



Article

Applying the Pender's Health Promotion Model to Identify the Factors Related to Older Adults' Participation in Community-Based Health Promotion Activities

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Abstract: Aging societies have garnered global attention regarding issues related to older adults' health promotion. This cross-sectional study aimed to identify factors associated with older adults' participation in community-based health promotion activities. The Older Adults' Health Promotion Activity Questionnaire was developed to collect data, and a total of 139 older adults were recruited from a community care center in Taoyuan City. Participants' mean age was 72.7 years (SD = 6.0 years), 74.8% were females, 64.7% were married, 59% had a lower level of education, 51.8% had lower income, 59% reported their health status not good, and 76.3% had chronic disease. Our findings indicated that age, perceived benefits, and self-efficacy were identified as significant predictors of participation in health promotion activities. Among them, perceived benefits were found to have the strongest association with participation in health promotion activities ($\beta = 0.305$; $p < 0.05$). The findings showed that the Pender's Health Promotion Model is useful to provide information for predicting and detecting significant factors related to older adults' participation in community-based health promotion activities. By using this model as a framework, researchers can design more specific studies that are directed towards improving healthy lifestyles and detecting the key components of health-related behaviors among different age groups.

Keywords: Pender's health promotion model; older adults; community-based health promotion activities; health promotion questionnaire



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1. Introduction

The proportion of older adults (aged 65 and over) is gradually increasing in countries around the world because of declining fertility rates. It is expected that the global population of older adults will reach 2 billion by 2050 [1]. By the end of 2019, the aging index of Taiwan, which has been on the rise, reached 119.8; this value is higher than the benchmark value for an aging society according to the World Health Organization (WHO). More than 30% of older adults in Taiwan have two or more chronic conditions, such as diabetes, heart failure, arthritis, or dementia, that can lead to increased hospitalizations or nursing home stays [2]. Managing one's health and being involved in health-promoting activities can have a positive impact on health, mortality, and quality of life.

Community-based health promotion activities have multiple benefits to improve older adults' physical functions, spiritual satisfaction, and sense of accomplishment [3]. Engagement in health promotion activities lasting 12 weeks or longer is a critical component to lasting health effects as such activities have been reported to have significant positive effects on older adults' physical, mental, and spiritual well-being [4–6]. Participation in health promotion activities is influenced by one's cognition, experience, family, society, culture, etc. [7]. Important factors affecting older adults' involvement in community-based health promotion activities include personal characteristics, perceived activity benefits,

perceived activity barriers, perceived activity self-efficacy, situational factors, interpersonal relationship factors, and feelings toward activity participation [4,6,8,9]. Identifying the effective factors on participation in health promotion activities in older adults is necessary to improve this behavior [3].

The Health Promotion Model identifies factors that influence health behaviors. Pender's Health Promotion Model is one of the most widely used models to identify and change unhealthy behaviors and promote health [10,11]. Predicting factors and explanatory constructs of health behavior in Pender's model include perceived benefits, barriers, and self-efficacy; behavioral emotions; and interpersonal and situational influencers [12]. The various constructs have been introduced as the strongest predictors of nutritional and self-care behaviors in recent studies [13,14]. The reason for emphasizing the use of Pender's Health Promotion Model is because this model explores, from a theoretical perspective, the factors and relationships that contribute to participation in community-based health promotion activities and enhanced health and quality of life among older adults.

Previous studies have suggested that older adults' participation in health promotion activities is closely related to perceived activity benefits and barriers. In terms of perceived benefits, older adults have reported that participating in health promotion activities enhanced their overall mind–body fitness and physical conditions [7,8,15]. In addition, social support when participating in health promotion activities not only positively affects the physical and mental health of older adults but also plays an important role in reinforcing their continuous involvement in such activities [7,8]. In contrast, various activity barriers can adversely affect their enthusiasm in health promotion activities. Perceived activity barriers are negatively correlated with older adults' involvement in health promotion activities [4], while those with fewer perceived activity barriers are more likely to participate in health promotion activities [16]. In Pender's Health Promotion Model, the concept of perceived self-efficacy is included as part of behavior-specific cognitive and emotional factors. This is supported by multiple domestic and international studies, which reported that self-efficacy is an important factor that promotes an individual's participation in health promotion behaviors and lifestyle [10,17–19].

Pender's Health Promotion Model has been widely adopted to explore different health promotion behaviors [10,11,19] and has achieved concrete results. However, limited studies have utilized this model to investigate older adults' engagement in community-based health promotion activities. Therefore, this study aimed to apply this model to identify the factors associated with older adults' participation in community-based health promotion activities.

