A STUDY OF LEISURE WALKING ON MENTAL HEALTH AND HEALTH PERCEPTION AMONG OLDER ADULTS

by

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ABSTRACT

This study determined intensity levels of leisure walking that affect mental health and health perception among older adults participating in different intensity levels of leisure walking groups. Using the 2017 California Health Interview Survey (CHIS) data, 4,737 individuals aged 65 and above participating in leisure walking were extracted through a purposive sampling method. This study classified three groups based on an intensity level of leisure walking such as light walking, moderate walking, and vigorous walking. In order to compare group differences in leisure walking intensity level by demographic characteristics, t-test and one-way analysis of variance (ANOVA) were used.

As a result of t-test, there were significant differences in intensity levels of leisure walking based on gender categories ($t = 3.55$, $p < .001$) and distress experience ($t = -2.12$, $p < .05$). As a result of ANOVA, there were significant differences in intensity levels of leisure walking by three different age groups ($F = 4.974$, $p < .01$). One-way multivariate analysis of variance (MANOVA) was utilized to compare group differences in mental health and health perception by intensity levels of leisure walking. As a result of MANOVA, there were significant differences in mental health and health perception among three groups of older adults. Older adults who participated in the moderate-intensity level of leisure walking reported better mental health than those individuals who participated in the light intensity level of leisure walking ($F = 7.84$, $\eta 2 = .003$, $p < .001$). Older adults who participated in vigorous and moderate-intensity levels of leisure

walking activity reported better health perception than those individuals who participated in the light intensity levels of leisure walking activity ($F = 29.63$, $\eta^2 = .012$, $p < .001$).

This study suggested that participation in the increased intensity levels of leisure walking served as an important vehicle for promoting positive health outcomes (e, g., psychological wellness) among older adults. Engagement in the vigorous and moderate intensity of leisure walking contributed to improved mental health and health perception among older adults. Leisure service providers and recreational therapists can help different older age groups decrease negative psychological symptoms (e. g., depression and anxiety) and enhance mental health and health perception by designing and implementing vigorous and moderate levels of leisure walking activities.
Keywords: Leisure walking, mental health, health perception, older adults

I. INTRODUCTION

Study Background

The number of adults aged 65 years and older has been rapidly increasing worldwide. According to the Administration for Community Living (ACL), this population in the United States increased from 37.2 million in 2006 to 49.2 million in 2016 (a 33% increase) and is projected to be 98 million in 2040 (ACL, 2018). With such a growing aging population, health promotion and health protection have become critical issues for health care professionals. Prior research has demonstrated that older adults are likely to experience a variety of health problems associated with chronic diseases, such as diabetes, cancer, heart disease, hypertension, and stroke (Elsawy & Higgins, 2010). In addition, older adults have reported high levels of cognitive challenges and impairments associated with aging, including gradual memory loss, dementia, Alzheimer's disease, and sensory impairments (Schubert et al., 2017). Such health problems are associated with psychological problems and concerns, such as loneliness, social isolation, depression, and anxiety, which result in diminished mental health (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015; Potvin, Forget, Grenier, Préville, & Hudon, 2011; Smith, 2012).

One of the major issues that older adults experience is poor mental health. According to the World Health Organization (WHO), poor mental health is one of the leading disease burdens globally and is associated with poor physical health, sleep deprivation, low socio-economic status, and health risk behaviors (WHO, 2018). A number of studies have demonstrated that older adults reported higher levels of psychological distress (i.e., depression) due to insufficient participation in physical

activities (e.g., Bustamante, Wilbur, Marquez, Fogg, Staffileno, & Manning, 2013). Thus, due to the importance of mental health for older adults, researchers have stressed the importance of physical activity (PA) participation as a way of promoting health benefits (Harris, 2018; Pollard & Wagnild, 2017).

A growing body of literature has stressed the importance of physical activity participation for health benefits among old adults (e. g., Pollard & Wagnild, 2017; Shigematsu et al., 2009). Among the variety of studied physical activities, leisure walking is considered the most cost-effective therapeutic form of exercise as it does not require specific training or skillsets (Center for Disease Control & Prevention; WHO, 2017). Pollard and Wagnild (2017) supported WHO's suggestion that different intensity levels (e.g., light, moderate, and vigorous) of leisure walking can produce different degrees of health awareness and mental health in older adults. For example, older adults who regularly participate in light-intensity activities, such as slow dancing and leisure walking, reported improved psychological well-being and reduced depression (Pollard & Wagnild, 2017). On the other hand, moderate-intensity activities, such as race walking, jogging, and running, improved older adults' mental health, enhanced their balance and prevented falls (Pereira, Vogelaere, & Baptista, 2008), and significantly reduced their rate of pain severity, stress, and anxiety (Shigematsu et al., 2009). These studies suggest that older adults gained health benefits, such as physical, social, cognitive, and psychological well-being, from leisure walking participation.

In spite of the importance of leisure walking among older adults, limited research exists that focuses on appropriate intensity levels of leisure walking for health benefits, such as mental health and health perception among older adults. In addition, a lack of

information exists about how demographic factors are associated with leisure walking intensity and health benefits among older adults. As such, a need exists to focus research on preventive strategies that can be used to promote health benefits through leisure walking for successful aging (Harris, 2018).

Problem Statement

With a rapidly aging world population, lifestyle-related disease burdens coupled with financial and social implications remain elusive (Chang, Wray, & Lin, 2014). Steptoe, Deaton, and Stone (2015) stressed that older adults are at a higher risk of psychological and mental issues than younger people. Substantial evidence exists to show that insufficient PA is associated with stress, depression, anxiety, and exposure to mental disorders among older adults (Ball, Timperio, Salmon, Giles-Corti, Roberts, & Crawford, 2007; Mortazavi, Mohammad, Ardebili, Beni, Mahmoodi, & Keshteli, 2012). For instance, Mortazavi, Ardebili, Eshaghi, Beni, Shahsiah, and Botlani (2012) demonstrated that older adults who did not participate in PA reported that they experienced high levels of psychological problems compared to those adults who regularly participated in PA. In addition, research has indicated that physically inactive in older adults causes them to have an increased risk of chronic disease compared to those older adults who are physically active (Booth, Roberts, & Laye, 2011).

Given the health benefits of PA among older adults, this study proposed that leisure walking is a therapeutic intervention for older adults that can be used to promote mental health and health perception. Considering the different levels of physical functions of older adults, the intensity of leisure walking can play an important role in promoting health. Unfortunately, insufficient evidence exists related to the recommended intensity

levels of leisure walking for health benefits among older adults. As such, this study aims to provide insightful information on how different levels of leisure walking are associated with health benefits.

