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ORIGINAL ARTICLE

Correlation between Self-Reported Daily Activity and Submaximal Walk Test in the Assessment of Functional Capacity among Patients with Hypertension

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Abstract

Background: Time constraint on the part of clinicians or musculoskeletal comorbidities in the lower limbs in some patients with hypertension may sometimes prevent submaximal walk test. Hence, self-reported activity thus becomes an alternative method for assessing quick functional capacity (FC). This study assessed FC using a self-reported daily activity tool; Duke Activity Status Index (DASI) and correlated its value with 6-Minute Treadmill Walk (6-MTW) among patients with hypertension.

Methods: This cross-sectional study recruited 150 (males: n = 54; females: n = 96) patients with mild-to-moderate hypertension from the Cardiac Care Unit of a Nigerian teaching hospital using purposive sampling technique. Physical and socio-demographic characteristics were recorded. Pre and post 6-MTW cardiovascular parameters were measured using an electronic sphygmomanometer. FC: maximum oxygen consumption (VO2 max) was evaluated using DASI and 6-MTW. Data were analyzed using descriptive and inferential statistics. Alpha level was set at $p < 0.05$.

Results: Participants were comparable in all physical and cardiovascular variables except body mass index (BMI) and heart rate ($p < 0.05$). The means of estimated VO2 max by DASI and 6-MTW were 24.4 ± 5.7 and 12.5 ± 3.6 mL/kg/min respectively. There was significant moderate correlation between DASI and 6MTW estimated VO2 max ($r = 0.58$; $p = 0.001$). However, there were significant inverse correlations between estimated DASI VO2 max and each of age ($r = -0.39$; $p = 0.006$) and BMI ($r = -0.35$; $p = 0.012$). Similarly, there were significant inverse correlations between estimated 6-MTW VO2 max and each of age ($r = -0.38$; $p = 0.012$) and BMI ($r = -0.29$; $p = 0.043$).

Conclusion: Estimated functional capacity assessed using the self-reported daily activity (DASI) demonstrated significant positive correlation with six-minute treadmill walk in patients with hypertension. DASI may be used as a quick tool for assessing functional capacity in patients with hypertension. Findings from this study may help to limit problems of insufficient laboratory facilities and inadequate experts in the assessment of functional capacity in many patients with cardiac challenges.

Keywords

Self-reported activity, Functional capacity, Submaximal walk test, Hypertension

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Abbreviations

FC: Functional Capacity; VO_2 max: Maximum Oxygen Consumption; DASI: Duke Activity Status Index; 6-MTW: 6-Minute Treadmill Walk; BMI: Body Mass Index; CCU: Cardiac Care Unit; OAUTHC: Obafemi Awolowo University Teaching Hospitals Complex; CVD: Cardiovascular Disease; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; RPP: Rate Pressure Product

Introduction

Cardiovascular disease (CVD) is one of the leading causes of morbidity and mortality worldwide with hypertension as the principal risk factor for all major CVDs [1,2]. Hypertension is a serious global public health problem affecting approximately one billion people globally and more than three million people die annually as a direct result of the condition especially in low and middle income countries [3]. In sub-Sahara Africa, there is substantial evidence that hypertension has become an important public health issue for which an enduring treatment is of utmost importance [2-4]. To a large extent, pharmacological treatment of hypertension has contributed to appreciable blood pressure control, delay in target organ damage and lowers CVD events [4]. However, socio-economic problem, drug adherence, cost of medication and adverse effects of drug are significant limiting factors for achieving successful hypertension control [4,5]. Thus, many health authorities have advocated the incorporation of lifestyle approaches including dietary modification, weight control and exercise in the management of hypertension [5,6].

Exercise as a non-pharmacological approach has been reported to lower blood pressure, improve functional capacity, quality of life and significant reduction in the CVD risk if implemented effectively [7,8]. However, baseline functional capacity of an individual needing exercise is required in order to stratify CVD risk, implementation of an effective exercise prescription and enrollment. Numerous investigations have demonstrated that assessment of functional capacity provides important diagnostic and prognostic information in a wide variety of clinical and research settings [9]. Presently, the current gold standard for assessing a person's aerobic exercise response is the maximum incremental cardiopulmonary exercise test using protocols such as Bruce or modified Bruce protocol [10]. However, availability of equipment and experts in this field are limited in many low and middle income nations [11]. Furthermore, most daily activities are performed at submaximal levels of exertion and, therefore, it has been proposed that submaximal functional tests are a better reflection of physical capability [12].

Popular amongst submaximal functional tests are two, six or twelve-minute walk tests and incremental shuttle walk test [13,14]. Owing to the importance of functional capacity assessment in the management of patients with CVD, the 6-minute walk test (6-MWT) has been reported to be important in the objective evaluation of functional capacity in cardiopulmonary rehabilitation [13,15]. Studies on functional walk tests concluded that the 6-MWT is easy to administer, better tolerated, and more reflective of activities of daily living than other walk tests [11,15]. However, presence of comorbidities such as musculoskeletal disorders including hip or knee arthritis and low-back pain, higher risk of falling, and time constraint among clinicians might hinder use of submaximal walk test for the assessment of functional capacity. Hence, the use of self-reported activity thus becomes an alternative choice for assessing functional capacity.

