

Relationship between the Involvements of Leisure Time Activities towards Performance in Cognitive Function among Elderly Population in Community Setting

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Elderly, aging, cognitive function, leisure-time activity

ABSTRACT

The growing incidence of cognitive decline in aging societies is a primary concern of health care organizations. Many factors were associated with the reduction of cognitive function, such as psychosocial factors, socio-demographic factors, or genetic factors. The aim of this study was to determine the association between the engagement in physical, cognitive, or social activities and the cognitive functions among elderly living in the community. This cross-sectional study was conducted on the 60 elderlies who are residing in community-dwelling using a convenient sampling method. The Leisure Time Activity checklist and Malay version Lowenstein Occupational Therapy Cognitive Assessment for Geriatric (MLOTCA-G) have been used as tools to assess the engagement of leisure time activity and the subject's performance in cognitive functions. The percentage of elderly who were engaged in leisure-time activities as the following: social activities (76%), physical activities (33.3%), and cognitive activities (18.3%). The percentage of high and low performance in cognitive functions were (81%) and (19%) respectively. This study showed significant correlations between age range and cognitive functions excluding visual identification of objects, object constancy, personal possession, and attention and concentration. There also had a significant correlation between the engagement of social, physical, and cognitive activities with the specific cognitive functions. Social activities were the most engaging of leisure time, followed by physical activities and mental activities. Most of the elderly show high performance of the cognitive function. There is also a significant correlation between the ages range in engagements of leisure time activities toward performances in cognitive function.



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1. INTRODUCTION

According to chronological age, the elderly was at age 65 and above. However, the elderly not merely depends as a function of chronological age but with the combination of chronological capacity, social involvement, and physical and mental health function [12]. The current population of Malaysians with an

aged range of 60 years and above is estimated to be 1.4 million and is projected to increase to 3.3 million in the year 2020 [29]. Cognitive decline is closely related to a cognitive impairment such as Alzheimer's disease or dementia. Cognitive decline was associated with the increase of old age. The factors of cognitive decline among old age are not specific to one aspect but may vary, such as genetic, declining cognitive performance, socio-demographic factor, or psychosocial factors [10]. As people age, they change in several ways, which are both either biological or psychological. Sometimes the changes may be better, and others are not for the elderly. Normally the aging of the brain was associated with the changes of neuroanatomical and neuropsychological occur with age. These changes that occur in the old age stage will disturb the cognitive function of the elderly. Reduce in cognitive function is not uncommon in late life and may be due to the normal process of aging. At least 10% of persons older than 65 years and 50% of those older than 85 years have some form of cognitive impairment, ranging from mild deficits to severe dementia. The most basic cognitive function are affected attention, memory, and perception [13]. Deficits of these basic cognitive functions may affect the higher-level cognitive function, such as language processing and decision-making skills. The higher level of cognitive function, which consists of speech and language, decision making, and executive control, also can be decline associated with the aging process among the elderly. According to [7], in the speech and language domain, there are evidence which discourse skills improve with age which is (1) tell well structured; (2) use more extensive vocabularies; (3) show good levels of comprehension. However, a comprehension deficit was primarily attributable to working memory limitation instead of impairment in basic language capacity. Thus, the impact of aging on cognitive function is somewhat mixed which some functions were decline, and others are improving. The brain has the ability to compensate for the decline in some functions by improving other functions [7]. Finally, the understanding of age-related changes in cognition will require a parallel understanding of the age-related changes in the brain and the underlying mechanisms for those changes.