Purpose of the Study

The purpose of this study is to investigate how leisure walking intensity levels are associated with mental health and health perception among older adults. In particular, this study focuses on three levels of leisure walking group (i.e., light, moderate, and vigorous walking) in order to examine the differences in mental health and health perception among older adults who participated in leisure walking.

Based on the above information, the following hypotheses are proposed:

H_1: Statistically significant differences exist in regard to the intensity levels of leisure walking based on demographic information (i.e., age, gender, distress experience, and disability status).

H_2: Statistically significant differences exist in regard to mental health and health perception among the intensity levels of leisure walking (i.e., light walking, moderate walking, and vigorous walking).

Significance of the Study

Prior research has suggested that regular participation in leisure walking can reduce morbidity, delay mortality, and improve a sense of independence among older adults (Kim, Chun, Heo, & Lee, 2014). As such, this study aims to provide evidence that leisure walking can enhance mental health and health perception. To this end, this study can contribute to program content and therapeutic interventions using leisure walking. Recreational therapists working with older adults can design and implement leisure

walking programs, such as nature walking and buddy walking, for older adults. Older adults can be motivated to participate in walking and pursue active leisure.

In addition, this study will offer valuable information regarding the recommended intensities of leisure walking to those individuals interested in engaging in the activities or designing leisure walking programs. In this regard, this study will offer insightful information regarding the contribution of leisure walking on health perception and mental health well-being among older adults.

II. LITERATURE REVIEW

Theoretical Framework

Various theories have been used to explain an individual's likelihood in engaging in aerobics to improve his/her health; however, the theory of planned behavior will be utilized in this study because it presumes that the pathway to an individual's behavior is one's intention or motivation to perform such a behavior. According to Lee (2016), the intention to engage in a particular activity (e.g., leisure-time walking) is influenced by the evaluation of the anticipated enjoyment, benefits, attitudes, or subjective norms, such as the approval of the certain activity by other people to engage in the activity. Leisure walking is a widely accepted activity and has been associated with improved physical, mental, and psychological wellness (White, Babic, Parker, Lubans, Astell-Burt, & Lonsdale, 2017). Therefore, designing an effective practical leisure walking program that provides the appropriate intensities of activities, while targeting specific age categories and providing information on the anticipated benefits may encourage older adults to participate in the program.

Health Problems of Older Adults

Aging individuals often suffer from various mental health issues, such as dementia. Adamson and Parker (2006) defined dementia as an illness that interferes with the daily functioning of the body. Prohaska et al. (2009) further explained that the disorder is a diminution of one's psychic ability, which alters his/her capacity for thinking, concentration, problem-solving, and perception. Makizako et al. (2015)

described the ailment as a compromised thought process caused by brain cell damage. Dementia patients often appear confused, portray repetitive behavior, and look agitated.

Another problem facing this group of individuals is depression. Older people remain prone to unexplained and occasional sadness. One explanation for this issue is the weak immunity of older adults (Prohaska et al., 2009). Due to this situation, physical conditions, such as hypertension, diabetes, and chronic pain, engulf them, which increases their risk of depression (Yoon, Lee, Lim, Kim, Jeon, & Mun, 2013). Stress and hormones affect older adults' brains, chemistry, and moods, increasing the likelihood of depression (Saleh et al., 2017). Stress is another mental health issue faced by older adults (Perrino, Mason, Brown, & Szapocznik, 2010) and is often attributed to continuous thinking and deterioration of physical abilities. As people grow old, their ability to live independently is often compromised. Stress is induced by such circumstances. The last mental health issue to be discussed in this paper is loneliness. Bergland, Thorsen, and Loland (2010) explained that older adults are subject to loneliness and social isolation, which causes a loss of independence, stress, anxiety, and chronic diseases.

Health Benefits According to Leisure Walking Intensity

Scholars have had different views on the impact of the intensity of walking on one's health. Some scholars believe that low-intensity walking is associated with better health in older adults (Makizako et al., 2015; Prohaska et al., 2009). Various scholars have attributed low-intensity levels to PA guidelines and reported that people believe that low-intensity walking is associated with better physical function and health including decreased depressive symptoms and improved quality of life (e. g., Prohaska et al., 2009; Varma, Chuang, Harris, Tan, & Carlson, 2015). Wahid et al. (2016) demonstrated that

vigorous activity decreased the risk of chronic diseases such as cardiovascular disease mortality and type 2 diabetes.

These activities incorporate aggregate health-promoting behaviors because indeed, the older adults will undertake them daily. Therefore, cases of functional decline and disability are addressed (Maki et al., 2012). Low-intensity walking is easily achievable by and sustainable for older adults. The positive outcomes associated with it include increased exercise by different ages in older adults (Makizako et al., 2015). It helps to know a person's Maximum Heart Rate (MHR) and monitor it (Bergland et al., 2010). By knowing their MHRs, older adults can take precautions to enhance happiness in their lives (Perrino et al., 2010). When comparing low and high-intensity walking, the low intensity is easier for older adults to complete, but high intensity provides more benefits in a shorter period of time.

Leisure Walking and Mental Health

Regular and vigorous exercises are recommended for a healthy physical state (Després, 2016). For example, walking improves self-perception and sleep quality, while it also reduces stress and symptoms of assuasive cognitive impairment, such as dementia, that are linked to blood inefficiency in the brain (Bergland et al., 2010; Prohaska et al., 2009). As such, aerobic exercises, such as walking, help improve one's overall cognitive function, which can improve executive functions, such as thinking, planning, and judgment (Makizako et al., 2015). Yoon et al. (2013) suggested that consistent walking and exercise causes positive responses in one's body. The psychological well-being of older individuals is often linked to their ability to undertake various exercises. According to Adamson and Parker (2006), exercise increases one's ability to be autonomous, gain

personal mastery, have personal development, establish personal growth, and gain a feeling of purpose in life. Prohaska et al. (2009) explained that walking has been shown to improve memory, which improves affection, positive attitudes, and quality of life (Maki et al., 2012).

Further research on the impact of leisure walking on mental health has indicated that being a member of a leisure walking group provides an individual with support and increased psychological well-being (Wensley & Slade, 2012). Wensley and Slade (2012) stated that leisure walking is an enjoyable activity that promotes positive feelings and eradicates negative thoughts, thus reducing the prevalence of depression and mood disorders. In turn, these feelings promote the psychological well-being of older adult participants. However, psychological well-being does not require the vigorous-intensity of PA. The implication of these assertions is that the intensity levels of PA impact mental health differently. In a cross-sectional study used to evaluate the relationship between mental health and leisure walking, Whiteman (2017) showed that taking a leisurely walk was the cheapest, safest, and easiest form of exercising and had several therapeutic benefits, such as improving the emotional and mental well-being of the participants. Therefore, a need exists for older adults to consistently participate in an exercise, such as walks, to enhance their psychological well-being.

