

## Effects of Involvement in Recreational Sports on Physical and Mental Health, Quality of Life of the Elderly

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**KEYWORDS** Involvement in Recreational Sports. Physical and Mental Health. Quality of Life

**ABSTRACT** This study aims to discuss the effects of involvement in recreational sports on physical and mental health and satisfaction with life. The elderly aged 65 and above in Changhua City in Taiwan were selected by convenience sampling, and total 212 valid copies were acquired. Questionnaire survey and Structural Equation Modeling (SEM) were utilized for testing the model in this study. The analysis results show the favorable goodness of fit and the following findings. 1. Involvement in recreational sports would positively affect physical and mental health of the elderly. 2. Physical and mental health shows positive effects on their quality of life of the elderly. 3. Physical and mental health shows mediating effects on the relations between involvement in recreational sports and quality of life of the elderly. The results indicated that the main consideration for involvement in recreational sports was "centrality". "Mental health" in physical and mental health is mostly emphasized by the elderly; "social interactions" were considered an important dimension of their quality of life. These findings suggested that in response to the advent of rapidly aging society, senior citizens are encouraged to engage in leisure activities, which could promote physical and mental health, improve quality of life, and achieve "successful aging" in their senior life.

### INTRODUCTION

Population ageing is a globally concerned issue. Under global population ageing, the demands and problems resulted from the rapid changes of ageing societies have become the global focus. In Taiwan, the elderly aged 65 and above was 7.09% of the total population in 1993, which exceeded the standard of ageing society (7%), set by World Health Organization. The elderly aged 65 and above in Taiwan increased up to 10.74% of total population by April 2011. Facing the increasing population of the elderly, the ageing problems have emerged. Along with gerontechnology, it would help reduce the effects of age-related impairments with technological devices thus, improving the home environment, the essential key factors that should be considered as the main criteria when designing the old age home. (Kashyap 2011). Having the elderly live healthier, happier, and dignified with higher quality of life is the prompt problem for the government and is worthy of the concerns

and research of relative workers. Under population ageing, the concept of successful ageing is proposed again, in which Satisfaction with Life is regarded as the essential factor (Franklin and Tate 2009). Regular physical activities or bodybuilding presents significant effects on the prevention from diseases (Warburton et al. 2006). Meanwhile, it could assist in reducing anxiety, depression, and negative emotion, enhance dignity and improve awareness, and improve Satisfaction with Life (Callaghan 2004). Can the elderly improve the physical and mental health through recreational sports, and would they result in positive and direct effects on quality of life? For this reason, this study tends to discuss the effects of Involvement in Recreational Sports on Physical and Mental Health and quality of life of the elderly.

### Literature Review

#### I. The Elderly

Different definitions are given for the aged from the aspects of society, psychological development, demography, and law. WHO divided them into the stages of young-old, young-old, middle-old, and oldest-old. The young-old referred to the age of 65-74, middle-old referred to the age of 75-84, oldest-old referred to the age above 85.

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## II. Involvement in Recreational Sports

Kyle et al. (2004) defined it as individual awareness and movement when participating in recreational sports. In other words, it referred to the degree of people perceiving excitement, investment, and concentration when investing in favorable leisure activities. Kyle and Mowen (2005) divided involvement in leisure into the dimensions of attraction, self-performance, and centrality of lifestyle. Decloe et al. (2009) included the ideas of social factors, flow experience, and situational involvement and regarded involvement as the effect on leisure behaviors.

## III. Physical and Mental Health

Physical and mental health contains physiology and psychology. Physical health refers to the health of physical development, that is, without any diseases or an individual being able to practice activities and take care of himself (Lee and Shih 2012). Mental health shows good life adjustment or an individual without any trouble hindering the psychological efficacy (Chang 1994). Accordingly, physical and mental healths are referred to as favorable physical and life adjustment. Physical and mental health could be evaluated from subjective and objective aspects. Objective evaluation is based on the diagnosis of medical treatment and chronic diseases and the declination and limitation of physical functions, while subjective evaluation is based on individual perception and attitudes toward the physical and mental conditions.

## IV. Quality of Life

Quality of life, health-related quality of life (HRQOL), should be measured with multiple layers and subjective perception. Objective indices could assist in measuring the real individual quality of life (Ferrans 1990). William et al. (1999) indicated that quality of life would change with health conditions. Satisfaction with life is an inevitable factor in successful ageing (Franklin and Tate 2009). In other words, the higher successful ageing of the elderly appears on higher satisfaction with life. Lin (2007) further classified satisfaction with life into daily life, self-concept, emotional state, and interpersonal interaction.