Declining cognitive function such as dementia may affect the ability of a person to perform activities of daily living. It began with the ability of complex activities then the progressing to more basic activities such as the ability to cope with dressing and toileting later in the disease course [23]. The reduction in the ability of performs daily activity lives it will make the elderly become more dependent, and their quality of life also will be reduced. Cognitive function is able to determine by using cognitive function assessments such as MMSE, LOTCA, MOCA. The prevalence of cognitive impairment among the elderly in the community was high, and they're also related to their socio-demographic features [24]. Leisure time activities which including social, physical, and cognitive activities, are associated with cognitive function [21]. There is a limited study about the effect of these three categories of leisure time activities (social, cognitive, and physical activities) among the elderly in Malaysia. The main objective of this study is to determine the involvement of leisure time activity (social activity, physical activity, and cognitive activity) that is associated with the cognitive function among the elderly in community lives in Kuantan, Pahang. The study focused on the elderly living in the community at Kuantan, Pahang. The study design that was applied in this study was a cross-sectional study. It focused on the elderly as the study was to determine the percentage of elderly participate in three leisure time activities. Then, the impact of elderly participates in leisure activities on cognitive function performance will be further review. The method of data collection for this study involved using face to face interview method. The advantages of face-to-face interview methods are screening becomes more accurate, the interviewer is able to capture verbal and non-verbal cues from the respondents, and keep the respondent focused and on track to completion [42]. Figure 1 explains the details of the data collection process.

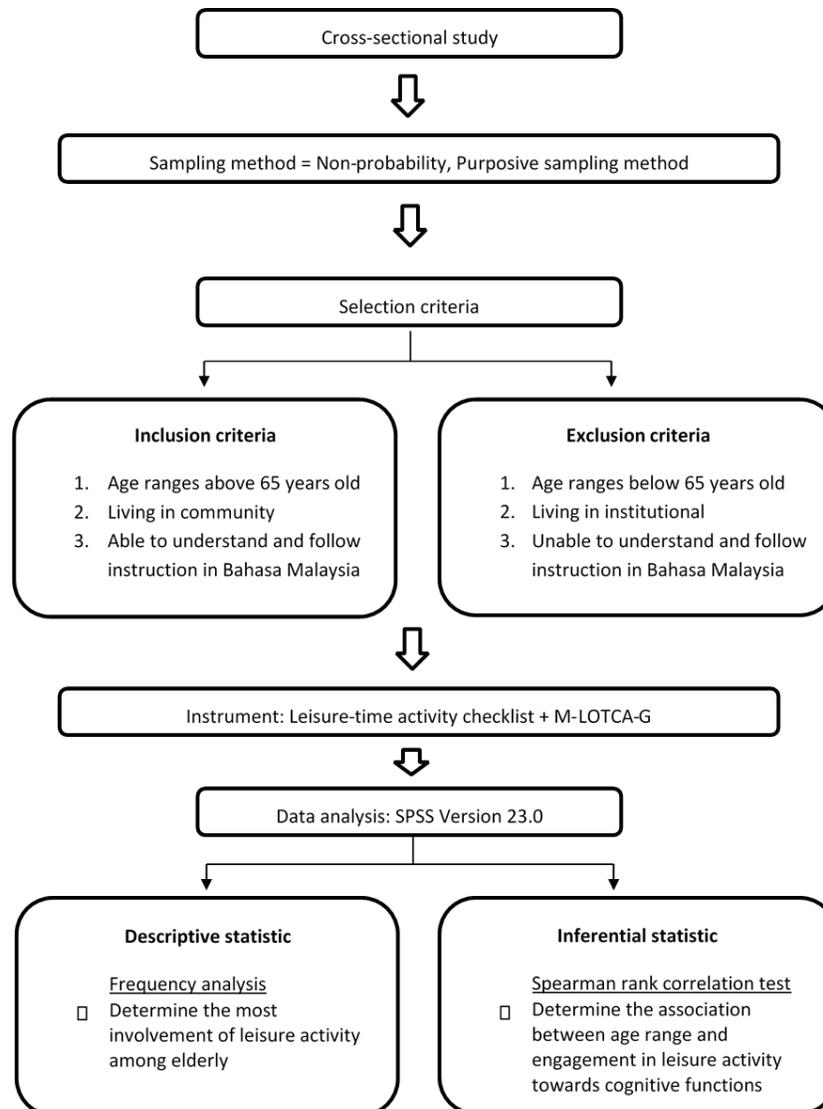


Figure 1 Flowchart of data collection process.

