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RELATIONSHIP BETWEEN QUALITY OF LIFE AND PHYSICAL ACTIVITY IN THE ELDERLY POPULATION

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Abstract

This study was designed to understand the relationship between quality of life (QOL) and physical activities (perceptual and actual) in the elderly population. A sample of 50 males, aged 55-64 years, was included. Standardized QOL, IPAQ, pedometer (Honor Band 6, Huawei, China), steps per day, resting and average heart rate (RHR, AHR), total sleep time (deep, light, and REM sleep), and oxygen saturation were obtained for 1 week. The majority (96%) of participants belonged to the middle- to low-income group and reported vigorous activity (56%), moderate (38%), and mild (6%) activity. When analyzing QOL, the majority of participants performed daily routine work (1.62 ± 0.66), had higher concentration levels (3.08 ± 0.52), were satisfied with their physical abilities (3.08 ± 0.53), were sexually active (3.74 ± 0.56), slept well (3.76 ± 0.65), and felt free to make their own decisions (3.92 ± 0.27). They loved their living place (3.86 ± 0.57), enjoyed a healthy physical environment (3.66 ± 0.59), and felt safe (3.76 ± 0.55). The elderly population living in hilly areas is enjoying a healthy and active physical life, as evidenced by their perceptions and objective physical activity measurements, reflected in a good quality of life.

Keywords: Step Count; Heart Rate; Sleep Time; Oxygen Saturation.

Introduction

Geriatrics is a medical field that refers to the health of senior citizens. While no specific age has been established for defining more mature people; the

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overwhelming opinion regards the age of 60 as the cut-off point (World Health Organization, 2013). The number of mature people aged 60 years or more is expected to rise from 841 million people in 2013 to a surplus of 2000 million in 2050 in the world. By 2047, the older population is expected to outnumber the younger (United Nations, 2013).

As shown in an Asian study, more established adults living alone are more prone to depression and social isolation due to unemployment, unexpected illness, stigma, and physiological and financial difficulties (Lakshmi & Roopa, 2013; Lim & Kua, 2011). Numerous factors, such as social interaction, intimate relationships, smoking cessation, immunization, exercise, and so on, have been found to impact senior people's personal happiness (Holt-Lunstad, 2008).

The concept of personal satisfaction is broad and fluid. It encompasses a variety of factors, including social, physical, psychological, and environmental elements (Ahmad & Shaikh, 2018). According to the World Health Organization, it involves people's perceptions of their condition in everyday life, as well as their desires and worries (Figueira et al., 2010). Individuals who measure QOL plan their interactions and observations to support social relationships while empowering volunteer efforts and demonstrating that, in addition to personal prosperity, one must also serve the community (Fleck et al., 2003).

Physical activity can enhance organic conditions and prevent physical degeneration in older people (McPhee et al., 2016). Active living has a significant impact on health and quality of life, as well as the prevention of aging and the reduction of functional and physical degradation (Freitas et al., 2007). The concept of QOL is complex, considering a variety of perspectives for this age group; nonetheless, diminished physiological capacity with age may affect the ability to do many tasks, thereby affecting personal satisfaction (QOL) (Figueira et al., 2010).

Previous research has clearly demonstrated the deterioration of the respiratory framework with age, as well as the beneficial effects of continued physical activity on this deterioration (Rees et al., 2007). The physiological cycle of aging is marked by a decrease in engine (motor) capacities, lower strength, adaptability, speed, and VO_{2max}, which disrupts daily activities and the maintenance of a healthy lifestyle (Martins et al., 2010).

Pakistan has 4.2% population ranging from 55-64 years. As per the latest census, life expectancy in Pakistan is 67.11 years (Nyoni, 2017). In addition, the WHO has labeled Pakistan as one of the countries

with more condensation of metabolic disorders and chronic health problems. Chronic health problems usually precipitate complications, especially with increasing age, which further leads to deterioration of quality of life (Sharif et al., 2024).

Moreover, people in this age group are usually neglected, and little research has been carried out into the quality of life (QOL) of these individuals. It was discussed earlier that great well-being and personal satisfaction depend upon regular physical activities apart from other factors. In addition, literature about the actual physical activity and quality of life of elderly people in this part of the world is lacking. Therefore, this study is designed to determine the perceptual and actual physical activities of the elderly population and to correlate them with quality of life.

The findings of the study will unveil the quality of life (QOL) and physical activity status of the older population, which may enable us to lay out recommendations for improving the QOL of these individuals.