## METHODOLOGY

### I. Research Framework

This study aims to explore the effects of involvement in recreational sports on the mutual effects between physical and mental health and satisfaction with life of the elderly. Based on the research purpose and the literature review, involvement in recreational sports, physical and mental health, and satisfaction with life are the variables for the conceptual framework of this study (Fig. 1).

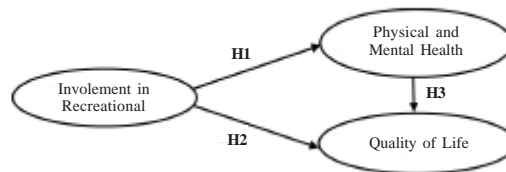


Fig. 1. Research framework

### II. Research Hypothesis

#### (1) Effects of Involvement in Recreational Sports on Physical and Mental Health of the Elderly

Dionigi (2006) indicated that the benefits seniors acquired from exercises allowed most participants perceiving that they could control their life and body; prolong the physical health, and present strength and active image. Accordingly, Hypothesis 1 is established as below.

*H1:* Involvement in recreational sports shows positive effects on physical and mental health of the elderly.

#### (2) Effects of Involvement in Recreational Sports on Quality of Life of the Elderly

Nimrod (2007) discovered that involving in high-level leisure activities presented significant effects on Satisfaction with Life and could benefit successful adjustment to retirement. In this case, Hypothesis 2 is established as below.

*H2:* Involvement in recreational sports reveals positive effects on quality of life of the elderly.

#### (3) Effects of Physical and Mental Health on Quality of Life

Hilleras et al. (2001) found out the personalities of health and stable emotion being the key

factors in satisfaction with life of the elderly. Hypothesis 3 therefore is established as below.

*H3*: Physical and mental health appears positive effects on quality of life of the elderly.

### III. Research Subject

The elderly domiciled in Changhua City of Taiwan, with the age of 65, and total 212 valid copies were acquired.

### IV. Research Tools

#### (1) *Compilation of Questionnaire*

The designed questionnaire was divided into four parts. Questionnaire referred to Lee and Shih (2012).

#### (2) *Pretest of Questionnaire*

The pretest questionnaires were distributed at Senior College of Presbyterian Church Changhua Branch on March 12, 2013. They were a group of seniors who had been involved in recreational activities over a long period of time. Total 51 copies were retrieved, with 85% valid copies. Furthermore, the reliability coefficient Cronbach's  $\alpha$  is used for measuring the consistency of the questions in the scales. With reliability analysis, the reliability of the scales is listed in Table 1.

**Table 1: Reliability analysis of variable scales in the pretest questionnaire**

Research variable scale	Number of question	Cronbach's $\alpha$	Evaluation result
Involvement in recreational sports scale	10	.962	High reliability
Physical and mental health scale	10	.952	High reliability
Quality of life scale	10	.946	High reliability

#### (3) *Data Analysis*

The retrieved valid questionnaires were coded and then tested and analyzed by Independent Samples t Test, Reliability Analysis, Analysis of Variance (ANOVA), Regression Analysis, and Linear Structural Equation Modeling (SEM),

which could test the dependence between two or more variables. SPSS18.0 and AMOS are further utilized for the analyses, with the significance standard  $p < .05$ .

## RESULTS

### I. Description of Sample Structure

According to the demographic variables in the questionnaire, the statistical results show that most participants were female (56.6%), aged 65-70 (55.2%), married with survival spouse (79.7%), and living with spouse (58.0%).

### II. Sample Characteristics and Analysis of Variance Of Dimensions

Analysis of Variance is applied to understanding the differences between demographic variable and involvement in recreational sports, physical and mental health, and quality of life. The results reveal no significance difference between demographic variable and involvement in recreational sports, physical and mental health, and quality of life (Gender appears significant differences on variable). The analyses are shown in Table 2.