2. FINDINGS AND DISCUSSION

2.1 Demographic data

A total of 60 elderly living in non-institutional were 65 years and above being a respondent for this study. There were most of them within the ages of 65-74 (68.3%), married (73.3%), and had SRP for their level of education (51.7%). There were more female (68.3%) respondents compared to males (31.7%). The majority had a family income of less than RM500 (63.3%) per month. Respondent's entire race has come from Malay (100.0%).

Table 1: Demographic profile of the 60 elderly respondents from Kuantan, Pahang

Age		
65-74 years old	41	68.3
75-84 years old	17	28.3
Above 85 years old	2	3.3

Gender		
Male	19	31.7
Female	41	68.3
Marital status		
Single	16	26.7
Married	44	73.3
Level of education		
SRP	31	51.7
SPM/SPMV	1	1.7
STPM	2	3.3
Diploma	3	5.0
Others	23	38.3
Salary per month		
RM0-RM500	38	63.3
RM501-RM1000	6	10.0
RM1001-RM2000	13	21.7
RM2001-RM3000	3	5.0

2.2 Involvement in leisure activities

The participation of the elderly in three leisure activities, such as social activities, physical activities, and cognitive activities, are presented in Table 2. The leisure time activities checklist revealed the prevalence of participation of the elderly in these leisure activities. There were more elderly participate the social activities with the most participation (76.7%) compared to the least participation (23.3). There were differences in the participation of elderly in physical and cognitive activities, elderly more on least participation (66.7%) and (81.7%) compared to most participation (33.3%) and (18.3%) respectively to the participation in physical and cognitive activities.

Table 2: Participation of 60 elderly in leisure activity

Participation in social activities		
Most participation	46	76.7
Least participation	14	23.3
Participation in physical activities		
Most participation	20	33.3
Least participation	40	66.7
Participation in cognitive function		

Most participation	11	18.3
Least participation	49	81.7

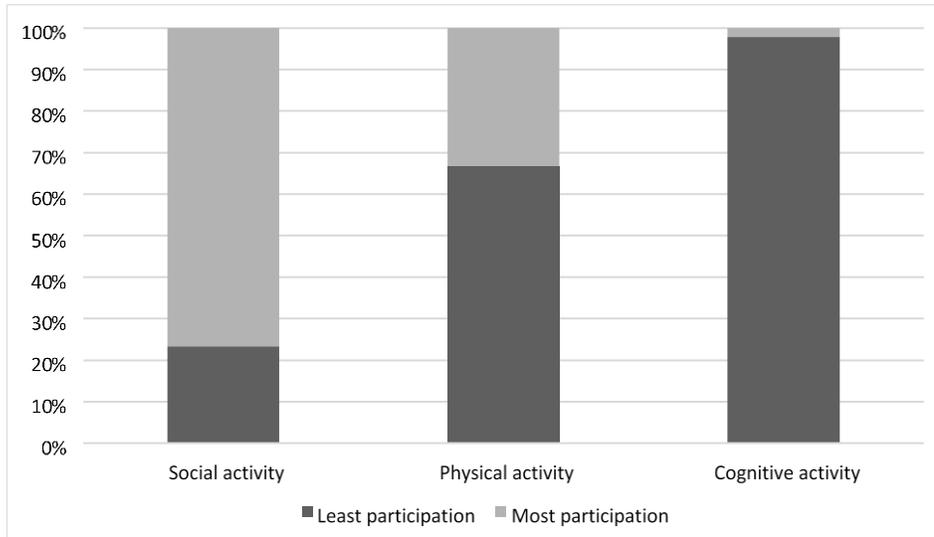


Figure 2: The percentage of least and most participation of leisure time activity among elderly

2.3 Cognitive function performance

The performances of cognitive function among 60 elderly living in the community are presented in Table 3. The use of the Malay version of LOTCA-G revealed the cognitive function performance among the elderly. This standardized assessment consists of 26 subtests that assess the cognitive function among the elderly. Elderly shows maximal performance for orientation for place and time, there are (56.7%) and (58.3%) respectively. Visual perception consists of visual identification of the object, visual identification of shape, overlapping figure, and object constancy. Respondent shows most in maximal performance for every subtest; there was visual identification of object (100.0%), visual identification of shape (51.7%), overlapping figure (43.3%) and object constancy (66.7%).