2. Materials and Methods

2.1. Study Design

A cross-sectional design was employed, and a questionnaire survey was conducted at a community care center in Taoyuan City, Taiwan. The community care center operates during daytime hours (9am–4pm), Monday through Friday. The center provides health promotion activities including stretching or other gentle exercise, mental stimulation games such as bingo, creative expression through arts and crafts, and nutritious meals. At present, there are about 250 older adults who use this center. Data were collected between January and April 2020.

2.2. Participants

A total of 139 older adults were recruited from a community care center in Taoyuan City. The inclusion criteria were participating in health promotion activities once a week and continuous participation for more than 12 weeks, ability to communicate in Hokkien or Mandarin, and willingness to participate. Exclusion criteria were serious mental problems, including dementia, inability to communicate cogently, and inability to walk to the community care center.

2.3. Measure

The Older Adults' Health Promotion Activity Questionnaire (see Appendix A) was developed based on a comprehensive systematic review, following interviews with 47 older adults who had been randomly selected and a panel of four experts (two academics in health promotion and two gerontologists). Additionally, 12 older adults, who were not invited to the interview, were recruited to review the questionnaire for readability and comprehension. The questionnaire comprises three parts. The first part included demographic data such as gender, age, marital status, educational level, income, self-reported health status, and chronic disease. The second part was designed to explore the frequency of older adults' participation in community-based health promotion activities (1 item). The respondents were asked to indicate their frequency using a 5-point Likert scale (very rarely = 1, rarely = 2, occasionally = 3, frequently = 4, very frequently = 5). The third part was the key part based on a five-dimensional Pender's Health Promotion Model. It included statements regarding perceived benefits (19 items), perceived barriers (20 items), self-efficacy (10 items), social support (14 items), and activity-related affect (9 items). All items were rated on a 5-point Likert scale ranging from 1 (completely disagree/not confident at all) to 5 (completely agree/very confident). Higher scores indicate better benefits, self-efficacy, social support, and positive affects. All negatively worded items in the questionnaire were reverse-coded.

2.4. Validity and Reliability

The validity and reliability of the questionnaire were assessed. The content validity and face validity of the questionnaire were verified using the content validity index (CVI), based on ratings of item relevance by a panel of four experts. No item was eliminated in the CVI assessment, and all items had a score above 0.88. Only four items were revised for appropriateness. The preliminary questionnaire was pilot tested with 42 older adults. Cronbach's alpha coefficient was used to evaluate the stability and internal consistency of the instrument. Cronbach's alpha coefficients were reported ranging from 0.72 to 0.94 for all subscales (perceived benefits: $\alpha = 0.94$; perceived barriers: $\alpha = 0.91$; self-efficacy: $\alpha = 0.84$; social support: $\alpha = 0.72$; activity-related affect: $\alpha = 0.94$), indicating acceptable level of internal consistency for each domain.

2.5. Statistical Analyses

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26 (SPSS Inc., Chicago, IL, USA). Descriptive statistics (percentages of frequencies, means, and standard deviations) were calculated. An independent-samples *t*-test was used for the comparison of two independent groups; the comparison of three or more groups was performed using analysis of variance (ANOVA) test statistics. Pearson's correlation analysis was conducted between older adults' participation in community-based health promotion activities and the Health Promotion Questionnaire with all subscales. A multiple linear regression analysis was used to examine predictors associated with older adults' participation in community-based health promotion activities. P values less than 0.05 were considered statistically significant for all tests.

3. Results

The participants' mean age was 72.7 years (range: 65–88), and 74.8% were females. Of all the elderly individuals, 64.7% were married, 59% had a lower level of education, 51.8% had lower income from their pension, and 59% reported their health status as not good. The majority of the elderly people participating in the study (76.3%) had chronic diseases. Mean scores of the Health Promotion Questionnaire with all subscales is shown in Table 1.

Table 1. Comparison of participants' characteristics and the Health Promotion Questionnaire with all subscales (N = 139).