**Table 2: Analysis of Variance of demographic variables**

Variable		Involvement in recreational sports	Physical and mental health	Quality of life
Gender	t	2.030*	3.256*	2.281*
	p	.044	.001	.024
Age	F	.475	.838	.899
	p	.754	.502	.465
Marital Status	F	.121	1.307	2.310
	p	.886	.357	.102

\*  $p < .05$ , and has reached significant difference

### III. Establishment and Verification of Model

#### (1) *Confirmatory Factor Analysis*

The research framework was supported by various literatures that it is not necessary to use Exploratory Factor Analysis for extracting factors, but merely to confirm the compatibility between the dimensions and the acquired data with Confirmatory Factor Analysis. AMOS is utilized

**Table 3: Overall fit of measuring model**

<i>Fit Indices</i>	$\chi^2/df$	<i>GFI</i>	<i>AGFI</i>	<i>RMSEA</i>	<i>NFI</i>	<i>CFI</i>	<i>RMR</i>
Reference standard	< 3	>.9	>.9	<.1	>.9	>.9	<.05
Recreational sports	5.298	.898	.807	.143	.925	.938	.050
Physical and mental health	4.576	.902	.814	.130	.933	.947	.023
Quality of life	4.420	.906	.823	.127	.932	.946	.022

in this study for evaluating the observed variables. The overall fit is organized in Table 3.

The significance of  $\chi^2$  is generally regarded as the standard that  $p>0.5$  is an acceptable model. Marsh et al. (1988) indicated that  $\chi^2$  would change with the number of samples; and, when the number of samples was large,  $p$  was about less than .05. The number of samples in this study is large that  $p<.05$  is reasonable. Overall speaking, the research model and the observed data presented favorable goodness of fit.

Composite reliability (CR) is the composition of the reliability of all measured variables, showing the internal consistency of dimensions. The higher value reveals the better consistency.

Convergent validity refers to the questions in the same dimension with high correlations. Fornell and Larcker (1981) suggested three measuring scales of (1.) all factor load obviously larger than 0.5, (2.) Composite reliability larger than 0.6, and (3.) average variance explained of latent variables calculated by Average Variance Extracted (AVE) larger than 0.5, where the higher AVE presented the higher convergent validity and discriminate validity of the latent variables. The analyses of composite reliability and convergent validity are organized in Table 4.

**Table 4: Convergent validity and reliability analysis of dimensions**

<i>Variable</i>	<i>Dimension</i>	<i>Composite reliability</i>	<i>Variance extracted</i>
<i>Recreational Sports</i>	Attraction	.933	.738
	Centrality	.921	.799
<i>Physical and Mental Health</i>	Physical health	.832	.558
	Mental health	.933	.779
<i>Quality of Life</i>	Self-concept	.884	.659
	Social interaction	.901	.695

Hatcher (1994) indicated that the covariance and standard error of paired dimensions in a scale with discriminate validity would not present

confidence interval (covariance $\pm$ 2times standard error) being 1. Discriminate validity of the latent variables in the dimensions is organized in Table 5. The analyses show confidence interval not containing 1 that favorable discriminate validity appears between the dimensions.

**Table 5: Discriminate validity of dimensions**

<i>Discriminate validity of scale</i>	<i>Pairwise compared dimensions</i>	<i>Confidence interval (covariance<math>\pm</math>2 times standard error)</i>
Recreational sports	Attraction <—> Centrality	.158~.074
Physical and mental health	Physical health <—> Mental health	.188~.096
Quality of life	Self-concept <—> Social interaction	.272~.156

**(2) Overall Composite Analysis**

According to the suggestion of Anderson and Gerbing (1988) two-step approach, Confirmatory Factor Analysis (CFA) is first proceeded to evaluate goodness of fit, and correlation analysis is further preceded for the casual model.

**1. Composition Fit Evaluation**

The evaluation of the overall fit is preceded based on the research subject and framework. The analyses of overall Goodness of Fit are shown, in which merely  $\chi^2/df=11.621(>3)$ ,  $GFI=.886(<.9)$ ,  $AGFI=.658(<.9)$ ,  $RMSEA=.224(<.1)$ , is favorable, other indicators, including  $NFI=.909(>.9)$ ,  $CFI=.916(>.9)$ ,  $RMR=.015(>.05)$ , achieve the standard, revealing the model achieving the standard, not requiring revision.

**2. Sample Estimate and Model Diagram of Structural Equation Modeling**

The entire model is proceeded path analysis of structural equation modeling with AMOS to

**Table 6: Effects of involvement in recreational sports on physical and mental health and quality of life of the elderly**

Variable relationship		Standardized estimate	p
Physical and mental health	<--- Involvement in recreational sports	.949*	.000
Quality of life	<--- Involvement in recreational sports	.076	.850
Quality of life	<--- Physical and mental health	.918*	.016
Attraction	<--- Involvement in recreational sports	.703*	.000
Centrality	<--- Involvement in recreational sports	.781*	.000
Physical Health	<--- Physical and mental health	.823*	.000
Mental Health	<--- Physical and mental health	.855*	.000
Self-concept	<--- Quality of life	.827*	.000
Social Interaction	<--- Quality of life	.881*	.000

\*  $p < .05$ , and has reached significant difference

verify the casual relations of hypotheses and the estimated data and contents in the effects of Involvement in recreational sports on physical and mental health and quality of life of the elderly.