The spatial perception domain consists of directions on the body, directions in front, and spatial relations. These subtests also had maximal performances, which are directions on the body (71.7%), directions in front (83.3%), and spatial relation (80.0%). Respondent shows more on maximal performance in the praxis domain, which is motor imitation (63.3%), utilization of object (93.3%), and symbolic action (81.7%). The performance of copy geometric form among respondents shows almost equal moderate (40.0%) and maximal (46.7%) performance. The other subtests for visuomotor organization domain, respondent shows more on maximal performance on two-dimensional models (41.7%), pegboard construction (58.3%), block design (35.0%), and reconstruction of the puzzle (33.3%).

Hence, the thinking operation domain also shows the elderly had maximal performance in these subtests. There were maximal performances for drawing a clock (43.3%), categorization (56.7%), and pictorial sequences (56.7%) subtests. Respondents show maximal performance on a famous personality (76.7%), a personal possession (63.3%), and an everyday object (35.0%) in-memory domain. For the attention and concentration subtest, most of the respondents give their great attention and concentration during assessment (68.3%).

Table 3 Performance of cognitive function among elderly

	1	2	3	4	5	6	7	8
Orientation								
Orientation for place	-	-	1(1.7%)	12(20.0)	-	6(10.0)	7(11.7)	34(56.7)
Orientation for time	-	-	-	5(8.3)	1(1.7)	9(15.0)	10(16.7)	35(58.3)
Visual identification								
of object			-	-	-		60(100.0)	
Visual identification								
of shape			-	6(10.0)	23(38.3)		31(51.7)	
Overlapping figures			1(1.7)	8(13.3)	25(41.7)		26(43.3)	
Object constancy			1(1.7)	2(3.3)	17(28.3)		40(66.7)	
Spatial perception								
Directions on body			-	2(3.3)	15(25.0)		43(71.7)	
Direction in front			-	9(15.0)	1(1.7)		50(83.3)	
Spatial relations			-	8(13.3)	4(6.7)		48(80.0)	
Praxis								
Motor imitation			5(8.3)	4(6.7)	13(21.7)		38(63.3)	
Utilization of objects					4(6.7)		56(93.3)	
Symbolic action				2(3.3)	9(15.0)		49(81.7)	
Visuomotor organization								
Copy geometric								
form			-	8(13.3)	24(40.0)		28(46.7)	
2-Dimensional			6(10.0)	16(26.7)	13(21.7)		25(41.7)	
model Pegboard								
construction			12(20.0)	4(6.7)	9(15.0)		35(58.3)	
Block design			8(13.3)	20(33.3)	11(18.3)		21(35.0)	
Reconstruction of								
puzzles			10(16.7)	18(30.0)	20(33.3)		12(20.0)	
Thinking operation								
Drawing a clock	6(10.0)	21(35.0)		7(11.7)	26(43.3)			
Categorization	3(5.0)	16(26.7)		7(11.7)	34(56.7)			
Pictorial sequence	4(6.7)	4(6.7)	18(30.0)		34(56.7)			

Memory				
A famous personality	-	6(10.0)	8(13.3)	46(76.7)
A personal possession	1(1.7)	12(20.0)	9(15.0)	38(63.3)
Everyday object	18(30.0)	15(25.0)	6(10.0)	21(35.0)
Attention and concentration	-	1(1.7)	18(30.0)	41(68.3)
Total	19.0% (low performance)		81.0% (high performance)	

2.4 Correlation of age range and performance of cognitive functions

Cognitive performance among elderly living in community most impaired on visuomotor organization (34.0%) followed by thinking operation (30.0%), memory (23.3%), orientation (15.0%), spatial perception (10.6%), visual perception (7.5%), praxis (6.11%) and attention (1.7%). Generally the elderly living in community was high performance of cognitive function (81.0%) compared to low performance of cognitive function (19.0%).