Leisure Walking and Health Perception

Perception is how sensory information is perceived and interpreted to allow an individual to understand various environmental views. Researchers have demonstrated that individual has multiple opinions regarding the impact of walking on health (Heesch, Burton, & Brown, 2011; Makizako et al., 2015, Varma et al., 2015). Specifically,

Makizako et al. (2015) stated that the results of the self-perceived health on walking differ by the overall health status of older adults. For example, Maki et al. (2012) illustrated that when one experiences negative moods and emotions, walking may serve as a stress releasing strategy.

Leisure walking has different impacts on how different individuals perceive their health. According to Barton, Hine, and Pretty (2009), some individuals believe that walking in natural environments and places with heritage value helps improve their psychological well-being by reducing depression, anxiety, stress, bad moods, and negative thoughts. The study further showed that people who spend their time in green nature environments benefit from both improved emotional and mental well-being (Barton et al., 2009). Different health perception depended on the community's and one's subjective assessment of general health as well. Demographic factors, such as age, play a strong role in determining health outcomes (Adamson & Parker, 2006). Older adults who grew up in communities that didn't value of walking had negative perceptions toward walking as it related to general health (Perrino et al., 2010). These adults believed that, regardless of their activities, their metabolism would remain the same (Varma et al., 2015) and no impact would occur on potential health problems or diseases.

Campbell, Smith, Tumilty, Cameron, and Treharne (2016) concurred with Barton et al. (2009) that the natural environment for walking impacts the way that individuals perceive their health. For instance, different neighborhoods influence leisure walking differently. Individuals living in serene neighborhoods tend to go for nature walks because they feel safe and secure (Campbell et al., 2016). On the other hand, individuals living in middle social class neighborhoods do not always walk for leisure because they

may not feel as if their environments are safe and secure (Campbell et al., 2016). In a similar exploratory study to assess the importance of leisure walking on participants' health perception, Christian et al. (2018) revealed that people perceived having leisurely walks with dogs as essential for promoting healthy social and environmental interactions and helping in improving the psychological well-being of elderly adults. According to Christian et al. (2018), elderly adults who own dogs tend to have emotional connections with their pets. The researchers emphasized that strong emotional links between humans and dogs strengthen the owners' built-in inspiration to exercise by walking their dogs.

Definitions of Terms

Older adults. Older adults are generally defined according to a range of characteristics, including chronological age, change in social roles, and change in functional abilities. For this study, older adults were defined as individuals aged 65 and over. The older adult population for this study was divided into three life-stage subgroups: young-old adult (65–74 age), middle-old adult (75–84 age), and old-old adult (85 and over) group (Levant, Chari, & DeFrances, 2015).

Leisure walking. Leisure walking was defined as walking specifically for fun, relaxation, or exercise, or to walk a dog. For this study, leisure walking was clearly distinguished from walking for transportation.

Mental health. Mental health was defined as the state of well-being of an individual related to coping with the circumstances of life in order to be productive and contribute to the community (WHO, 2019b). In this study, mental health refers to a person's condition of high levels of positive emotions in the absence of hopeless, restless,

and depression. On the other hand, mental health issues can be regarded as depression, anxiety, and potential stress-related problems.

Health perception. Health status was defined as an individual's relative levels of wellness and illness, taking into account the presence of biological or physiological dysfunction, symptoms, and functional impairment. Health perception was defined as a subjective rating by the affected individual of his/her health status. For example, some people perceive themselves as healthy despite suffering from one or more chronic diseases, while others perceive themselves as ill when no objective evidence of diseases can be found.

III. RESEARCH METHODOLOGY

Research Method

The study adopted a quantitative approach to the analysis of data. Essentially, a quantitative method offered the opportunity to gather statistical data, which further allows examination of the difference in the relationship between variables (Eyisi, 2016). The method helps to test the hypotheses based on secondary data that is analyzed using a descriptive approach (Eyisi, 2016).

Participants and Procedures

This study used data released from the 2017 California Health and Interview Survey (CHIS, 2017), which is a nationally represented survey of non-institutionalized adults in the United States. The CHIS data were collected from 21,587 people via a face-to-face survey method with Computer-Assisted Personal Interviewing (CAPI). To respond to the research inquiry, a total of 4,737 older adults over 65 years of age were drawn from the raw data, using a purposive sampling method. This sample represents individuals with the capability to engage in leisure walking and more vulnerable to mental health and perception of health (Yang, Chen, & Wendorf Muhamad, 2017). The CHIS data includes a wide range of health information, such as health conditions, health behaviors, general health, disability, mental health, and health care utilization and access. The variables selected from the CHIS data for this study were leisure walking, general health, and mental health.

Instrumentations

Dependent variables. Health perception was used to measure participants' perceived health. The question is as follows: "Would you say that, in general, your health

is excellent, very good, good, fair, or poor?" One item was reversed code and was rated on a 5-point Likert type scale ranging from 5 (poor) to 1(excellent). This measurement has been widely applied to health studies (Kim, Kim, Malonebeach, & Han, 2015; Kim, Kim, & Han, 2018). Higher scores indicated better perceived health.

To measure participants' mental health, K6 Mental Health Assessment which has been used in CHIS data was utilized in this study. Six items measuring mental health were used that focused on how the participant felt in the last 30 days. The questions are as follows: "How often during the past 30 days did you feel nervous?", "How often during the past 30 days did you feel hopeless?", "How often during the past 30 days did you feel restless or fidgety?", "How often during the past 30 days did you feel depressed that nothing could cheer you up?", "How often during the past 30 days did you feel everything was an effort?", and "How often during the past 30 days did you feel worthless?" The questions were rated on a 5-point Likert type scale ranging from 5 (none of the time/never) to 1 (all of the time). Higher scores indicated better mental health.

Independent variables. Leisure walking intensity was evaluated based on the duration and time a week that the individuals engaged in leisure walking. In order to measure the intensity levels of the leisure walking, two questions were asked as follows; "How many time did that walk for at least 10 minutes for fun, relaxation, exercise, or to walk the dog?" and "How long did that walk take/On average, how long did those walks take?" The participants were responded to open-ended questions. As such, the continuous scores for leisure walking were calculated as follows; The Metabolic Equivalent of Task (MET) levels x minutes (or hours) of activity per day x days per week. MET is the objective measure of the ratio of the rate at which a person expends energy, relative to

the mass of that person, while performing some specific physical activity compared to a reference, set by convention at 3.5 ml of oxygen per kilogram per minute, which is roughly equivalent to the energy expended when sitting quietly. The MET intensity levels assigned helps individuals understand which levels of physical activity promote burn the calories and determine the most effective activities they should be doing to meet those. The participants were then classified into three intensity levels of leisure walking groups (Ainsworth et al., 1993; Ainsworth et al., 2000): (1) light walking group (those individuals who reported less than 3.0 MET-hours/week), (2) moderate walking group (those individuals who reported 3.0-5.9 MET-hours/week), and (3) vigorous walking group (those individuals who reported more than 6.0 MET-hours/week).