Variables		Perceived Benefits		Perceived Barriers		Self-Efficacy		Social Support		Activity-Related Affect		
	<i>n</i>	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total			4.19	0.45	1.79	0.53	3.92	0.83	3.76	0.53	4.48	0.49
Gender												
Male	35	25.2	4.10	0.37	1.71	0.51	3.72	1.01	3.74	0.54	4.44	0.46
Female	104	74.8	4.22	0.48	1.81	0.53	3.99	0.74	3.76	0.53	4.49	0.49
Statistical Analysis			<i>t</i> = −1.351		<i>t</i> = −0.983		<i>t</i> = −1.725		<i>t</i> = −0.230		<i>t</i> = −0.494	
<i>p</i> value			<i>p</i> = 0.033 *		<i>p</i> = 0.720		<i>p</i> = 0.047 *		<i>p</i> = 0.761		<i>p</i> = 0.680	
Age												
65–74	93	66.9	4.14	0.44	1.83	0.54	3.86	0.85	3.75	0.50	4.44	0.50
>75	46	33.1	4.28	0.46	1.69	0.50	4.06	0.76	3.76	0.61	4.57	0.46
Statistical Analysis			<i>t</i> = −1.732		<i>t</i> = 1.472		<i>t</i> = −1.360		<i>t</i> = −0.103		<i>t</i> = −1.467	
<i>p</i> value			<i>p</i> = 0.310		<i>p</i> = 0.932		<i>p</i> = 0.186		<i>p</i> = 0.112		<i>p</i> = 0.148	
Marital status												
Married	90	64.7	4.17	0.44	1.74	0.50	3.94	0.87	3.78	0.51	4.48	0.46
Widowed	41	29.5	4.25	0.49	1.81	0.61	3.93	0.74	3.75	0.60	4.51	0.54
Divorced/Single	8	5.8	4.13	0.39	2.14	0.22	3.68	0.81	3.57	0.42	4.31	0.45
Statistical Analysis			<i>F</i> = 0.473		<i>F</i> = 2.168		<i>F</i> = 0.386		<i>F</i> = 0.546		<i>F</i> = 0.618	
<i>p</i> value			<i>p</i> = 0.624		<i>p</i> = 0.02 *		<i>p</i> = 0.680		<i>p</i> = 0.581		<i>p</i> = 0.541	
Education status												
Less than high school	82	59	4.16	0.49	1.77	0.54	3.97	0.76	3.75	0.56	4.49	0.52
Higher education level	57	41	4.23	0.40	1.80	0.51	3.86	0.91	3.77	0.50	4.46	0.44
Statistical Analysis			<i>t</i> = −0.956		<i>t</i> = −0.274		<i>t</i> = 0.783		<i>t</i> = −0.303		<i>t</i> = 0.434	
<i>p</i> value			<i>p</i> = 0.393		<i>p</i> = 0.674		<i>p</i> = 0.319		<i>p</i> = 0.281		<i>p</i> = 0.021 *	
Monthly income												
Below USD 300	72	51.8	4.26	0.46	1.66	0.50	4.00	0.86	3.71	0.58	4.57	0.47
Over USD 300	67	48.2	4.11	0.43	1.92	0.52	3.84	0.78	3.81	0.47	4.38	0.49
Statistical Analysis			<i>t</i> = 1.951		<i>t</i> = −3.017		<i>t</i> = 1.089		<i>t</i> = −1.021		<i>t</i> = 2.253	
<i>p</i> value			<i>p</i> = 0.336		<i>p</i> = 0.544		<i>p</i> = 0.869		<i>p</i> = 0.134		<i>p</i> = 0.284	
Self-reported health status												
Not good	82	59	4.16	0.48	1.84	0.56	3.67	0.86	3.68	0.52	4.46	0.50
Good	57	41	4.23	0.41	1.71	0.47	4.29	0.61	3.86	0.55	4.51	0.48
Statistical Analysis			<i>t</i> = −0.856		<i>t</i> = 1.462		<i>t</i> = −4.622		<i>t</i> = −1.962		<i>t</i> = −0.628	
<i>p</i> value			<i>p</i> = 0.416		<i>p</i> = 0.237		<i>p</i> = 0.004 *		<i>p</i> = 0.893		<i>p</i> = 0.910	
Chronic disease												
No	33	23.7	4.19	0.51	1.67	0.42	4.11	0.75	3.75	0.56	4.52	0.53
Yes	106	76.3	4.19	0.44	1.82	0.55	3.87	0.84	3.76	0.53	4.47	0.47
Statistical Analysis			<i>t</i> = 0.041		<i>t</i> = −1.415		<i>t</i> = 1.484		<i>t</i> = −0.096		<i>t</i> = 0.480	
<i>p</i> value			<i>p</i> = 0.478		<i>p</i> = 0.154		<i>p</i> = 0.202		<i>p</i> = 0.790		<i>p</i> = 0.244	

USD: United States dollar; * *p* < 0.05.

There was a significant correlation between the participants' perceived benefits mean scores and their gender. It was found that perceived benefits mean scores were significantly higher in females in comparison to males ($t = -1.351, p = 0.033$). Perceived barriers mean scores of those who were divorced or single (never married) were significantly higher than those who were married ($F = 2.168, p = 0.002$). There was a significant correlation between the participants' self-efficacy mean scores, their gender, and self-reported health status. It was found that self-efficacy mean scores were significantly higher in females in comparison to males and in those who had reported health status as good in comparison to those who had reported their health status as not good ($t = -1.725, p = 0.047$; $t = -4.622, p = 0.004$). Activity-related affect mean scores of those who had a lower education level were significantly higher than those who had a higher education level ($t = 0.434, p = 0.021$). No significant correlations were found between social support mean scores and participants' characteristics ($p > 0.05$) (see Table 1).