Materials & Methods

Research Design

A descriptive study having both qualitative and quantitative components was conducted to determine the correlation of quality of life with perceived and actual physical activities in the elderly population.

Participants

All elderly 50 males, with an age range of 55-64 years, in the district Sudnothi (Azad Kashmir) were considered as the population of the study. No specific reservations were made about the health of the participants, except that those with severe heart issues and those not able to walk were excluded from the study.

Research Protocol

The purpose of the study was conveyed to the population in the local language, and any questions regarding the study were answered. After their agreement, written informed consent was taken from them. The data was collected with the standard questionnaire WHO-QOL (World Health Organization Quality of Life Questionnaire) and IPAQ (International Physical Activity Questionnaire). To collect data regarding actual physical activities, band 6 (Hawaii, China) apparatuses were provided to all the participants for one week, and they were instructed about their use.

Data Collection Tools

As the data has both qualitative and quantitative components, the quantitative data of the population was collected by using honor band 6, while the qualitative and perceptual data of the population were collected by using standardized questionnaires, WHO-QOL, and IPAQ. The validity and reliability of these tools and

references are given below, followed by a detailed description.

Data Collection Tools

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Table 1. Demographic Information of the Respondents

Tool	References	Reliability (Cronbach's alpha coefficient)
WHO QOL	1Lodhi FS, Raza O, Montazeri A, Nedjat S, Yaseri M, Holakouie-Naieni K. Psychometric properties of the Urdu version of the World Health Organization's quality of life questionnaire (WHOQOL-BREF). Medical Journal of the Islamic Republic of Iran. 2017 Dec 25; 31:129. doi: 10.14196/mjiri.31.129	0.825
	2. Power M, Bullinger M, Harper A. The World Health Organization WHOQOL-100 tests the universality of Quality of Life in 15 different cultural groups worldwide. Health Psychology. 1999 Sep;18(5):495.	0.84
	3. Whoqol Group. Development of the World Health Organization WHOQOL-BREF quality of life assessment. Psychological Medicine. 1998 May; 28(3):551-8. DOI: https://doi.org/10.1017/S0033291798006667	0.70
IPAQ	1. Booth ML, Ainsworth BE, Pratt MI, Ekelund UL, Yngve AG, Sallis JF, Oja PE. International Physical Activity Questionnaire: 12-country reliability and validity. Med Sci Sports Exerc. 2003;195(9131/03):3508-1381. DOI: 10.1249/01.MSS.0000078924.61453.FB	0.80
	2. Deng HB, Macfarlane DJ, Thomas GN, Lao XQ, Jiang CQ, Cheng KK, Lam TH. Reliability and validity of the IPAQ-Chinese: the Guangzhou Biobank Cohort Study. Medicine & Science in Sports & Exercise. 2008 Feb 1;40(2):303-7. DOI: 10.1249/mss.0b013e31815b0db5	0.84
	3. Hallal PC, Victora CG. Reliability and validity of the International Physical Activity Questionnaire (IPAQ). Med Sci Sports Exerc. 2004 Mar 1; 36(3):556. DOI: 10.1249/01.MSS.0000117161.66394.07	0.80

WHO-QOL

In order to assess participants' perceptions of quality of life, the WHO-QOL questionnaire, a validated tool for the elderly population, was used. This tool is widely applied in research. The questions were asked about different domains related to their life, which are as follows.

Physical Domain: In this domain, questions were asked by the participants about their physical health and problems related to health. 1 to 5 weightages were given to the responses against each item.

Psychological Domain: In this domain, participants were asked questions to determine how much they are involved in their lives. Different questions regarding physical fitness, sleep, sexual life, and mental fitness were included.

Social Domain: In this domain, questions were asked from participants regarding their financial situation, relationship, leisure activities, love, and care in order to know about their social life.

Environmental Domain: In this domain, questions were asked of participants regarding their living place, safety and security, and transport, and the response was recorded according to the given weightages.

IPAQ (International Physical Activity Questionnaire)

The IPAQ (International Physical Activity Questionnaire) long form was used to assess the perception of the participants regarding their daily routine activities during the last week. The responses were analyzed by using the data analysis techniques provided with the questionnaire (IPAQ Long Form Scoring Spreadsheet.xlsx). This questionnaire gives you an estimated idea of the category of lifestyle (mild, moderate, vigorous) based on one work activity. In addition, it gives a rough idea of the MET consumption by an individual.

Honor Band-6: A physical activity measuring apparatus honor band-6 was used to collect the actual physical activity data. Participants' steps per day, energy expenditure per day, average heart rate, resting heart rate, total sleep time, deep sleep, light sleep, REM sleep, and oxygen saturation throughout the week were measured with this apparatus.