Demographic variables. In order to measure the participant's disability status, one item was used. The question was as follows: "Are you blind or deaf, or do you have a severe vision or hearing problem?" The respondents were responded between 'Yes' or 'No' Two groups were classified based on participants' response. In order to measure the participant's psychological distress (e.g., nervous, depression, or stress) experience, one item was used as follows: "How many days out of the past 365 days were you totally unable to work or carry out your normal activities because of your feeling nervous, depressed, or emotionally stressed?" The participants were responded to opened questions (i. g., number of days).

Data Analysis

The Statistical Package for the Social Sciences (SPSS) utilized to analyze the data. Frequency analysis was used to identify participants' characteristics with regard to demographics. Descriptive analysis was utilized to identify mean and standard deviation

of mental health and health perception according to demographic information. T-test was performed to examine the differences in intensity levels of leisure walking among two groups by demographic information (e.g., gender, disability status, and distress experience). One-Way Analysis of Variance (ANOVA) was conducted to determine the difference in intensity levels of leisure walking among three age groups (i.e., young-old adult: 65-74 age, middle-old adult: 75-84 age, and old-old adult: 85 and over). As a post-test, this study utilized the Scheffe post-hoc test to measure the difference between each groups if there are the significance of differences among groups.

A one-way multivariate analysis of variance (MANOVA) was conducted with the intensity levels of the leisure walking as an independent variable, and health perception and mental health as dependent variables. This analysis was used to test the significance of the differences among three leisure walking group (i.e., light walking, moderate walking, and vigorous walking). The use of MANOVA is appropriate when the dependent variables are correlated (French, Macedo, Poulsen, Waterson, & Yu, 2008). Two correlations met the criterion: general health and mental health ($r = .327$, $p < .01$). As a post-test, Dunnett T3 post-hoc test was utilized to measure the difference between each group if there is the significance of differences among groups.

IV. RESULTS

Participants Demographic Characteristics Information

The respondents' demographic characteristics regarding gender, age, marital status, education level, disability status, and distress experience are presented in Table 1. The analysis, as presented in this section, is based on the information provided by the participants at the time of data collection as obtained from CHIS 2017. Each category is summarized in Figures 1-5.

Table 1. Demographic Characteristics Information (N = 4,737)

		n	%
Gender	Male	1936	40.9
	Female	2801	59.1
Age	Young-old (65-74age)	2679	56.6
	Middle-old (75–84age)	1518	32.0
	Old-old (85 and over)	540	11.4
Marital	Married	2278	48.1
	Living with a partner	119	2.5
	Widowed	1191	25.1
	Divorced/Separated	851	18.0
	Never married	298	6.3
Education	No Formal education Or Grade 1-8	178	3.8
	Grade 9-11	100	2.1
	Grade 12/High School Diploma	695	14.7
	Some College	897	18.9
	Vocational School	117	2.5
	AA or AS Degree	348	7.3
	BA or BS Degree/ Some Graduate School	1270	26.8
	MA or MS Degree	668	14.1
	PH.D or Equivalent	464	9.8
Disability Status (Vision/Hearing)	Yes	652	13.8
	No	4085	86.2
Distress Experience	Yes	3266	68.9
	No	1471	31.1

Out of the 4,737 participants, 2,801 (59.1%) were females while 1,936 (40.9%) were males (Figure 1). At the time of data collection, over a half (56.6%) of them were aged from 65 to 74 years while 32% were aged from 75 to 84 years. Only 11.4% were aged above 84 years (Figure 2). About 51% were either married or living with a partner while 43 % were either widowed, divorced, or separated. Only 6.3% mentioned that they were never married (Figure 3). Half of them had at least a bachelor's degree while 29% were either in some college, a vocational school, or had an associate degree. About 15% had a grade 12 or diploma certificate, 2% were in 9-11 grades, while the rest were either in lower grades or had no formal education (Figure 4). Only 14% had a disability (either vision or hearing) while a notable 69% mentioned that they had experienced a distressing situation in their life (Figure 5).