The Health Promotion Questionnaire included all subscales and participation in community-based health promotion activities using Pearson's correlation analysis. The results revealed that older adults' participation in community-based health promotion activities was significantly correlated with perceived benefit ($r = 0.22, p < 0.05$) and self-efficacy ($r = 0.17, p < 0.05$) (see Table 2).

Table 2. Pearson's correlation analysis between participation in community-based health promotion activities and the Health Promotion Questionnaire with all subscales.

	Perceived Benefits	Perceived Barriers	Self-Efficacy	Social Support	Activity-Related Affect
<i>r</i>	0.22	−0.04	0.17	0.02	0.12
<i>p</i>	0.011 *	0.640	0.036 *	0.811	0.155

* $p < 0.05$.

A multiple linear regression analysis was performed to examine predictors associated with participation in community-based health promotion activities among the older adults. Multicollinearity among the independent variables was examined using correlation coefficients and variance inflation factor (VIF). No extreme coefficient value ≥ 0.8 was found between the independent variables, indicating a low risk of multicollinearity. All independent variables had $VIF \geq 10$ and tolerance ≥ 0.1 , indicating no presence of multicollinearity. All variables, including the Health Promotion Questionnaire with all subscales, as well as the demographic characteristics of the participants, were entered as independent variables to predict the dependent variable, namely, older adults' participation in community-based health promotion activities. Age, perceived benefits, and self-efficacy were identified as significant predictors of older adults' participation in community-based health promotion activities ($\beta = 0.202, p < 0.05$, $\beta = 0.305, p < 0.05$, $\beta = 0.060, p < 0.05$, respectively). Among all the significant predictors, perceived benefits had the highest standardized regression coefficient ($\beta = 0.305; p < 0.05$) indicating participants who perceived higher benefits were more likely to have a higher participation in health promotion activities. Further, age and self-efficacy demonstrated relative higher contributions toward participation in health promotion activities. The results suggested that significant variables in the Pender's Health Promotion Model were important in predicting the factors related to older adults' participation in community-based health promotion activities. The model was significant and explained 35.3% of the variance of older adults' participation in community-based health promotion activities ($F = 2.293, df = 8, 129, p < 0.05$) with an adjusted R^2 of 0.249 (see Table 3).

Table 3. Multiple regression analysis model examining predictors associated with participation in community-based health promotion activities ($N = 139$).

Variables	B	Std. Error	Beta	t	p-Value
Age	0.696	0.298	0.202	2.337	0.021 *
Gender	0.065	0.325	0.018	0.201	0.841
Self-reported health status	0.261	0.300	0.079	0.870	0.386
Perceived Benefits	1.090	0.425	0.305	2.566	0.011 *
Perceived Barriers	−0.441	0.331	−0.144	−1.333	0.185
Self-efficacy	0.118	0.184	0.060	0.644	0.041 *
Social Support	−0.370	0.296	−0.122	−1.253	0.212
Activity-related Affect	0.070	0.369	0.021	0.189	0.850

$R^2 = 0.353$ (35.3%), adjusted $R^2 = 0.249$ (24.9%), * $p < 0.05$.

4. Discussion

The aim of this study was to apply the Pender's Health Promotion Model to identify the factors associated with older adults' participation in community-based health promotion activities. This study found that perceived benefits were the strongest predictor ($\beta = 0.305$; $p < 0.05$), with participants being more likely to engage in health promotion activities if their perceived benefits are high. Studies with systematic reviews have shown that the important predictor was typically perceived benefits when assessing the adherence of participants attending community-based exercise programs [8,20]. A study has been conducted to determine the effect of a multi-strategy program based on the Pender's Health Promotion Model, to prevent loneliness of elderly women by improving social relationships. The results showed that perceived benefits and barriers were significant variables related to reducing loneliness in older women [21]. Furthermore, another study [22] on older adults' health beliefs regarding the motivation to exercise, perceived benefits and barriers were the most direct determinants of increasing a high continuous participation rate. Although perceived barriers were not a significant predictor in our study, there is a need to focus on increasing awareness of community-based health promotion activities benefits while reducing the identified barriers.

Self-efficacy is an important determinant for complex activities and long-term changes in health behaviors [23]. This study is consistent with previous studies that cited the importance of self-efficacy in health promotion activities in older adults and demonstrated that older adults who have more confidence, are more competent to manage their health, and are more likely to regularly engage in health promotion activities [3,7]. Studies also found that self-efficacy is an indicator for predicting important health outcomes such as healthy eating, oral health, and hypertension prevention in different populations [24,25]. The findings support the importance of self-efficacy for engaging in community-based activities and should be considered in interventions to increase the continuous participation rate [7].