Anthropometric Data

Age: Participants' ages were collected directly from them during data collection and verified against their CNICs.

Weight: A digital weight machine (Seca, Italy) was used to measure the weight of the participants. Participants were told to stand on the machine with bare feet, and they were wearing a single dress during the weight measurement.

Height: A standard stadiometer (Seca, Italy) was used to measure the height of the participants. Participants were advised to stand vertically with bare feet while both feet were touching each other.

BMI (body mass index): The standard formula (weight in kg)/ (height m) ^{2} was used to calculate the BMI of the

participants. The participants were categorized as underweight (<18.5), normal (18.5-24.5), and overweight (29.9).

Waist Circumference: A measuring tape was used to measure the waist circumference. The tape is placed horizontally around the abdomen at the iliac crest. During the measurement, the participants were advised to breathe normally and stay calm. The waist circumference was measured in cm.

Hip Circumference: A measuring tape was used to measure the hip circumference. The tape was placed horizontally around the widest portion of the buttocks. The hip circumference was measured in cm.

Waist-Hip Ratio: Waist-hip ratio was calculated by dividing the waist circumference by the hip circumference. This ratio indicates the distribution of fats and the overall health of the participants. As per the WHO, the recommended W/H ratio for males should be less than 0.9, and for females, less than 0.85.

Blood Pressure: Blood pressure (mmHg) of each participant was measured by using the sphygmomanometer, and both the systolic and diastolic numbers were recorded.

Pedometer Data

Honor Band-6 was used to collect the pedometer data of the participants for a week, which is as follows.

Total Steps: The total steps data of the participants was recorded after synchronization of the apparatus with the data reader, which includes the steps data of each participant for a week, and the average steps data was calculated by dividing the total steps by the total days.

Total distance traveled: The total distance traveled by the participants was recorded by the apparatus and obtained by synchronizing it with the data reader application. The average distance traveled by the participants per day was calculated by dividing the total distance by the total number of days.

Energy Expenditure: Energy expenditure during a week was recorded by the apparatus, and the average energy expenditure of each participant was calculated by dividing the total energy expenditure of each participant by the total number of days.

Oxygen Saturation: The oxygen saturation of the participants was recorded by the apparatus, and an oximeter was also used to check the oxygen level of the participants three times, and the average was calculated.

Sleep Time: The sleep time of the participants was recorded by the apparatus as follows.

Deep Sleep: The deep sleep (non-rapid eye movement sleep) was recorded by the

apparatus and was calculated by synchronizing it with the data reader application. The total deep sleep time of each participant was calculated by adding the total deep sleep time duration for the whole week.

Light Sleep: Light sleep (transition between waking and sleeping) was recorded by the apparatus, and total light sleep was calculated by adding the whole week's light sleep duration.

REM Sleep: REM (rapid eye movement sleep) was recorded by the apparatus and was calculated by adding the whole week's light sleep duration of each participant.

Heart Rate: The heart rate of the participants was also recorded by the Honor Band-6 as follows:

Average Heart Rate: The average heart rate of the participant was recorded by the apparatus and was calculated by adding the total average heart rate of each participant and dividing it by the total number of days.

Resting Heart Rate: The resting heart rate was recorded by the apparatus and was calculated by adding the total resting heart rate of each participant throughout the week and dividing it by the total number of days.

Procedure for Data Collection

Approval for the study was obtained from BOSAR (the ethical board of Sarhad University of Science and IT). After approval based on purposive sampling, participants were identified. The purpose of the study was conveyed to them in the local language, and any questions regarding the study were answered. After their agreement, written informed consent was taken from them. The perceptual data were collected with the standard questionnaire WHO-QOL (World Health Organization Quality of Life Questionnaire) and IPAQ (International Physical Activity Questionnaire). Weight, height, BMI, waist circumference, hip circumference, and blood pressure were measured. After that, they were given a band-6 apparatus and were instructed about its use. A successful synchronization of the apparatus with the data reader was ensured at the place. After one week, the participants were approached for the retrieval of the data, and they were thanked for taking part in the study.

Procedure for Data Analysis

Data was analyzed using SPSS (Statistical Package for the Social Sciences) version 20. The normality of data was determined through the Shapiro-Wilk test of normality. Frequencies and percentages were used for categorizing data such as educational status, health status, social status, and perceived physical status, while Mean ± SD was used to elaborate numerical data such as age, height, BMI, actual steps, average heart rate, resting heart rate, etc.