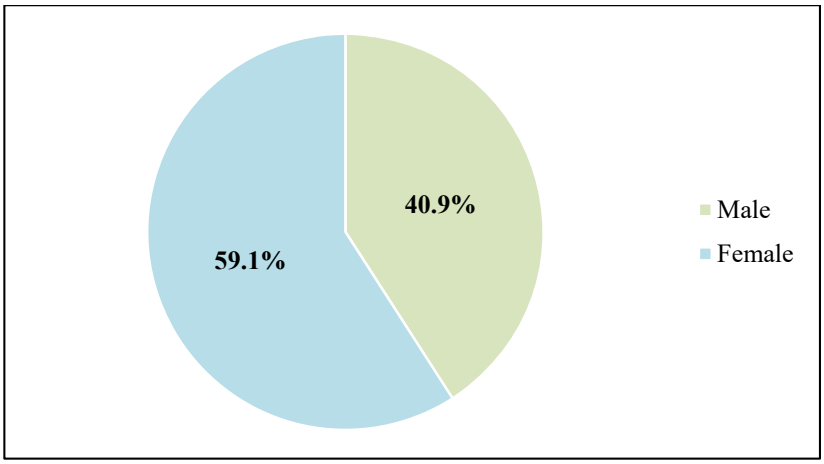

Figure 1. Respondents' Distribution by Gender

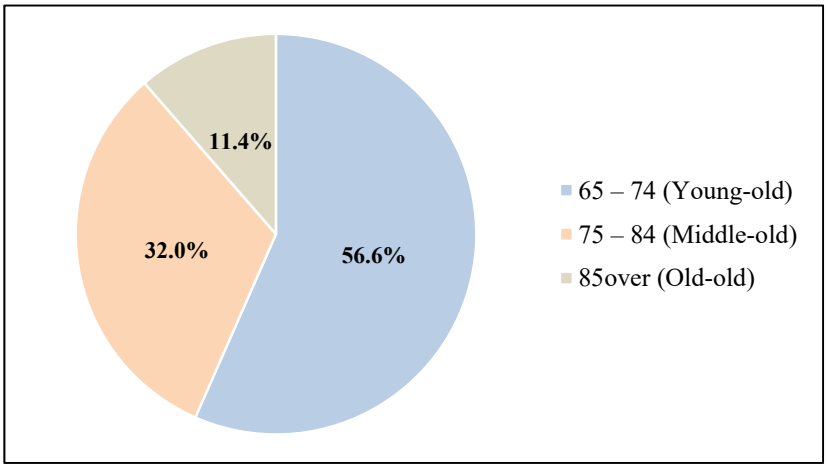

Figure 2. Respondents' Distribution by Age

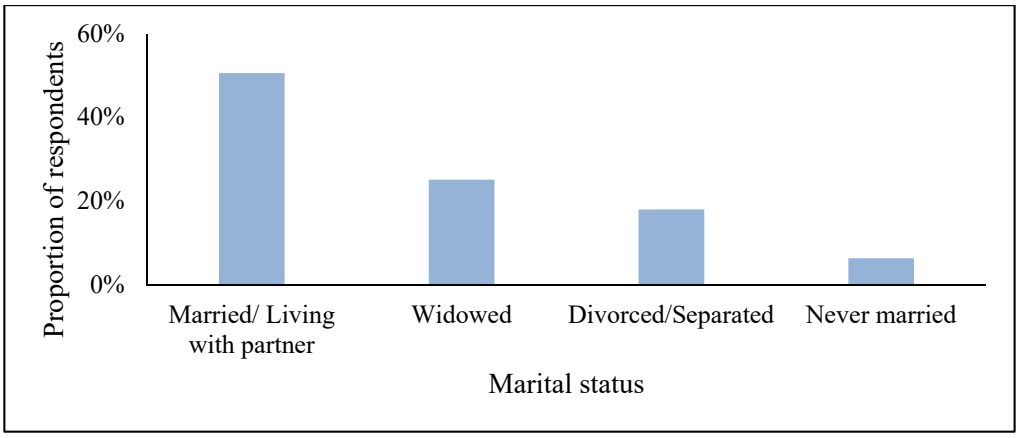

Figure 3. Respondents' Distribution by Marital Status

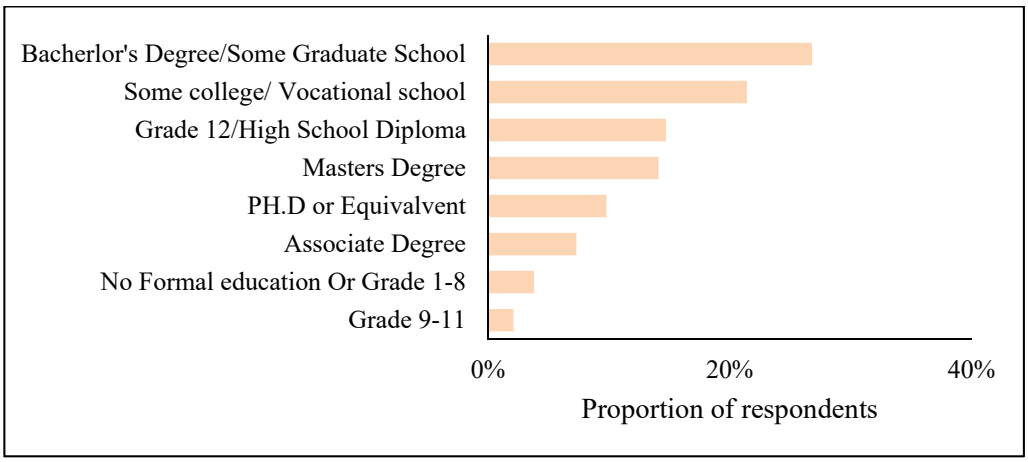

Figure 4. Respondents' Distribution by Marital Status

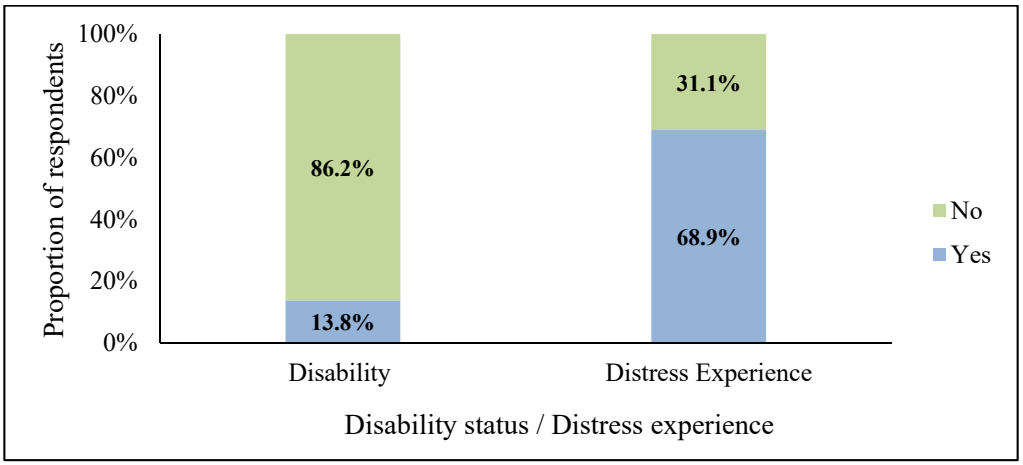

Figure 5. Respondents' Distribution According to Disability Status/ Distress Experience

Mental health and Health Perception Based on Demographic Characteristics

In this section, descriptive statistics, specifically mean and standard deviation, are used to summarize the mental health and health perception of the participants according to their demographic characteristics (gender, age, marital status, education level, disability status, and distress experience).

Table 2 presents the mean scores and standard deviation of mental health and health perception according to gender and age. Male reported the highest mean score on mental health (mean = 4.64, SD = 0.47) and the lowest mean score on health perception (mean = 3.54, SD = 1.03). Female reported the highest mean score on health perception (mean = 3.60, SD = 1.05) and the lowest mean score on mental health (mean = 4.57, SD = 0.50). The young-old adults (65-74 age) group reported the highest mean score on health perception (mean = 3.60, SD = 1.06) and the middle-old adults (74-85 age) group reported the highest mean score on mental health (mean = 4.64, SD = 0.45). However, the old-old adults (over 85 years of age) group reported the lowest mean score on health

perception (mean = 3.52, SD = 0.98) and young-old adults (65-74 age) group reported the lowest mean score on mental health (mean = 4.58, SD = 0.50).