The results include significant differences between participants' characteristics and the Health Promotion Questionnaire with all subscales included gender, marital status, educational level, and self-reported health status in this study. It was found that perceived benefits and self-efficacy mean scores were significantly higher in females in comparison to males and this is consistent with the findings of Seo [26]. Studies found that women have a higher level of health knowledge and are more active in seeking health-related information than men do, which is thought to account for higher health-seeking behaviors [27]. Thus, gender is an important role in promoting health behavior. Meanwhile, we have found self-efficacy mean scores were significantly higher in those who had self-reported their health status as good in comparison to those who had self-reported their health status as not good. Since older people who perceive good health status tend to have higher self-efficacy, they may be more capable of looking after themselves and be more active in leisure activities, housework, and functional activities [9].

Married participants perceived significantly lower barriers than those who were divorced or single (never married) in this study. Married people may have the support

from their spouse, so they perceive a lower level of barriers in participation of health promotion activities. Zhuori [28] suggests that with the support of family members, friends, and the public, older adults may be encouraged to participate in activities by attending recreational exercises, which in turn facilitates them to return to the society. Activity-related affect mean scores of those who had a lower education level were significantly higher than those who had a higher education level in this study, which is opposite to the findings of a previous study [29] and this suggested that it might be important to assess the impact of the interaction between self-efficacy and affect to ensure an effective health promotion program in further studies.

This study has some limitations. Data collection was limited to a particular care center in Taoyuan City for sampling convenience, resulting in a small sample size of merely 139 participants, who were surveyed only once. The data were cross-sectional which precludes inferences related to factors that affect older adults' long-term participation in community-based health promotion activities. Moreover, as data were self-reported, there is a risk of self-report bias including social desirability and introspective ability. Further studies using experimental designs are needed to test causality in the associations among the measured variables in this study.

The results of this study show that the constructs of Pender's Health Promotion Model can be used as a framework for predicting and detecting significant factors related to older adults' participation in community-based health promotion activities. By using this model as a framework, researchers can design more specific studies that are directed towards improving a healthy lifestyle and detecting the key components of health-related behaviors among different age groups.

5. Conclusions

To conclude, age, perceived benefits, and self-efficacy were identified as significant predictors of older adults' participation in community-based health promotion activities. Older adults perceived health promotion activities as beneficial, which in turn encouraged them to participate in them, resulting in a high participation rate. With an increase in older adults' self-efficacy, they are more likely to regularly engage in health promotion activities. The results of this study can serve as a reference when developing health promotion plans for older adults.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Research data are not available because participant consent did not include sharing of data.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. The Older Adults’ Health Promotion Activity Questionnaire

Part 1: Personal Information

What is your gender?

Male Female

Year of birth:

1. What is your marital status?

Married Widowed Divorced/Single

2. What is your highest educational level?

Less than high school High school College or university degree Master’s degree

3. What is your total monthly income?

Below USD 300 Over USD 300

4. How is your health in general?

Not good Good

5. Do you have any chronic diseases?

No Yes

Part 2: Frequency of participation in community-based health promotion activities

1. How often do you participate in health promotion activities in the community care center?

Very rarely Rarely Occasionally Frequently Very frequently

Part 3.1. Perceived Benefits

Please circle the number which best indicates your opinion.

	Completely Disagree 1	Disagree 2	Neutral 3	Agree 4	Completely Agree 5
1. Participating in community-based health promotion activities increases my muscle strength.	1	2	3	4	5
2. Participating in community-based health promotion activities prevents cardiovascular diseases.	1	2	3	4	5
3. Participating in community-based health promotion activities relieves my stress and tension.	1	2	3	4	5
4. Participating in community-based health promotion activities increases my physical fitness (muscle endurance, flexibility, etc.).	1	2	3	4	5

5.	Participating in community-based health promotion activities helps control my blood pressure.	1	2	3	4	5
6.	Participating in community-based health promotion activities helps maintain my figure (body weight).	1	2	3	4	5
7.	Participating in community-based health promotion activities helps relieve my backache.	1	2	3	4	5
8.	Participating in community-based health promotion activities increases my chances of making friends.	1	2	3	4	5
9.	Participating in community-based health promotion activities allows me to earn respect from others.	1	2	3	4	5
10.	I believe health promotion activities are good recreational activities.	1	2	3	4	5
11.	After participating in community-based health promotion activities, I feel more energetic in daily life (less likely to feel tired).	1	2	3	4	5
12.	Participating in community-based health promotion activities improves my sleep quality and makes it easier to fall asleep (better sleep).	1	2	3	4	5
13.	Participating in community-based health promotion activities makes me happy.	1	2	3	4	5

14.	I enjoy participating in community-based health promotion activities.	1	2	3	4	5
15.	Participating in community-based health promotion activities makes me feel at ease (e.g., feels peaceful, comfortable, and relaxed).	1	2	3	4	5
16.	Participating in community-based health promotion activities increases my confidence.	1	2	3	4	5
17.	Participating in community-based health promotion activities is good for my mental health.	1	2	3	4	5
18.	Participating in community-based health promotion activities makes me look younger.	1	2	3	4	5
19.	Participating in community-based health promotion activities provides me with a sense of accomplishment.	1	2	3	4	5

3.2. Perceived barriers

Please circle the number which best indicates your opinion.