Correlation was carried out with Pearson correlation statistics for determinants of QOL and IPAQ, QOL and actual physical data, and IPAQ and actual physical data. ANOVA was applied to check the difference between the means of participants based on the grouping of social status and health status. P value < 0.05 was considered significant.

Results

Correlation of QOL with IPAQ

Pearson correlation statistics were carried out to determine the correlation of domains of QOL and IPAQ data. A statistically significant positive correlation was observed between the psychological domain and MET total, which points toward the fact that more active participants exhibited a better psychological profile. The correlations for the rest of the parameters were not statistically significant, as shown in. Psychological domain and total MET correlation: Table 2 shows the correlation of total MET with psychological domain (R2 = 0.16, r = 0.401, and p = 0.004 value).

Table 2. QOL, IPAQ Correlation

		MET mild	MET moderate	MET vigorous	MET total
TPhy	r value	260	-.171	-.003	.148
	P value	.068	.234	.985	.305
AvgePhy	r value	.071	-.094	.177	.166
	P value	.626	.518	.218	.251
Tpsy	r value	.197	.058	.240	.401**
	P value	.171	.691	.093	.004
AvgePsy	r value	.197	.058	.240	.401**
	P value	.171	.691	.093	.004
Tsoc	r value	-.013	.021	.012	.006
	P value	.931	.882	.935	.966
AvgeSoc	r value	.074	.042	.134	.198
	P value	.608	.771	.353	.167
Ten	r value	.044	-.061	-.055	-.043
	P value	.764	.673	.706	.766
AvgeEn	r value	.269	-.147	-.117	.063
	P value	.058	.307	.418	.666

Correlation of QOL with Pedometer Parameters

Pearson correlation was carried out to determine the correlation of QOL domains with pedometer data. A statistically significant positive correlation was observed between total physical, light, and deep sleep, which indicates that adopting physical activities as a healthy habit is beneficial for good sleep. An increase in the level of physical activities according to health and age increases the level of sound sleep. Similarly, a significant positive correlation was also observed between average environmental domain and REM sleep, which indicates that the better the living environment was REM sleep; in addition, a peaceful environment

has a positive impact on mental health, which is necessary for sound sleep. Table 3 shows the correlation of average environmental domain with REM (rapid eye movement) sleep (R2 = 0.134, r = 0.366, and p = 0.009).

Table 3. QOL, Pedometer Parameters Data Correlation

		RHR (bpm)	AHR	AS day	M steps	L steps	Total Steps	Av EE day (kcal)	TD (km)	TD_Day (km)	Sleep time (min)	Sleep day	Deep sleep%	Light sleep%	REM sleep%
TPhy	r value	.121	-.319*	.123	.105	.027	.123	.274	.065	.065	-.154	.154	.467**	.379**	.074
	P value	.402	.024	.394	.470	.850	.394	.054	.652	.656	.286	.286	.001	.007	.609
Avge	r value	.009	.136	-.040	-.109	.024	-.040	-.140	.038	.040	-.257	-.257	.127	-.285*	.237
Phy	P value	.951	.345	.784	.453	.869	.784	.333	.795	.784	.072	.072	.381	.045	.097
Tpsy	r value	-.023	-.019	-.080	-.084	-.089	-.080	-.003	-.010	-.007	-.074	-.074	.103	.010	-.047
	P value	.875	.898	.579	.563	.539	.579	.984	.947	.961	.610	.610	.479	.947	.747
Avge	r value	-.023	-.019	-.080	-.084	-.089	-.080	-.003	-.010	-.007	-.074	-.074	.103	.010	-.047
Psy	P value	.875	.898	.579	.563	.539	.579	.984	.947	.961	.610	.610	.479	.947	.747
Tsoc	r value	.166	-.077	-.131	-.088	.045	-.131	.111	-.245	-.247	-.114	-.114	-.196	.044	.084
	P value	.250	.595	.366	.541	.757	.366	.444	.086	.084	.431	.431	.172	.764	.561
Avge	r value	-.214	-.043	-.010	.048	-.049	-.010	-.121	.014	.015	-.086	-.086	.044	.001	.001
Soc.	P value	.136	.765	.947	.740	.737	.947	.404	.925	.918	.552	.552	.760	.997	.996
Ten	r value	.091	-.117	-.279*	-.155	-.256	-.279*	-.205	-.208	-.209	-.136	-.136	-.099	.068	.111
	P value	.529	.419	.050	.281	.072	.050	.153	.147	.146	.346	.346	.495	.641	.441
Avge	r value	.082	.033	.034	-.046	.069	.034	-.120	-.021	-.019	-.073	-.073	-.152	-.151	.366**
En	P value	.572	.819	.812	.749	.636	.812	.408	.887	.898	.614	.614	.292	.294	.009