Table 2. Health Perception and Mental Health Mean Scores Based on Gender and Age

	Status	Health Perception	Mental Health
Gender	Male	3.54 (1.03)	4.64 (0.47)
	Female	3.60 (1.05)	4.57 (0.50)
Age (Years)	Young-old age (65-74 age)	3.60 (1.06)	4.58 (0.50)
	Middle-old age (74-84 age)	3.56 (1.03)	4.64 (0.45)
	Old-old age (85 and over)	3.52 (0.98)	4.60 (0.51)

Table 3 presents the mean scores and standard deviation of mental health and health perception according to marital status. Older adults who living with a partner reported the highest mean score on health perception (mean = 3.67, SD = 1.02), followed by older adults who married (mean = 3.63, SD = 1.02), widowed (mean = 3.55, SD = 1.02), and divorced/separated (mean = 3.52, SD = 1.09). Older adults who married reported the highest mean score on mental health (mean = 4.63, SD = 0.45), followed by older adults who living with partner (mean = 4.62, SD = 0.37), widowed (mean = 4.60, SD = 0.51), and divorced/separated (mean = 4.56, SD = 0.52). Older adults who never married reported the lowest mean score on health perception (mean = 3.41, SD = 1.11) and mental health (mean = 4.50, SD = 0.58).

Table 3. Health Perception and Mental Health Mean Scores Based on Marital Status

Marital Status	Health Perception	Mental Health
Married	3.63 (1.02)	4.63 (0.45)

Table 3. Continued

Living with Partner	3.67 (1.02)	4.62 (0.37)
Widowed	3.55 (1.02)	4.60 (0.51)
Divorced/Separated	3.52 (1.09)	4.56 (0.52)
Never Married	3.41 (1.11)	4.50 (0.58)

The mean score health perception and mental health of the participants according to their education levels are summarized in Table 4. Those individuals with either no formal education or attained the eighth grade reported the lowest mean score on health perception (mean = 2.68, SD = 1.11) and mental health (mean = 4.40, SD = 0.75). On the other hand, those individuals with masters or doctoral degrees reported the highest mean score on health perception (mean = 3.83, SD = 0.97) and mental health (mean = 4.65, SD = 0.41).

Table 4. Health Perception and Mental Health Mean Scores Based on Education Levels

Education Level	Health Perception	Mental Health
No Formal education- Grade 8	2.68 (1.11)	4.40 (0.75)
Grade 9-11	2.74 (1.15)	4.48 (0.57)
Grade 12/High School Diploma	3.43 (1.06)	4.61 (0.48)
Some College	3.48 (1.04)	4.57 (0.51)
Vocational School	3.31 (1.05)	4.47 (0.58)
AA or AS Degree	3.55 (0.97)	4.60 (0.48)
BA or BS Degree/Some Graduate School	3.73 (0.98)	4.62 (0.46)
MA or MS Degree	3.82 (0.96)	4.65 (0.41)
PH.D or Equivalent	3.83 (0.97)	4.65 (0.41)

The average health perception and mental health of the participants according to their disability status and distress experience are presented in Table 5. Those individuals with a disability reported the lowest mean score on health perception (mean = 3.17, SD = 1.08) and mental health (mean = 4.46, SD = 0.61). Those individuals who distressed reported the lowest mean score on health perception (mean = 3.44, SD = 1.05) and mental health (mean = 4.42, SD = 0.49).

Table 5. Health Perception and Mental Health Mean Scores Based on Disability Status and Distress Experience

	Status	Health Perception	Mental Health
Disability (Vision/Hearing)	Yes	3.17 (1.08)	4.46 (0.61)
	No	3.64 (1.02)	4.63 (0.46)
Distress Experience	Yes	3.44 (1.05)	4.42 (0.49)
	No	3.88 (0.96)	5.00 (0.00)

Table 6 presents the mean score and standard deviation of health perception and mental health according to the three intensity walking levels. The participants who engaged in vigorous walking reported the highest mean score on health perception (mean = 3.78, SD = 1.01) and those individuals who engaged in moderate walking reported the highest mean scores related to mental health (mean = 4.65, SD = 0.43), while participants who engaged in light walking reported the lowest mean score on health perception (mean = 3.50, SD = 1.05) and mental health (mean = 4.58, SD = 0.50).

Table 6. Health Perception and Mental Health Mean Scores Based on Walking Intensity

Walking Intensity	Health Perception	Mental Health
Light Walking	3.50 (1.05)	4.58 (0.50)
Moderate Walking	3.73 (1.02)	4.65 (0.43)
Vigorous Walking	3.78 (1.01)	4.62 (0.48)

Differences in Leisure Walking Intensity Levels by Demographic Factors

This section presents the results of tests of significance conducted to assess the differences in walking intensities, health perception, and mental health according to the various demographic factors. The various tests that were applied include independent t-test and one way ANOVA.

An independent sample t-test was conducted to compare leisure walking intensities between two groups (i.e., males and females group). As shown in Table 7, there was a significant difference in the mean walking intensities across the gender categories ($t = 3.55$, $p < .001$). Males recorded higher intensities (mean = 3.14, SD = 6.33) than females (mean = 2.59, SD = 3.17).

Table 7. Result of t-test for Walking Intensity Levels According to Gender

Male		Female		t-test	
Mean	*SD*	*Mean*	*SD*	t	*p*
3.14	6.33	2.59	3.17	3.55***	.000

***p < .001

Independent sample t-tests were conducted to compare the participants' walking intensities based on their disability status and distress experience. The results were as shown in Table 8. Averagely, those individuals who experienced distressing situations

reported lower walking intensities (mean = 2.70, SD = 3.85) than the non-distressed (mean = 3.07, SD = 6.25). The difference was statistically significant at 95 % confidence level (t = -2.12, p < .05). The difference in walking intensities based on disability status was not statistically significant (t = - 0.018, p =.986). The results suggest that while distress was a significant determinant of walking intensity, the same was not true for disability. Both the disabled and the physically healthy engaged in excesses with similar intensities.

Table 8. Result of t-test for Walking Intensity Levels by Disability Status and Distress Experience

	Yes		No		t-test	
	Mean	*SD*	*Mean*	*SD*	*t*	*p*
Disability status	2.81	4.59	2.82	4.75	-0.018	.986
Distress Experience	2.70	3.85	3.07	6.25	-2.12*	.034

*p < .05

One-way ANOVA was used to compare differences in walking intensities across the age groups. The result revealed that there were significant differences among the three age groups on walking intensities (F = 4.974, p < .01). Scheffe's post-hoc test was conducted on univariate statistics (ANOVAs). The Scheffe test is generally regarded as the most conservative procedure for controlling the family-wise error rate at .05 levels and most effective with groups of different sizes (Howell, 1992). Using the Scheffe test, the young-old adult (65-74 age) group reported higher intensity levels of leisure walking than the old-old adult (85 and over) group. However, Levene's test showed that the homogeneity assumption was violated (Levene's test = 3.140, p = .043) a fact that may have some bearings on the findings (see Table 9).