The casual relations among factors are drawn according to the hypotheses and the data in Table 6, and Figure 2.

### (3) AMOS Empirical Analysis of Research Hypotheses

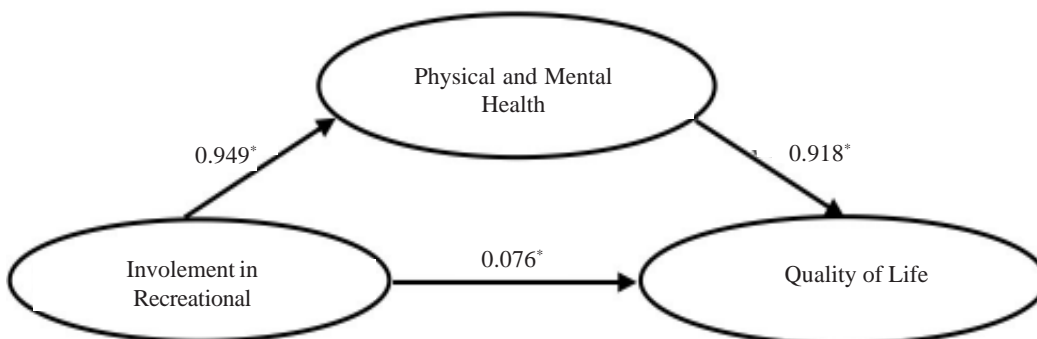
The empirical analyses with AMOS are shown in Table 6 and Figure 2. The hypotheses are verified to discuss the positive effects of involvement in recreational sports on physical and mental health and satisfaction with life of the elderly.

1. *Hypothesis 1:* Involvement in recreational sports shows positive effects on physical and mental health of the elderly.

From Table 6, the regression weight of involvement in recreational sports towards physical and mental health appears .949,  $p < .05$ , reaching the significance, that Hypothesis 1 is supported. The result shows the positive effects of involvement in recreational sports on physical and mental health and that physical and mental health of the elderly would increase with higher involvement in recreational sports.

2. *Hypothesis 2:* Involvement in recreational sports reveals positive effects on quality of life of the elderly.

From Table 6, the regression weight of Involvement in recreational sports towards quality of life of the elderly appears .05,  $p < .05$ ; not achieving the significance, that Hypothesis 2 is not supported. The result presents that involvement in recreational sports cannot necessarily affect quality of life of the elderly positively.



**Fig. 2 Model diagram of the effects of involvement in recreational sports on physical and mental health and quality of life of the elderly**

\*  $p < .05$ , and has reached significant difference



3. *Hypothesis 3*: Physical and mental health appears positive effects on quality of life of the elderly.

From Table 6, the regression weight of physical and mental health towards quality of life of the elderly reveals .918,  $p < .05$ , achieving the significance, that Hypothesis 3 is supported. The result reveals the positive effects of physical and mental health on quality of life of the elderly.

## DISCUSSION

The research samples are first described based on the single variable and then according to the hypothesis verification. AMOS is utilized for the estimation and verification. From Figure 2, the following results are concluded.

### (1) Involvement in Recreational Sports of the Elderly

From the dimensions in involvement in recreational sports of the elderly, centrality appears the reflection effects (regression weight=.781), followed by attraction (regression weight=.703).

Accordingly, involvement in recreational sports presents centrality on the elderly that is plays a critical role in the life of the elderly. The elderly could fill up the leisure time by involving in recreational sports, talking about recreational sports with friends, and satisfying the demands for adjusting to the ageing so as to achieve individual physical health and mental satisfaction. The research results are close to those of Lee and Shih (2012) that involvement in recreational sports is valuable, meaningful, and related to the life of the elderly.

### (2) Physical and Mental Health of the Elderly

Among the dimensions in physical and mental health of the elderly, mental health (regression weight=.855) appears the reflection effects, followed by physical health (regression weight=.823).

As a result, the elderly maintain the physical functions, help the movements of joints and muscles, relax the nervous and scared moods, control the depression and anxiety, and enhance the activities and exercises by involving in recreational sports so as to achieve physical and mental health. Such results are close to those of Lee and Shih (2012) that involvement in recreational sports appears positively affect with physical and mental health of the elderly.