Correlation of QOL with Anthropometric

Pearson correlation statistics were carried out to determine the correlation of domains of QOL (quality of life) and anthropometric data. A statistical negative correlation was observed between the total social domain and DBP (diastolic blood pressure), which indicates that the respondents with high blood pressure keep themselves socially separated, especially from those situations that may lead them toward anger, resulting in high blood pressure. Table 4 shows the correlation of the total social domain with DBP (diastolic blood pressure), (R2 = 0.106, r = -0.325, p = 0.021) value.

Table 4. QOL, Anthropometric Correlation

		Age years	Height Cm	Weight Kg	BMI	Hip Circum	Waist Circum	WH Ratio	SBP	DBP
TPhy	r value	.086	-.198	-.176	-.115	-.143	-.180	-.156	-.036	.118
	P value	.551	.167	.222	.426	.323	.211	.280	.805	.414
AvgePhy	r value	-.205	.105	.181	.147	.178	.142	-.085	-.069	-.209
	P value	.153	.468	.209	.308	.217	.324	.556	.632	.146
Tpsy	r value	-.116	.112	-.056	-.115	-.068	-.015	.156	.152	.039
	P value	.424	.437	.697	.426	.641	.916	.279	.292	.789
AvgePsy	r value	-.116	.112	-.056	-.115	-.068	-.015	.156	.152	.039
	P value	.424	.437	.697	.426	.641	.916	.279	.292	.789
Tsoc	r value	-.008	-.005	-.096	-.126	-.120	-.144	-.104	-.182	-.325*
	P value	.958	.974	.505	.384	.407	.319	.473	.207	.021
AvgeSoc	r value	-.206	-.125	-.165	-.143	-.126	-.104	.032	-.086	-.093
	P value	.152	.388	.253	.322	.384	.474	.823	.552	.521
Ten	r value	-.080	.082	.187	.173	.141	.158	.102	-.181	-.033
	P value	.581	.574	.193	.231	.328	.272	.482	.208	.821
AvgeEn	r value	.105	-.100	.049	.124	.226	.203	-.019	.203	.094
	P value	.467	.488	.734	.389	.115	.158	.894	.157	.518

Correlation of IPAQ with Pedometer Data

Pearson correlation statistics were carried out to determine the correlation between IPAQ (International Physical Activity Questionnaire) and pedometer data. A statistically significant positive correlation was observed between MET mild and REM sleep, which indicates that respondents who regularly participate in daily routine activities and utilize their body energy properly show a better improvement in their sleep. Similarly, a positive correlation was also observed between MET moderate and total sleep time, MET moderate and sleep per day, which points towards the fact that the sleep duration per day and total sleep duration of more active participants increase because of their involvement in daily routine physical activities and utilization of body energy properly.

Table 5 MET and REM sleep correlation, showing the correlation of MET mild with REM (rapid eye movement) sleep ($R2 = 0.097$, $r = 0.311$ and $p = 0.02$, correlation of MET moderate with total sleep minutes ($R2 = 0.099$, $r = 0.315$ and $p = 0.026$), and the correlation of MET moderate with total sleep minutes per day ($R2 = 0.099$, $r = 0.31$ and $p = 0.02$).

Table 5. IPAQ, Pedometer Data Correlation

		RHR (bpm)	AHR	AS day	M steps	L steps	Total steps	Av EE day (kcal)	TD (km)	TD day (km)	Sleep Time (min)	Sleep day	Deep sleep%	Light sleep%	REM sleep%
MET	r valve	.006	-.196	-.059	-.137	-.003	-.059	-.090	-.020	-.020	-.228	-.228	-.275	.002	.311*
mild	P valve	.968	.172	.683	.342	.984	.684	.533	.890	.891	.112	.112	.054	.991	.028
MET	r valve	-.150	-.073	.008	.093	-.044	.008	-.061	.103	.102	.315*	.315*	.129	-.112	-.001
moderate	P valve	.298	.613	.958	.522	.759	.957	.674	.478	.481	.026	.026	.372	.439	.996
MET	r valve	-.044	.162	-.032	.038	.081	-.032	.213	-.142	-.141	-.205	-.205	.206	-.135	-.038
vigorous	P valve	.762	.260	.823	.791	.578	.823	.137	.327	.328	.153	.153	.151	.349	.794
MET	r valve	-.103	-.071	-.064	-.035	.052	-.064	.073	-.076	-.076	-.221	-.221	-.009	-.152	.228
Total	P valve	.476	.622	.657	.811	.721	.657	.613	.600	.601	.122	.122	.951	.290	.111