	Completely Disagree	Disagree	Neutral	Agree	Completely Agree	
	1	2	3	4	5	
1.	I feel powerless and weak (insufficient physical strength) to participate in community-based health promotion activities.	1	2	3	4	5
2.	I feel body pain (such as muscle soreness) after attending community-based health promotion activities.	1	2	3	4	5
3.	I fear that I may fall or get injured when attending community-based health promotion activities.	1	2	3	4	5

4.	I fear that participating in community-based health promotion activities may aggravate the symptoms of my existing diseases.	1	2	3	4	5
5.	The community health activity center is too far from my place.	1	2	3	4	5
6.	I am worried about safety when participating in community-based health promotion activities.	1	2	3	4	5
7.	Community-based health promotion activities lack professional guidance and engagement.	1	2	3	4	5
8.	Community-based health promotion activities do not offer suitable activity groups.	1	2	3	4	5
9.	I do not have peers who can attend community-based health promotion activities with me.	1	2	3	4	5
10.	Bad weather (too cold, too hot, or rainy weather) can affect my participation in community-based health promotion activities.	1	2	3	4	5
11.	There are no suitable community-based health promotion activity centers near my house.	1	2	3	4	5
12.	There is insufficient information about community-based health promotion activities.	1	2	3	4	5
13.	I feel I am too old to participate in community-based health promotion activities (declined physical functions and physical strength).	1	2	3	4	5
14.	I lack motivation and interest in participating in community-based health promotion activities.	1	2	3	4	5

	1	2	3	4	5
15. Participating in community-based health promotion activities is costly.					
	1	2	3	4	5
16. I do not have time to participate in community-based health promotion activities (need time to look after grandchildren/family members, etc.).					
	1	2	3	4	5
17. I cannot attend community-based health promotion activities due to ailments (such as perceiving that my health is not suitable to engage in activities).					

3.3. Self-efficacy

Please circle the number which best indicates your opinion.

	Not Confident at all	Not Very Confident	Neither	Fairly Confident	Very Confident
	1	2	3	4	5
1. I will attend community-based health promotion activities even when the weather is bad.					
	1	2	3	4	5
2. I will attend community-based health promotion activities even when there is no invitation or encouragement from my relatives and friends.					
	1	2	3	4	5
3. I will attend community-based health promotion activities even when there is a lot of housework.					
	1	2	3	4	5
4. I will attend community-based health promotion activities even when my physical condition is not ideal.					
	1	2	3	4	5
5. I will attend community-based health promotion activities even when I feel like being lazy.					
	1	2	3	4	5
6. I will attend community-based health promotion activities even when I am in a bad mood.					

	1	2	3	4	5
7. I will attend community-based health promotion activities even when I feel tired.					
8. I will attend community-based health promotion activities even when I feel very distressed.					
9. I will attend community-based health promotion activities even when I feel sore and uncomfortable after the last activity.					
10. I will attend community-based health promotion activities even when more interesting events are available.					

3.4. Social Support

Please circle the number which best indicates your opinion.

	Completely Disagree 1	Disagree 2	Neutral 3	Agree 4	Completely Agree 5
1. My family accompanies me when attending community-based health promotion activities.					
2. My family encourages me to attend community-based health promotion activities.					
3. My family explains the benefits of participating in community-based health promotion activities to me.					
4. My family acknowledges improvements in my physical condition after attending community-based health promotion activities.					
5. My family discusses any issues related to attending community-based health promotion activities with me.					

6.	My family assists me in making plans to participate in community-based health promotion activities.	1	2	3	4	5
7.	My family provides me with supplies required for attending community-based health promotion activities.	1	2	3	4	5
8.	My friends accompany me when attending community-based health promotion activities.	1	2	3	4	5
9.	My friends encourage me to attend community-based health promotion activities.	1	2	3	4	5
10.	My friends explain the benefits of participating in community-based health promotion activities to me.	1	2	3	4	5
11.	My friends acknowledge improvements in my physical condition after attending community-based health promotion activities.	1	2	3	4	5
12.	My friends discuss any issues related to attending community-based health promotion activities with me.	1	2	3	4	5
13.	My friends assist me in making plans to participate in community-based health promotion activities.	1	2	3	4	5
14.	My friends provide me with supplies required for attending community-based health promotion activities.	1	2	3	4	5

3.5 Activity-related Affect

Please circle the number which best indicates your opinion.

