern is consistent with two complementary perspectives. In the technology acceptance model, perceived usefulness functions as a proximal determinant of subsequent acceptance-related beliefs[4]. In dual-process accounts of persuasion, personally relevant and useful messages are more likely to be processed through the central route and to shape downstream cognitions[12]. It also aligns with evidence that individuals' evaluations of message usefulness prospectively predict attitudes and behavioral cognitions[5-6]. Among persons with disabilities, useful information may therefore help translate general awareness of exercise opportunities into more concrete expectations that exercise can support physical health, psychological well-being, daily functioning, and health-related economic outcomes[1][21]. In this sense, information exposure alone appears insufficient. Rather, what mattered was whether the information was perceived as useful for initiating participation.

Second, the four benefit dimensions did not contribute equally to exercise participation. Although perceived usefulness of exercise

Table 5. Summary of indirect effects

Effect	<i>B</i>	<i>SE</i>	95% CI	β
Perceived usefulness-> physical-function benefits-> exercise participation	-.007	.014	[-.034, .020]	-.005
Perceived usefulness-> stress-relief benefits-> exercise participation	.025	.010	[.005, .045]	.017*
Perceived usefulness-> daily-life-function benefits-> exercise participation	-.013	.015	[-.042, .016]	-.009
Perceived usefulness-> medical-cost-reduction benefits-> exercise participation	.073	.020	[.035, .112]	.051***
Total indirect effect	.079	.020	[.039, .118]	.055***

* $p < .05$, *** $p < .001$, *B*=unstandardized coefficient, β =standardized coefficient. Values are rounded to three decimal places; therefore, the sum of the reported individual indirect effects may differ slightly from the reported total indirect effect.

information was positively associated with all four benefit dimensions, only stress-relief and medical-cost-reduction benefits were significantly associated with latent exercise participation when the four dimensions were examined simultaneously, providing partial support for H2. The Health Belief Model identifies perceived benefits as important cognitive factors associated with health behavior[11]. However, the present findings suggest that the unique behavioral relevance of perceived benefits may differ according to the type of benefit considered. This result reinforces the importance of treating perceived exercise benefits as a multidimensional rather than homogeneous construct[16-17][20][32].

The nonsignificant associations of physical-function and daily-life-function benefits with exercise participation differ from previous findings showing that overall perceived exercise benefits or physical outcome expectations were positively associated with physical activity among adults with multiple sclerosis[9][18]. However, the present results are consistent with evidence that favorable outcome expectations do not always have a unique direct association with physical activity when other behavioral mechanisms are considered. Martin Ginis et al.[33], for example, found that outcome expectations were not directly associated with physical activity among persons with spinal cord injury after self-regulation was included in the model. Instead, outcome expectations were indirectly associated with physical activity through self-regulation. Malone et al.[20] also found no significant difference in overall perceived exercise-benefit scores between adults with disabilities or chronic health conditions who met and did not meet physical activity guidelines.

These differences may partly reflect variation in the research models used across studies. The present study simultaneously examined perceived usefulness of exercise information, four correlated benefit dimensions, exercise participation, and relevant covariates. Walking ability, disability

severity, and sociodemographic characteristics were also controlled. Shared variance among the benefit dimensions and adjustment for these covariates may therefore have reduced the unique associations of physical-function and daily-life-function benefits with participation. Thus, the nonsignificant paths do not necessarily indicate that these benefits are unimportant. Rather, they suggest that these benefit perceptions did not explain unique variation in exercise participation beyond the other benefit dimensions and covariates included in the present model.

The nonsignificant direct association between perceived usefulness of exercise information and exercise participation did not support H3. One possible explanation is that perceived usefulness alone may be insufficient to translate exercise information into participation. Rather, its association with exercise participation may depend on whether the information is linked to stronger beliefs about the benefits of exercise. This interpretation is consistent with the HBM, which identifies perceived benefits as important beliefs associated with health behavior[11], and with communication applications of the model suggesting that health messages may be associated with behavior through such health-related beliefs[34]. It also aligns with persuasive-message research and the elaboration likelihood model, which link useful and personally relevant messages with stronger issue-relevant cognitions[6][12].