Correlation of IPAQ with Anthropometric Data

Pearson correlation statistics were carried out to determine the correlation of IPAQ and anthropometric data. A statistically significant positive correlation was observed between MET moderate, MET total, and height, indicating that participants with standardized height have an ideal BMI, are more active in their daily routine work, and show higher MET values. Table 6 MET moderate, height of correlation showing the correlation of MET moderate with height (R2 = 0.119, r = 0.343, and p = 0.015) value, and the correlation of MET total with height (R2 = 0.084, r = 0.291, and p = 0.041) value.

Table 6. IPAQ, Anthropometric data of Correlation

		Age years	Height Cm	Weight Kg	BMI	Waist Circum	Hip Circum	WH Ratio	SBP	DBP
MET mild	r value	-.098	.239	.088	-.017	.062	.092	-.100	-.054	-.103
	P value	.498	.095	.544	.907	.668	.526	.489	.709	.478
MET moderate	r value	-.041	.343*	.069	-.081	-.042	-.016	-.097	.029	.102
	P value	.775	.015	.635	.575	.772	.911	.503	.840	.482
MET vigorous	r value	-.089	-.081	.054	.118	.126	.124	.041	.013	-.017
	P value	.539	.574	.708	.413	.385	.390	.778	.928	.905
MET total	r value	-.174	.291*	.145	.041	.134	.169	-.096	-.013	-.051
	P value	.227	.041	.313	.780	.355	.240	.505	.930	.724

Correlation of Pedometer Data with Anthropometric Data

Pearson correlation statistics were carried out to determine the correlation between pedometer and anthropometric data. A statistically significant positive correlation was observed between AHR (average heart rate) and weight, BMI, hip

circumference, and waist circumference. This point is towards the fact that AHR will remain higher in respondents with high weight, BMI, hip circumference, and waist circumference values, and vice versa, the higher these values, mean respondents have high ratio of fat in their bodies. Similarly, a statistical negative correlation was observed between total sleep times, sleep time per day, and weight, BMI, hip circumference, waists circumference, which indicates that the respondents with a high ratio of fat or who are obese have a greater chance of abnormal sleep, waking up more often, tossing and turning throughout the night. Too much fat in the body effect on heart's working efficiency, which leads to pressure on the circulation of blood and on the respiration, causing abnormal sleep. The table 7 showing the correlation of AHR with weight (R2 = 0.253, r = 0.503, and p = 0.00); the correlation of BMI with AHR (R2 = 0.272, r = 0.521, and p = 0.000); the correlation of AHR with waist circumference (R2 = 0.308, r = 0.555, and p = 0.00; the correlation of AHR with Hip circumference (R2= 0.280, r = 0.529, and p = 0.00, Scatter plotting in fig 4.15(A) and 4.15 (B) showing the correlation of total sleep time with weight and BMI (R2= 0.107, 0.135; r = -0.327, -0.367 and p = 0.02, 0.009, the correlation of total sleep time with hip and waist circumference (R2= 0.087, 0.103; r = -0.295; -0.320, and p = 0.038, 0.023).