	Completely Disagree 1	Disagree 2	Neutral 3	Agree 4	Completely Agree 5
1. I often feel content after participating in community-based health promotion activities.					
2. I am generally happy after participating in community-based health promotion activities.	1	2	3	4	5
3. I am quite happy after participating in community-based health promotion activities.	1	2	3	4	5
4. I feel energetic after participating in community-based health promotion activities.	1	2	3	4	5
5. Attending community-based health promotion activities makes me feel I belong to a certain group.	1	2	3	4	5
6. Attending community-based health promotion activities makes me feel I can take control of my life.	1	2	3	4	5
7. The equipment used in community-based health promotion activities is comprehensive and safe.	1	2	3	4	5
8. The community-based health promotion activity center is close to my home.	1	2	3	4	5
9. Attending community-based health promotion activities is free.	1	2	3	4	5

References

1. World Health Organization. Ageing and Health. 2018. Available online: <http://www.who.int/news-room/fact-sheets/detail/ageing-and-health> (accessed on 8 June 2021).
2. Ministry of the Interior Taiwan. Statistics. 2020. Available online: https://www.moi.gov.tw/stat/news_detail.aspx?sn=13742 (accessed on 15 June 2021).

3. Liljas, A.E.M.; Walters, K.; Jovicic, A.; Iliffe, S.; Manthorpe, J.; Goodman, C.; Kharicha, K. Strategies to improve engagement of 'hard to reach' older people in research on health promotion: A systematic review. *BMC Public Health* **2017**, *17*, 1–12. [[CrossRef](#)] [[PubMed](#)]
4. Gillette, D.B.; Petrescu-Prahova, M.; Herting, J.R.; Belza, B. A pilot study of determinants of ongoing participation in enhance fitness: A community-based group exercise program for older adults. *J. Geriatr. Phys. Ther.* **2015**, *38*, 194–201. [[CrossRef](#)] [[PubMed](#)]
5. Ramirez-Campillo, R.; Diaz, D.; Martinez-Salazar, C.; Valdes-Badilla, P.; Delgado-Floody, P.; Mendez-Rebolledo, G.; Canas-Jamet, R.; Cristi-Montero, C.; Garcia-Hermoso, A.; Celis-Morales, C.; et al. Effects of different doses of high-speed resistance training on physical performance and quality of life in older women: A randomized controlled trial. *Clin. Interv. Aging* **2016**, *11*, 1797–1804. [[CrossRef](#)] [[PubMed](#)]
6. Ma, C.L.; Kuo, C.Y.; Fang, L.C. A study on the influence of physical fitness into community care center on physical and mental health of elderly. *J. Soc. Dev. Study* **2017**, *20*, 1–38.
7. Lee, Y.T.; Hsieh, H.Y.; Tseng, C.H.; Chang, Y.L.; Huang, H.L.; Yu, S.W. Promoting health and community-living for elderly people through community empowerment in Mei Cheng Village, Xindian District, Taiwan. *Taiwan Geriatr. Gerontol.* **2016**, *11*, 186–195.
8. Farrance, C.; Tsofliou, F.; Clark, C. Adherence to community based group exercise interventions for older people: A mixed-methods systematic review. *Prev. Med.* **2016**, *87*, 155–166. [[CrossRef](#)]
9. Chao, M.L.; Chen, W.T.; Wang, S.M. Relationships between self-efficacy, social support and self-care in older people with diabetes mellitus. *J. Taiwan Health Care Assoc.* **2018**, *18*, 1–12.
10. Bhandari, P.; Kim, M.Y. Predictors of the health-promoting behaviors of Nepalese migrant workers. *J. Nurs. Res.* **2016**, *24*, 232–239. [[CrossRef](#)]
11. Goodarzi-Khoigani, M.; Moghadam, M.; Nadjarzadeh, A.; Farahnaz Mardanian, F.; Hossein Fallahzadeh, H.; SeyedSaeed Mazloomi-Mahmoodabad, S. Impact of nutrition education in improving dietary pattern during pregnancy based on Pender's health promotion model: A randomized clinical trial. *Iran. J. Nurs. Midwifery Res.* **2018**, *23*, 18–25.
12. Pender, N.J.; Murdaugh, C.L.; Parsons, M. *Health Promotion in Nursing Practice*, 6th ed.; Pearson: Boston, MA, USA, 2011; pp. 122–126.