Table 9. Results of ANOVA Test for Differences in Walking Intensity by Age

Source	SS	MS	F	p	Scheffe Post-Hoc Test
Between Groups	222.2	111.1	4.974**	.007	1 > 3
Within Groups	105767	22.3			
Total	105990				

**p < .01

Note. 1 = Young-old Adult Group (65-74 age), 2= Middle-old Adult Group (75-84 age), and 3= Old-old Adult Group (85 and over)

The above results showed that age, gender, and distress have significant impacts on walking intensities. Generally, increased age, being female, and distress are associated with low-level walking intensities. The effect of disability on walking intensity is not statistically significant.

Differences in Mental Health and Health Perception by Leisure Walking Intensity

MANOVA analysis was conducted to test for the effect of intensity of leisure walking on differences in health perception and mental health. Prior to the test, the homogeneity of covariance using Box's M test was examined. A statistical test for equality of covariance matrices found to be significant (Box's M = 53.008, F = 8.825, p < .001). In this study, Box's M-test indicated there were significant differences. To follow-up, a more conservative Pillai's Trace test was used instead of Wilks' lambda for the statistical robustness (Tabachnick & Fidell, 2001). MANOVA results showed significant differences among three different levels of walking intensity on dependent variables (mental health and health perception), Pillai Trace = .013, F = 15.872, p = .000, multivariate η^2 = .007 (see Table 10).

Table 10. Multivariate Tests for Health Perception and Mental Health by Intensity levels of Leisure walking

Effect		Value	F	Hypothesis *df*	Error *df*	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.981	121876.740	2.000	4733.000	.000***	.981
Leisure walking	Pillai's Trace	.013	15.872	4.000	9468.000	.000***	.007

***$p < .001$

The models for the effects of walking intensity on mental health and health perception are in Table 11. Dunnett T3 Post-hoc test showed that there were significant differences in health perception scores among vigorous-intensity walking, moderate-intensity walking, and light-intensity walking groups. It indicated that older adults who participated in vigorous and moderate-intensity levels of leisure walking activity reported better perceived health than those individuals who participated in the light intensity levels of leisure walking activity ($F = 29.63$, $\eta^2 = .012$, $p < .001$). As for mental health, Dunnett T3 Post-hoc test revealed significant differences between moderate-intensity walking and light-intensity walking groups on the mental health scores. It indicated that older adults who participated in the moderate-intensity level of walking activity reported better mental health than those individuals who participated in the light-intensity level of walking activity ($F = 7.84$, $\eta^2 = .003$, $p < .001$). As such, the results suggest that walking intensity had significant impacts on both mental and perceived health. An increase in intensity was associated with improved scores for both variables.

Table 11. Effects of Leisure Walking Intensity on Health Perception and Mental Health

Dependent Value	Sum of Squares	df	MS	F	p	Partial Eta Squared	Observed Power	Dunnett T3
Health Perception	63.677	2	31.838	29.629***	.000	.012	1.000	2, 3 > 1
Mental Health	3.706	2	1.853	7.838***	.000	.003	.953	2 > 1

***$p < .001$

1 = Light Walking (less than 2.9 METs), 2= Moderate Walking (3.0-5.9 METs), and 3= Vigorous Walking (over than 6.0 METs)

V. DISCUSSION

This study explored how different levels of leisure walking were associated with mental health and health perception of older adults. The results of this study showed that older adults who participated in moderate-intensity leisure walking reported higher mental health than those individuals involved in light-intensity leisure walking. In addition, older adults who engaged in moderate and vigorous-intensity leisure walking reported higher health perception than those individuals involved in light-intensity leisure walking. Furthermore, this study extends the body of literature demonstrating that certain levels of walking can contribute to better mental health and health perception; participation in the vigorous and moderate-intensity of leisure walking was found to be particularly effective in promoting health benefits among older adults. The discussion sections listed below were ordered by hypothesis order.

Differences in Leisure Walking Intensity Levels by Demographic Factors

The results of this study showed that participation in leisure walking intensity is influenced by demographic characteristics (e. g., age, gender, disability status, and psychological distress experience). It appears that these demographic characteristics played an important role in influencing leisure walking intensity among older adults. Prior study has demonstrated that factors such as age, gender, and environment affect the walking of individuals differently (Ghani, Rachele, Washington, & Turrell, 2016). Ghani et al.'s supported the finding of the current study that older adults aged 65-74 (young-old), being men, and non-distressed are associated with higher intensity levels of leisure walking.

Previous studies investigated the relationship between gender and leisure walking among older adults (Makizako et al., 2015; Varma et al., 2015). They found that older women reported a higher prevalence than older men of leisure walking. They illustrated that older women frequently participated in leisure walking because of their positive relationships with children and gender roles. However, the result of this study suggested that older men tended to engage in more vigorous leisure walking than older women. This result can be illustrated by the findings of Craft, Carroll, and Lustyk (2014) that men engaged in more exercise and physical activities for enjoyment than women and women reported exercises for weight loss. In addition, various household tasks and responsibilities of older women can influence the frequency and intensity of leisure walking (Varma et al., 2015).

Prior study has found that older adults experience a gradual deterioration of functional abilities associated with aging to participate in physical activities (Bergland et al., 2010). The current study presented that the percentage of participation in vigorous-intensity of leisure walking decreased with the increased age. This finding is consistent with Toots et al. (2016) that the aging process resulted in diminished independence and reduced participation in physical activities such as leisure walking. This study suggests that low and moderate intensity of leisure walking can be a suitable and sustainable exercise type for older adults.

Experiencing distress and/or a disability can be an additional important factor that negatively affects involvement in leisure walking as well as in other physical activities. The results of the current study found that experiencing high levels of distress restricted older adults to participate in vigorous-intensity of leisure walking. The outcomes of the

study showed that few participants experiencing distress participated in vigorous, moderate, and light walking intensity respectively. Matud and García (2019) identified psychological distress as one of the factors that contribute to psychosocial functioning and functional disability among older adults. This result supported Matud and Garcia's idea that distress experience can be associated with psychological, emotional, and physical aspects of older adults' lives that negatively impact mental health and health perception. Thus, the findings of the study expand the existing body of literature on how the distress experience affects participation in the different levels of leisure walking.