H4 was partially supported. Significant indirect associations were observed through perceived medical-cost-reduction and stress-relief benefits, but not through physical-function or daily-life-function benefits. Among these pathways, the indirect association through perceived medical-cost-reduction benefits was the strongest. This finding carries clear implications for disability sport promotion and public health communication. A Korean study comparing households with and without members with disabilities found that annual out-of-pocket medical expenditures were approximately 1.29 times higher among households

with members with disabilities. These households were also more likely to spend more than 10% of their household living expenses on medical care [35]. Given this elevated financial burden, the potential for exercise to reduce future medical expenditures may be particularly salient to persons with disabilities. This may help explain why perceived medical-cost-reduction benefits showed the strongest indirect association with exercise participation. Information that presents exercise participation as part of practical health maintenance and a potential means of reducing future medical costs, rather than only as recreation, leisure, or fitness, may therefore be particularly persuasive for information-exposed persons with disabilities.

The significant indirect association through perceived stress-relief benefits also deserves attention in this study. Beyond its physical benefits, exercise may also support psychological and emotional well-being. Physical activity has been shown to reduce depressive and anxiety symptoms even in non-clinical populations[21]. Persons with disabilities may also face psychological barriers to exercise, including low confidence, social isolation, and low motivation[2-3]. From a self-determination perspective, exercise is more likely to be sustained when it satisfies psychological needs and is regulated through relatively autonomous motivation[22]. Benefits that are perceived as emotionally relevant, such as stress relief, may be especially likely to support this form of motivation. Consequently, information that frames exercise as a means of stress relief, emotional regulation, and psychological recovery may be more effective than messages emphasizing only general physical health.

In contrast, perceived physical-function and daily-life-function benefits did not significantly mediate the association between perceived usefulness of exercise information and exercise participation. One explanation is that these benefits may be perceived as broad or long-term outcomes. Persons with disabilities may readily acknowledge

that exercise is generally beneficial for physical function, but this general belief alone may be insufficient to motivate exercise participation[1]. Similarly, improvements in daily-life function may be considered important. However, these benefits may be perceived as too indirect or long-term to motivate immediate exercise participation. These nonsignificant findings indicate that not all positive beliefs about exercise are equally associated with exercise participation.

The findings of this study have several practical implications for disability sport policy and communication strategy. Information campaigns should move beyond simple program, facility, or schedule information and emphasize personally relevant benefits[13-15][36]. Messages should foreground psychological and health-economic value rather than general fitness appeals since exercise participation was most strongly linked to stress-relief and medical-cost-reduction benefits. Information should be practical and tailored to the specific needs and circumstances of each person with a disability. Meta-analytic evidence indicates that tailored health communication produces larger behavior-change effects than generic materials[36].

V. Conclusions

This study showed that perceived usefulness of exercise information was positively associated with multiple perceived exercise benefits among persons with disabilities. However, only stress-relief and medical-cost-reduction benefits were significantly associated with exercise participation, with the strongest indirect association observed through medical-cost-reduction benefits. Perceived usefulness itself was not directly associated with exercise participation. These findings suggest that exercise information may be more behaviorally relevant when it emphasizes personally meaningful psychological and healthcare cost-related benefits. Accordingly, disability sport promotion policies

need to shift from simply providing exercise information to emphasizing benefit-oriented messages that are relevant to the everyday concerns of persons with disabilities.

Several limitations should be acknowledged. First, the cross-sectional design precludes causal inference. Although the model was specified as a mediation model, the results should be interpreted as statistical indirect associations rather than as evidence of temporal or causal mediation. Longitudinal and intervention-based studies are needed to confirm directionality. Second, perceived usefulness of exercise information and the four perceived benefit dimensions were measured with single items. These variables were treated as observed measures, so measurement error and internal consistency could not be assessed. Accordingly, the related paths should be interpreted as associations with observed single-item measures. Future studies should use validated multi-item measures of both information usefulness and perceived exercise benefits. Third, restricting the sample to information-exposed respondents was appropriate because the usefulness item was administered only to this group. However, excluding respondents with no data on any of the four perceived exercise benefit dimensions may have introduced selection bias. Thus, the findings apply only to information-exposed persons with disabilities who provided valid data on the perceived benefit measures. Fourth, previous research supports the conceptual use of frequency, duration, and intensity as indicators of exercise participation[37]. However, the factor loading for exercise frequency was very low, indicating that it contributed little to the latent exercise participation construct. One possible explanation is that, in disability sport settings, the duration and intensity of each exercise session may distinguish participation levels more clearly than regular weekly frequency, which may be constrained by accessibility, health status, transportation, and support needs. Therefore, findings involving this construct should be

interpreted cautiously, as it primarily reflects exercise duration and intensity. Finally, nearly half of the analytic sample was aged 60 years or older. Although age was statistically controlled, this age concentration may have contributed to the relatively strong association between perceived medical-cost-reduction benefits and exercise participation, as older adults may place greater importance on health maintenance and medical expenses. Future studies should examine whether these associations differ across age groups.

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