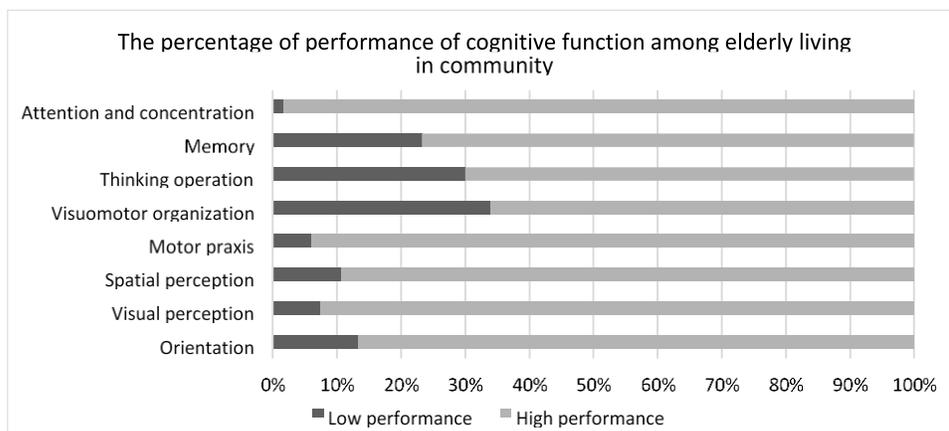


Figure 3 The performance of cognitive function among elderly in the community

2.5 Correlation of social activity and cognitive function among elderly

There was moderate negative significant correlation between social activity and direction in front ($r=-0.564$, $P\text{-value}=0.000$), motor imitation ($r=-0.456$, $P\text{-value}=0.000$), utilization of object ($r=-0.463$, $P\text{-value}=0.000$) and symbolic action ($r=-0.564$, $P\text{-value}=0.000$). Meanwhile, the correlation between social activity and other subtests showed weak negative significance correlation on spatial relation ($r=-0.351$, $P\text{-value}=0.006$) and a famous personality subtest ($r=-0.337$, $P\text{-value}=0.008$). Whereas, the other subtests had no significance correlation since the $P\text{-value}$ of these subtest more than 0.05.

Table 4: orrelation coefficient (r) between participation in social activity and cognitive function

Characteristic	r	P-value
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Orientation		
Orientation for place	0.021	0.873
Orientation for time	-0.080	0.544
Visual perception		
Visual identification of object	-	-
Visual identification of shape	-0.243	0.062
Overlapping figures	0.054	0.680
Object constancy	-0.189	0.149
Spatial perception		
Directions on body	-0.016	0.906
Direction in front	-0.564	0.000*
Spatial relations	-0.351	0.006*
Praxis		
Motor imitation	-0.456	0.000*
Utilization of objects	-0.463	0.000*
Symbolic action	-0.531	0.000*
Visuomotor organization		
Copy geometric form	0.229	0.078
2-Dimensional model	-0.026	0.845
Pegboard construction	-0.168	0.201
Block design	-0.190	0.147
Reconstruction of puzzles	-0.134	0.307
Thinking operation		
Drawing a clock	-0.102	0.437
Categorization	-0.123	0.348
Pictorial sequence	0.080	0.544
Memory		
A famous personality	-0.337	0.008*
A personal possession	0.086	0.516
Everyday object	-0.087	0.508
Attention and concentration	-0.121	0.357

r = Spearman's rank correlation coefficient, p = probability *(p<.05)

2.6 Correlation of physical activity and cognitive function among elderly

The correlation between physical activity and cognitive function shows weak negative and positive significance correlation on orientation for place ($r=-0.261$, $P\text{-value}=0.044$), overlapping figure ($r=-0.266$, $P\text{-value}=0.040$), directions on body ($r=-0.269$, $P\text{-value}=0.038$), direction in front ($r=0.262$, $P\text{-value}=0.043$), spatial relations ($r=0.258$, $P\text{-value}=0.047$), two dimensional model ($r=-0.282$, $P\text{-value}=0.029$) and attention and concentration subtest ($r=-0.256$, $P\text{-value}=0.048$). Otherwise, there was no significant correlation between physical activity and other subtests for cognitive function assessment.