Differences in Mental Health and Health Perception by Leisure Walking Intensity

The results showed significant differences among three different levels of walking intensity on mental health and health perception. As such, the results suggest that walking intensity had significant impacts on both mental health and health perception. An increase in intensity was associated with improved scores for health benefits. Prior studies have suggested that leisure walking reduces depressive symptoms and increases positive feelings and emotions among older adults (Chekroud et al. 2018; Krogh, Nordentoft, Sterne, & Lawlor, 2011; Wensley & Slade, 2012; Noh et al., 2015). For example, Noh et al. (2015) suggested that leisure walking is essential in reducing stress while decreasing depressive symptoms and improving performance by stimulating the central nervous system in individuals of all ages and gender. The results of the study suggest that such positive outcomes can be contributing factors to the increasing mental health of older adults. The findings of this study are in line with the existing knowledge that a positive relationship exists between leisure walking and mental health.

Numerous clinical studies that have investigated the relationship between different intensities of physical activities and mental health have found that vigorous physical activity was most effective in regard to increasing mental health (Asztalos, De Bourdeaudhuij, & Cardon, 2010; Craft, 1997; Cox et al., 2004). On the other hand, some studies have demonstrated that moderate to light-intensity physical activity is most beneficial for promoting psychological well-being and enhancing positive mood (Berger & Motl, 2000; Cox et al., 2004; Ford, Puckett, Reeve, & Lafavi, 1991). These previous studies have indicated that a complex relationship exists between different levels of physical activity and mental health benefits. The current study advocates that moderate-intensity leisure walking is most beneficial for mental health among older adults. This result suggests that participation in vigorous leisure walking is not an ideal exercise form for mental health among older adults. In addition, Julien, Gauvin, Richard, Kestens, and Payette (2015) found that moderate or high levels of walking were associated with lower depressive symptoms. The results of this study partially supported that moderate walking can be effective in reducing depressive symptoms and, as a result, older adults can gain mental health benefits.

The perception of an individual's health and well-being affects his or her participation in leisure activities (Campbell et al., 2016). Vigorous walking demonstrates high physical fitness and is associated with better-perceived health as outlined by Pedrero-Chamizo et al. (2015). In this study, the descriptive statistics suggested that health perception was influenced by intensity levels of leisure walking. They showed that older adults who reported high health perception tended to participate in more vigorous leisure walking. This study suggested that self-perception of health can be an important

motivational factor in PA participation such as leisure walking. In particular, the results of this study produced a contradictory finding that participation in vigorous leisure walking is not an ideal exercise form for health promotion among older adults.

Previous studies have stressed the importance of high levels of physical activity participation for health perception and health-related quality of life (Amireault and Godin, 2014; Ergun et al., 2013). These studies have suggested that increased physical activity participation allows people to enhance their perception of health and well-being. The results of the current study support the idea that increased leisure walking participation helps older adults improve their health perception. This study also indicates that moderate leisure walking may be the optimal level of engagement to be used as a tool in regard to increasing the health perception of older adults. In addition, the descriptive statistics showed that older adults who reported high health perception tended to participate in more vigorous leisure walking. This study suggested that one's self-perception of health can be an important motivational factor in regard to physical activity participation, such as leisure walking.

Based on the statistical analysis (MANOVA), the hypothesis *there is a statistically significant difference in mental health and health perception among three groups (light walking, moderate walking, and vigorous walking groups) participating in different intensity levels of leisure walking* has been justified in the study.

VI. LIMITATIONS AND SUGGESTIONS

The limitations of the present study need to be addressed. First, this study is based on a cross-sectional and self-reported design. The inverse relationship between leisure walking and health benefits can exist; older adults who perceive better health and wellbeing can participate in more walking leisure. Future research is needed to explore this inverse relationship and can produce useful information and knowledge to researchers. Second, there are other important variables that affect leisure walking such as social and physical environment (e.g., urban vs. rural), leisure preferences, and community-based programs. It would be interesting if future researchers consider these factors that investigate how they influence PA participation. Third, other demographic characteristics such as education and socioeconomic status may affect participation in leisure walking among older adults. Older adults who perceive positive neighborhood bonding and utilize leisure resources can participate in more leisure-time physical activities. Thus, future studies are needed to explore how socioeconomic status or education level can influence leisure activity participation. Last, this study did not contain previous medical conditions and histories that may affect leisure walking. Different types of disabilities or disorders can be considered in future studies.

VII. IMPLICATIONS FOR PRACTITIONERS

This study makes some implications on how recreational therapists design and implement leisure walking as an intervention for older adults. First, this study suggested that a moderate intensity of leisure walking can generate the ideal health benefits among older adults. Recreational therapists need to create strategic plans on how to motivate and encourage older adults to engage in moderate levels of leisure walking. One method is to create a walking buddy program. By participating in leisure walking with other peers, clients can be highly motivated to engage in leisure walking. In addition, recreational therapists need to create community-based walking programs and activities for older adults by inviting friends and family members as a social support system. To some clients who participate in moderate leisure walking, recreational therapists encourage them to increase more engagement in vigorous leisure walking.

Considering the findings of this study, older women or older adults who perceive high levels of distress are less likely to participate in leisure walking. Recreational therapists need to create strategies on how to encourage older women to participate in leisure walking. One method is to provide leisure education programs that offer the importance of leisure walking and leisure resources of walking for older women. By taking part in leisure education programs, older women can gain more resources and knowledge on leisure walking or seek out leisure walking partners. Also, providing counseling programs designed to reduce stress levels is essential for older adults to participate in activities.

VIII. CONCLUSION

This study was an initial exploration of investigating the differences in mental health and health perceptions of the older adults participating in the different levels of leisure walking. This study provided evidence that leisure walking is an effective therapeutic program that promotes mental health and health perception among older adults. In particular, moderate intensity of leisure walking can be the ideal form of exercise for older adults to increase mental health and health perception.

Recreational therapists need to be aware of the value of leisure walking for older adults and create contexts that offer the opportunity for participation in the walking activity. Leisure service providers and recreational therapists should consider the different health benefits in different intensity levels of leisure walking and can help different older age groups decrease negative psychological symptoms (e. g., depression and anxiety) and enhance mental health and health perception by designing and implementing vigorous and moderate levels of leisure walking activities.

This study concluded that certain walking intensity level can lead to stronger health benefits among older adults. Specifically, participation in vigorous and moderate walking levels was found to promote mental health and health perception. Further, leisure walking activity may be provided as a preventive strategy for mental health issues among older adults. Therefore, leisure service providers and recreational therapists should strive to provide richer opportunities for older adults to engage in leisure walking.

Ethical Consideration

The data drawn for this article are from the California Health Interview Survey and the United States Census Bureau and have been prepared for public release as free public use files. Because the files contain individual respondent records, they have been designed to minimize the risk of respondent identification yet preserve the broadest range of descriptive demographic data. No direct identifiers, such as respondent name, telephone number, or address, are available in any of these data files.

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