13. Haghi, R.; Ashouri, A.; Karimy, M.; Rouhani-Tonekaboni, N.; Kasmaei, P.; Pakdaman, F.; Zareban, I. The role of correlated factors based on Pender health promotion model in brushing behavior in the 13–16 years old students of Guilan, Iran. *Ital. J. Pediatr.* **2021**, *47*, 1–10. [[CrossRef](#)]
14. Pouresmali, A.; Alizadehgoradel, J.; Molaee, B.M.V.; Fathi, D. Self-care behavior prevention of Covid-19 in the general population based on Pender health promotion model. *Research Square* **2020**, *1*, 1–17. [[CrossRef](#)]
15. Chang, W.F.; Sun, J.C.; Lee, H.C.; Wang, T.J. The effects of a whole body dynamic exercise program on hip mobility and balance ability in older adults. *Formos. J. Phys. Ther.* **2017**, *42*, 141–142.
16. Hsu, I.P.; Lee, Y.H.; Hu, Y.J.; Chuang, L.C.; Chen, C.Y. Participation in health promotion activities and related factors among the elderly in a selected district in Taipei City, Taiwan. *Taiwan J. Public Health* **2016**, *35*, 642–657.
17. Khodaveisi, M.; Omidi, A.; Farokhi, S.; Soltanian, R.A. The effect of Pender's health promotion model in improving the nutritional behavior of overweight and obese women. *Int. J. Community Based Nurs. Midwifery* **2017**, *5*, 165–174. [[CrossRef](#)]
18. Chen, C.Y.; Chiang, I.C.; Huang, Y.W.; Hu, Y.J. The effectiveness of regular exercise intervention program into community elders. *Health Promot Health Edu. J.* **2016**, *40*, 79–101.
19. Hepburn, M. The variables associated with health promotion behaviors among urban black women. *J. Nurs. Scholarsh.* **2018**, *50*, 353–366. [[CrossRef](#)]
20. Kumar, A.; Delbaere, K.; Zijlstra, G.A.R.; Carpenter, H.; Iliffe, S.; Masud, T.; Skelton, D.; Morris, R.; Kendrick, D. Exercise for reducing fear of falling in older people living in the community: Cochrane systematic review and meta-analysis. *Age Ageing* **2016**, *45*, 345–352. [[CrossRef](#)]
21. Alaviani, M.; Khosravan, S.; Alami, A.; Moshki, M. The Effect of a Multi-Strategy Program on Developing Social Behaviors Based on Pender's Health Promotion Model to Prevent Loneliness of Old Women Referred to Gonabad Urban Health Centers. *Int. J. Community Based Nurs Midwifery* **2015**, *3*, 132–140.
22. Cadore, E.L.; Rodríguez-Mañas, L.; Sinclair, A.; Izquierdo, M. Effects of different exercise interventions on risk of falls, gait ability, and balance in physically frail older adults: A systematic review. *Rejuvenation Res.* **2013**, *16*, 105–115. [[CrossRef](#)]
23. Breland, J.Y.; Wong, J.J.; McAndrew, L.M. Are Common Sense Model constructs and self-efficacy simultaneously correlated with self-management behaviors and health outcomes: A systematic review. *Health Psychol. Open* **2020**, *7*, 1–13. [[CrossRef](#)]
24. Guntzviller, L.M.; King, A.J.; Jensen, J.D.; Davis, L.A. Self-Efficacy, Health Literacy, and Nutrition and Exercise Behaviors in a Low-Income, Hispanic Population. *J. Immigr. Minor. Health* **2017**, *19*, 489–493. [[CrossRef](#)] [[PubMed](#)]
25. Kim, A.S.; Jang, M.H.; Park, K.H.; Min, J.Y. Effects of Self-Efficacy, Depression, and Anger on Health-Promoting Behaviors of Korean Elderly Women with Hypertension. *Int. J. Environ. Res. Public Health* **2020**, *17*, 6296. [[CrossRef](#)]
26. Seo, E.J.; Haa, Y. Gender differences in predictors of physical activity among Korean college students based on the health promotion model. *Asian Pac. Isl. Nurs. J.* **2019**, *4*, 1–10.
27. Ek, S. Gender differences in health information behaviour: A Finnish population-based survey. *Health Promot. Int.* **2015**, *30*, 736–745. [[CrossRef](#)]

28. Zhuori, N.; Cai, Y.; Yan, Y.; Cui, Y.; Zhao, M. Does Social Support Affect the Health of the Elderly in Rural China? A Meta-Analysis Approach. *Int. J. Environ. Res. Public Health* **2019**, *16*, 3471. [[CrossRef](#)]
29. Tseng, C.H. Effects of Tai Chi training program on functional fitness in community-dwelling older adults. *East J.* **2017**, *47*, 27–41.