Table 5: Correlation coefficient between participation in physical activity and cognitive function

Characteristic	r	P-value
Orientation		
Orientation for place	-0.261	0.044*
Orientation for time	-0.253	0.051
Visual perception		
Visual identification of object	-	-
Visual identification of shape	-0.003	0.979
Overlapping figures	-0.266	0.040*
Object constancy	0.026	0.844
Spatial perception		
Directions on body	-0.269	0.038*
Direction in front	0.262	0.043*
Spatial relations	-0.258	0.047*
Praxis		
Motor imitation	0.106	0.420
Utilization of objects	-0.047	0.720
Symbolic action	-0.229	0.078
Visuomotor organization		
Copy geometric form	-0.076	0.563
2-Dimensional model	-0.282	0.029*
Pegboard construction	-0.006	0.965
Block design	-0.162	0.215
Reconstruction of puzzles	-0.089	0.498
Thinking operation		
Drawing a clock	-0.073	0.578
Categorization	-0.214	0.101
Pictorial sequence	-0.179	0.171
Memory		
A famous personality	-0.144	0.274
A personal possession	-0.026	0.843
Everyday object	-0.227	0.081
Attention and concentration	-0.256	0.048

r = Spearman's rank correlation coefficient, p = probability *($p < .05$)

2.7 Correlation of cognitive activity and cognitive function among elderly

The correlation between cognitive activity and cognitive function showed weak positive and negative significance correlation on orientation for time ($r = -0.297$, P -value= 0.021), orientation for place ($r = -0.266$, P -value= 0.005), directions in front ($r = 0.344$, P -value= 0.007), motor imitation ($r = 0.300$, P -value= 0.020), categorization ($r = -0.334$, P -value= 0.009) and pictorial sequences ($r = -0.322$, P -value= 0.012). Additionally, the other subtest of cognitive function had no significance correlation with cognitive activity among elderly living in community.

Table 6: Correlation coefficient (r) between participation in cognitive activity and cognitive function.

Characteristic	r	P -value
Orientation		
Orientation for place	-0.249	0.055
Orientation for time	-0.297	0.021*
Visual perception		
Visual identification of object	-	-
Visual identification of shape	0.090	0.495
Overlapping figures	-0.357	0.005*
Object constancy	-0.235	0.071
Spatial perception		
Directions on body	-0.198	0.130
Direction in front	0.344	0.007*
Spatial relations	-0.138	0.293
Praxis		
Motor imitation	0.300	0.020*
Utilization of objects	0.033	0.800
Symbolic action	-0.113	0.391
Visuomotor organization		
Copy geometric form	-0.164	0.212
2-Dimensional model	-0.255	0.049
Pegboard construction	-0.091	0.491
Block design	-0.193	0.140
Reconstruction of puzzles	-0.048	0.718
Thinking operation		
Drawing a clock	-0.098	0.457
Categorization	-0.334	0.009*
Pictorial sequence	-0.322	0.012*

Memory		
A famous personality	-0.163	0.214
A personal possession	0.055	0.678
Everyday object	-0.011	0.932

Attention and concentration -0.251 0.053

r = Spearman's rank correlation coefficient, p = probability *(p<.05)

2.8 The involvement in social activity, physical activity and cognitive activity as leisure activity among elderly

The findings of this study have shown that most of the elderly living in the community had the most participation in the social activity as their leisure time activity in a year. The most participation of the elderly living in community in leisure time activity was a social activity which the elderly had social contact others, going to religious service or meeting with the associations, going classes or watching television [39]. Finding from the previous study also supported by the statement from [37] they stated that the elderly more tendency to do social activity compared to the other leisure time activity. Meanwhile, this study found that the elderly living in the community had the least participation in leisure-time physical and cognitive activity. This study was supported by the previous study by [1] they stated that the elderly had physical inactivity, which may include due to limitations in terms of medical health problems. Then, the elderly also tend to reduce their time to participate in a cognitive activity such reading books, writing the letter and make a telephoning activity. Usually, the elderly not participating more in cognitive activity due to the lacking of writing skills, reading skills, and declining in their vision [36].