### (3) Quality of Life of the Elderly

From the dimensions in quality of life of the elderly, social interaction (regression weight=.881) reveals the reflection effect, followed by self-concept (regression weight=.827) and, presenting that the elderly perceiving happiness, remaining pleasant moods, showing favorable interpersonal interaction, and accepting the physical ageing are the key factors in satisfaction with life. Reported high socio-economic stratus of social isolation in both the sexes were impacted more by the family and friends rather than the neighbors and coping mechanisms dimensions (Kaur and Saini 2011). Hilleras et al. (2001) considered the personalities with stable health and emotion as the key factors in satisfaction with life. The research results appear similar conclusions to those of Lee (2009) and Hilleras et al. (2001).

### (4) Verification of Research Hypotheses

Structural equation modeling is utilized for measuring the latent variables with the observed variables so as to verify the mutual effects among involvement in recreational sports, physical and mental health, and quality of life. The hypothesis verifications are concluded as follows. 1. Involvement in recreational sports appears positive effects on physical and mental health, with the direct effect .949 and  $p = .000 < .05$ , achieving the statistical significance. 2. Involvement in recreational sports does not show positive effects on quality of life, with the direct effect .076 and  $p = .850 > .05$ , not reaching the statistical significance. 3. Physical and mental health presents positive effects on quality of life, with the direct effect .918 and  $p = .016 < .05$ , achieving the statistical significance. 4. Involvement in recreational sports does not appear positive effects on satisfaction with life, but shows mediating effects on quality of life through physical and mental health (.949 × .918 = .871). Physical and mental health therefore is regarded as the mediator between involvement in recreational sports and quality of life, with which involvement in recreational sports reveals positive effects on quality of life.

## CONCLUSION

The present study demonstrated the conclusion: 1. Involvement in recreational sports would

positively affect physical and mental health of the elderly. 2. Physical and mental health shows positive effects on their quality of life of the elderly. 3. Physical and mental health shows mediating effects on the relations between involvement in recreational sports and quality of life of the elderly. The results indicated that the main consideration for involvement in recreational sports was "centrality". "Mental health" in physical and mental health is mostly emphasized by the elderly; "social interactions" were considered an important dimension of their quality of life.

### RECOMMENDATIONS

According to the above conclusions, the following suggestions are proposed for the elderly involving in recreational sports to enhance physical and mental health and quality of life.

#### (1) Suggestions for the Elderly

The quality of life could be enhanced by paying attention to daily healthcare, participating in recreational sports with pleasant emotion, and establishing good interpersonal interaction. Successful ageing is the physiological, psychological, and social optimization in which the elderly could actively participate in the society without being discriminated and independently present favorable quality of life.

From the second conclusion in this study, physical and mental health appears positive effects on quality of life, and both physical and mental health and favorable quality of life are the essentials of successful ageing. The elderly should pay attention to daily healthcare, keep favorable activity and stable emotion, establish good interpersonal relationship, and enjoy quality ageing life.

#### (2) Suggestions for the Family

The research findings show that social interaction is a key factor in enhancing quality of life that the family should encourage the elderly involving in recreational sports for favorable social interaction with others. In addition to encouraging the elderly participating in recreational sports, the family could accompany the elderly participating in the sports on holidays so as to enhance parent-child relationship and promote physical and mental health and the quality of life for successful ageing.

#### (3) Suggestions for Communities

Multiple recreational sports or group activities should be designed for the elderly to enhance the involving motivation. The research findings show the positive effects of physical and mental health on quality of life where mental health is a key factor. Professional staff or volunteers should be arranged for services, technological instructions, healthcare, and sports injury prevention. Active concerns could enhance the elderly people's enthusiastic participation and continuous involvement.

#### (4) Suggestions for Governmental Institutes

Physical and mental health presents positive effects on quality of life, and mental health is the key factor that having the elderly face ageing is a primary issue. The governmental institutes should integrate with community health promotion centers of hospitals to irregularly hold psychological and health counseling, impart the elderly with unfavorable self-awareness of physical and mental health or insufficient healthcare knowledge to understand healthcare and the face of ageing, and enhance the spiritual life of the elderly. Moreover, recreational activities or sports should often be held to increase the involvement intention in recreational sports, enhance the physical and mental health, and promote the quality of life.

### LIMITATIONS

Because of human resource and external factors, the following limitations of this study are proposed.

- (1) The answering of questionnaires might be difficult for the elderly because of the eyesight and question comprehension.
- (2) The research participants are restricted in the elderly (aged 65 and above) in Changhua County, Taiwan. The research conclusions therefore might not be expanded to the elderly in other counties in Taiwan.

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