Table 7. Pedometer Data, Anthropometric Data of Correlation

		RHR (bpm)	AHR	AS day	M steps	L steps	Total Steps	Av EE day (kcal)	TD (km)	TD day (km)	Sleep time (min)	Sleep day	Deep sleep%	Light sleep%	REM sleep%
Age years	r value	.167	-.155	-.135	-.166	-.084	-.135	-.148	-.139	-.139	-.132	-.132	-.309*	.193	.064
	P value	.247	.281	.350	.248	.564	.350	.306	.335	.334	.362	.362	.029	.180	.660
Height Cm	r value	-.017	.189	.018	.066	-.109	.018	-.064	.016	.017	-.014	-.014	.063	.080	-.140
	P value	.905	.189	.904	.650	.452	.903	.661	.914	.909	.923	.923	.663	.579	.333
Weight Kg	r value	.100	.503**	-.145	-.186	-.124	-.145	-.047	-.113	-.113	-.327*	-.327*	.031	-.088	.114
	P value	.490	.000	.315	.195	.393	.315	.745	.436	.436	.020	.020	.830	.545	.430
BMI	r value	.108	.521**	-.190	-.250	-.103	-.190	-.019	-.152	-.153	-.367**	-.367**	.046	-.180	.206
	P value	.455	.000	.185	.080	.477	.185	.894	.291	.290	.009	.009	.752	.210	.151
Waist Circum	r value	.135	.555**	-.157	-.154	-.146	-.157	-.136	-.146	-.145	-.320*	-.320*	.055	-.143	.136
	P value	.351	.000	.277	.287	.311	.277	.345	.313	.315	.023	.023	.704	.323	.346
Hip Circum	r value	.074	.529**	-.149	-.137	-.155	-.149	-.085	-.146	-.145	-.295*	-.295*	.049	-.142	.152
	P value	.609	.000	.303	.343	.284	.303	.555	.313	.314	.038	.038	.733	.325	.291
WHRatio	r value	.234	.234	-.067	-.086	-.008	-.067	-.207	-.039	-.037	-.176	-.176	.020	-.045	-.002
	P value	.102	.102	.645	.552	.955	.645	.150	.788	.798	.222	.222	.891	.755	.989
SBP	r value	-.154	-.016	.043	.042	-.004	.043	-.060	.084	.085	.093	.093	.000	.081	-.075
	P value	.286	.911	.767	.771	.977	.767	.681	.562	.559	.521	.521	.999	.576	.606
DBP	r value	-.110	.138	.085	.155	-.061	.085	.099	.057	.059	.204	.204	.178	-.050	-.107
	P value	.448	.341	.559	.282	.672	.559	.494	.696	.683	.155	.155	.215	.731	.461

Discussion

This study was designed to study the correlation between the quality of life and physical activities in the elderly population. All domains of QOL for our participants reported better QOL, including physical, social, psychological, and environmental. These findings are very encouraging as the general perception of QOL of elderly people seems miserable and unsatisfactory (Payette et al., 2011). The QOL, physical domain mean scores ascertained that the majority of the respondents of this age group had less difficulty in performing daily routine work (1.62 ± 0.66), required less medication (1.5 ± 0.70), less difficulty in special senses (2.12 ± 0.59) and they had a high level of concentration (3.08 ± 0.52) and energy (3.14 ± 0.60 for daily activities.

QOL, psychological domain, ascertained that the respondents of age 55-64 don't show much worry about any pain or discomfort (1.98 ± 0.58) and enjoy their daily routine (3.02 ± 0.82). The majority of the respondents are looking satisfied with their physical abilities to move around for any work (3.80± 0.53). Similarly, the QOL, social domain ascertained that most of the participants had little or no financial problems (1.94 ± 0.84), they enjoyed their free time (2.76 ± 0.91), and felt free to make their own decisions (3.92 ± 0.27). As a member of society, they experience much love and respect from others (3.10 ± 0.76). The QOL, environmental domain ascertained that the majority of the respondents love the places where they live (3.86 ± 0.57±) as well as feeling safe and secure in that environment (3.76 ± 0.55) (Fujikawa et al., 2011).

The study shows that people in this region were living in a combined family system (96%), the dependence on each other shows a better social score and an affluent financial status, which all cumulatively lead to better QOL. The QOL indicators, like neighborhood, environmental conditions, such as any type of pollution, are better in this region, which is why the participants are satisfied with their physical abilities to move around and are satisfied with the environmental conditions. Study shows that when environmental factors are stable, then QOL will be stable.

The total MET was observed to be higher among the participants with postgraduate qualifications, while those with primary qualifications showed the least MET. Similarly, participants with higher qualifications reported better physical and social status as compared to primary education holders (Wilski & Tasiemski, 2016; Tacchino, 2017). Better qualifications enhance the chance of

awareness amongst the masses regarding a better physical and social life. This shows that people with high qualifications are more health-conscious, and they appreciate the values of social interaction and gathering (Schuller, 2004).

Similarly, while considering the health condition of the participants, a significant difference was observed for weight ($p = 0.00$), BMI ($p = 0.001$), waist circumference ($p = 0.00$), hip circumference ($p = 0.00$), DBP ($p = 0.03$), and AHR ($p = 0.002$). The results indicate that the participants with single and multiple chronic problems are overweighed than those of normal participants. They have a higher BMI value than other respondents. This indicates a high ratio of fat in their bodies, leading to a higher risk of heart problems and diabetes. Respondents with single and multiple chronic problems also had higher DBP (diastolic blood pressure) than those of normal respondents. In addition, the AHR (average heart rate) in single and multiple chronic problem respondents is higher than that of others. The results show that the respondents with a high fat ratio have an increased risk of heart disease (Vanderlei et al., 2009; Rolim et al., 2013). Adiposity, especially a pear shape, is considered one of the leading factors for chronic health problems, including heart disease, high blood pressure, and diabetes. Therefore, participants with high BMI values show single or multiple chronic problems.