2.9 Cognitive function performance among elderly

The performance of cognitive function among elderly living in the community has high-performance cognitive function including the domains of orientation, visual perception, spatial perception, praxis, visuomotor organization, memory and attention, and concentration. Generally, the percentage performance of cognitive function among elderly living in the community had high performance. This was supported by the study of the prevalence of cognitive impairments among elderly living in the community is 19.0% [26]. Most of the studies use the MMSE as their assessment tool to determine the level of cognitive function among the elderly. This assessment had their cut-off point score, which enables the researcher to determine the intact and impaired elderly cognitive function. For this study, the assessment used to determine the cognitive function was the Malay version of LOTCA-G. Malay version of LOTCA-G needs to be analyzed every subtest, which consists of its owned score instead of having a cut-off point score. This study more specifically analyzed the cognitive function of the elderly according to its domains.

2.10 Correlation of age range and cognitive function among elderly

The correlation between age range and performance of cognitive function showed moderate correlation to the domain of the cognitive function. This result is supported by the study from [36], who stated as increasing in subjective age, there is an association with the changes in the performance of the cognitive function. This may cause to the aging process or elderly background of education.

2.11 Correlation of social activity and cognitive function among elderly

The correlation between leisure-time social activity and cognitive function showed a moderate negative correlation for certain subtests and a weak negative correlation for another certain subtest. Social activity

was correlated with cognitive function in domains of spatial perception, praxis, and memory. There is no previous study that correlates leisure-time social activity and specific cognitive function. However, they still had studies of the correlation of participation in social activity and level of cognitive performance, such as intact or impaired cognitive performance. As revealed by [20], there was a correlation between involvement in social activities in lifestyle and cognitive function among the elderly. This statement has been supported as there was an association between the participation of social activities and cognitive function; the conclusion of this study was the more involvement in social activities among the elderly, the fewer tendencies of cognitive decline [22].

2.12 Correlation of physical activity and cognitive function among elderly

There was some positive and negative correlation between leisure-time physical activity and cognitive function among the elderly. This study showed the correlation between physical activity and cognitive function in visual perception, spatial perception, visuomotor organization, and attention and concentration domain. The result of a study showed that the elderly participation in physical activity had an effect on the process of declining cognitive function, which slows the rate of cognitive function decline [33]. In the systematic study done by [8], twenty-six studies reported a positive correlation between physical activity and maintenance or enhancement of cognitive function. This study also suggests that physical activity may help to improve cognitive function and delayed the progression of cognitive impairment in the elderly.

2.13 Correlation of cognitive activity and cognitive function among elderly

There are some positive and some negative correlations between cognitive activity and cognitive function among elderly living in the community. The domain that correlated between cognitive activity and cognitive function are orientation, spatial perception, praxis, visuomotor organization, and thinking operations. Persons with a cognitively active lifestyle will help to maintain cognitive functioning with aging. Hence, cognitive inactivity is associated with a reduction in cognitive performance. This statement is supported by the study of [41] which there were most studies had correlations between participation in cognitive activity and cognitive function. [25] found that the interaction of education and cognitive activity among the elderly was significantly correlated with cognitive functions.

3. Conclusion & Recommendations

In summary, this study highlights key research on the association between the participation in three selected leisure-time activities, which are social activity, physical activity, and cognitive activity, and cognitive function among the elderly living in the community. Based on our findings in the literature, all three selected leisure time activities among the elderly living in the community had an association with cognitive function. More specifically, leisure time social activity had an association with spatial perception, praxis, and memory on the cognitive function among the elderly. In addition, the leisure-time physical activity among elderly living in the community is associated with certain cognitive functions; there are orientation, spatial perception, thinking operation, and attention and concentration. While the leisure time cognitive activity is associated with slightly different cognitive functions among elderly living in the community, there are orientation, spatial perception, praxis, and thinking operation. This current study also gives a brief look at the most leisure time activity that elderly living in community involvement and the performance of cognitive function specifically.

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