Extensive Pearson correlation statistics were carried out to determine the correlation of domains of QOL with IPAQ, pedometer data, and anthropometric data, IPAQ with pedometer and anthropometric data, and pedometer with anthropometric data.

In correlation between QOL and IPAQ, a statistically significant positive correlation was observed between the psychological domain and MET total, which points toward the fact that more active participants exhibited a better psychological profile. Meanwhile, in correlation between QOL and pedometer, a positive correlation was observed between total physical and light sleep, which indicates that adopting physical activities as a healthy habit is beneficial for good sleep. An increase in the level of physical activities according to health and age increases the level of sound sleep. Similarly, a significant positive correlation was also observed between the average environmental domain and REM sleep, which indicates that the better the living environment, the better will be the REM sleep; in addition, peaceful environment brings a positive impact on mental health which is necessary for a sound sleep

(Teychenne et al., 2008, Asztalos et al., 2008; Ohta et al., 2007).

In correlation of QOL with anthropometric data, a statistical negative correlation was observed between the total social domain and DBP (diastolic blood pressure), which indicates that the respondents with high blood pressure keep themselves socially separated, especially from those situations which may lead them toward anger resulting in high blood pressure (Department of Health and Human Services, 2006; Krämer et al., 2010; Sun et al., 2010).

Moreover, a statistical positive correlation was observed between MET mild and REM sleep, which indicates that respondents who regularly participate in daily routine activities and utilize their body energy properly show a better improvement in their sleep. Similarly, a positive correlation was also observed between MET moderate and total sleep time, MET moderate and sleep per day, which points towards the fact that the sleep duration per day and total sleep duration of more active participants increase because of their involvement in daily routine physical activities and utilization of body energy properly. In correlation of IPAQ with anthropometric, a statistically significant positive correlation was observed between MET moderate, MET total, and height, which indicates that participants with standardized height have ideal BMI, and they are more active in their daily routine work and show a better value of MET (Buman & King, 2010). As participants of the study lived in hilly areas and had to do a lot of strenuous physical activity in their daily routine for ordinary house chores, this is not only beneficial for their better sleep but also increases the duration of sound sleep. Moreover, active participants who perform regular daily activities also utilize their body energy properly and maintain better BMI values. Similarly, in correlation between pedometer and anthropometric data, a significant positive correlation was observed between AHR (average heart rate) and weight, BMI, hip circumference, and waist circumference. This points towards the fact that AHR will remain higher in respondents with high weight, BMI, hip circumference, and waist circumference values, and vice versa; the higher these values, mean respondents have high ratio of fat in their bodies. Similarly, a statistical negative correlation was observed between total sleep times, sleep time per day, and weight, BMI, hip circumference, waists circumference, which indicates that the respondents with a high ratio of fat or who are obese have a greater chance of abnormal sleep, waking up more often, and tossing and turning throughout the night. Too much

fat in the body affects the heart's working efficiency, which leads to pressure on the circulation of blood and also on the respiration, causing abnormal sleep. Participants with a high value of BMI show an increase in heart rate value, which also had an inverse relation with sleep cycle, resulting in disturbance of the deep sleep of the participants.

Conclusion

The elderly population of the district Sudnothi enjoys a good quality of life and engages in better physical activities. For enjoying a good, healthy life, involvement in any physical activity is a must for the elderly population, which provides them with the strength and flexibility to carry out daily activities. Awareness of the elderly population about better QOL and its correlation with physical activity is a must, and the masses, especially the elderly population, must be educated about the importance of indulging in physical activity. It can also be recommended on the findings of the study that the availability of the grounds and physical activity facility is not mandatory. The old age group can benefit from merely walking up and down hills, which can be easily achieved in almost any community.

Mass awareness from the government about good QOL and physical activity for all ages is a must, as educating the nation and a subsequent incorporation of physical activity in lifestyle across all ages will surely decrease the burden on the health care systems of the country. In the future, the same study can be replicated in planned as well as urban areas of Pakistan for comparisons and drawing meaningful conclusions about the incorporation of physical activity into the lifestyle of people. Moreover, the same study can be conducted in the female population for a better understanding of gender-based variations.

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