Several self-administered and interview-based activity questionnaires have been developed to estimate a patient's functional capacity [16,17]. The Duke Activity Status Index (DASI) is a self-reported measure of ability to do twelve personal, household and recreational activities used to assess cardiovascular capacity [17,18]. It has been reported that the DASI has high criterion validity and its predictive significance and simplicity recommends it over several other self-administered tools for evaluating functional capacity [19]. Previous researches seldom compared the DASI with established functional exercise capacity tests to determine whether its predictive capacity is as strong as those of submaximal exercise tests. Furthermore, there is dearth of empirical data on the assessment of functional capacity among patients with hypertension using self-reported tool such as DASI. This study was designed to assess and correlate the DASI's functional capacity outcomes with that of submaximal walk test among patients with hypertension.

Methods

Study sample

This was a cross-sectional study design involving patients with mild to moderate hypertension who were receiving medical treatment at the Medical Outpatient Department; Cardiac Care Unit, Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Nigeria. Participants were recruited into the study using purposive sampling technique. The purpose of the study was explained to participants and those who volunteered to participate signed an informed consent before participation. The study protocol was approved by the Ethics and Research Committee of OAUTHC Ile - Ife, Nigeria. The study was conducted at the Physiotherapy Department of OAUTHC, Ile-Ife, Nigeria.

Inclusion criteria

Eligibility for inclusion were:

i. Clinical diagnosis of mild to moderate

hypertension (≥ 140/90 ≤ 180/109 mmHg), regular use of prescribed anti-hypertensive medications.

ii. Participants whose ages were 40 and 65 years.

iii. Capability to perform submaximal walk test.

Exclusion criteria

They were excluded from the study if presented with

i. History of severe hypertension, unstable angina, congestive heart failure or other severe cardiac disease,

ii. Visual impairment and inability to ambulate without support.

The minimum sample size for the study was calculated using the formula: $n = Z^2 (p (1 - p)/e2$ where, n = required sample size, Z = z-value (z-value for 95% confidence level (1.96), p = The estimated proportion of an attribute present in the population, and e = The desired level of precision (i.e. confidence interval, expressed as decimal (0.05) [20]. Taking the overall prevalence (p) of hypertension in Nigeria using the 160/95 mmHg cut-off point, the prevalence is about 11.2% [21] and a sample size of 142 was estimated. However, the sample size was increased to 150 participants to accommodate for possible missing data.

Procedure

The purpose of the study was explained to the participants before obtaining an informed consent. Thereafter, socio-demographic and physical characteristics were assessed using standard procedures while cardiovascular parameters including heart rate, systolic and diastolic blood pressure were assessed using an electronic sphygmomanometer (Omron Intelli sense M6 Comfort, Japan). The Duke Activity Status Index (DASI) was administered to each participant to assess functional capacity (maximum oxygen consumption [VO_2 max]) based on individual's daily activity. Thereafter, participant underwent a six minute submaximal walk test on a treadmill device (Enraf Nonius, Treadmill manufactured by Bonte Technology BV, Netherlands) as described by Stevens, et al. [22].

Assessment of functional capacity: The Duke Activity Status Index (DASI) is a self-reported measure of ability to perform 12 items daily activities including personal care, household task, sexual function, and recreational activities [17]. Each was assigned a metabolic equivalent (MET) used to assess functional capacity. The DASI required participant to tick either a "yes" or "no" to each question. The sum of "yes" responses were multiplied by 0.43 and then add 9.6 to arrive at DASI score to give the estimated maximum oxygen consumption (VO_2 max). The final score ranges between 0 and 58.2 points. The higher the scores, the better the functional capacity scores [17]. Each participant was given the questionnaire to respond to the 12 items which was completed within three to five minutes. The total score was determined and recorded for each participant. Earlier, the psychometric properties of the instrument was determined by translating the original DASI to Yoruba language and back translated to English language by experts. The translation was done by Yoruba language experts while back translation was done by English experts from the Department of linguistics and African languages studies of the Obafemi Awolowo University, Ile-Ife, Nigeria. The original version was administered on 10 patients with mild to moderate hypertension who were not part of the main study. After a week, the new English version was re-administered on the same participants. Responses from the original and new version were subjected to test-retest reliability using Spearman rank correlation coefficient. A test-retest reliability value of r = 0.72 was obtained. The questionnaire was self-administered and was collected immediately after completion. However, participants who were not literate in English language were assisted by a research assistant who helped to read (Yoruba version of DASI) loud to the hearing of the participant before completing the questionnaire.

Submaximal walk test: Each participant underwent a six-minute treadmill walk (6-MWT); a submaximal walk test which was conducted on a motorized treadmill. Instructions regarding the goal of the 6-MWT during treadmill walk test was adopted from the study of Stevens, et al. [22]. Prior to the 6-MTW, participant was instructed on how to increase and decrease the speed of the treadmill along with how to stop and restart the treadmill if needed to rest. The standard encouragement such as "you are doing fine", keep it up" was given at 2 and 4-minutes intervals. The initial speed of the treadmill walk was set at 1 mile per hour (3.3 km/h) and the minimal speed was 0.6 miles per hour (1.2 km/h) without any inclination (0% elevation). Exercise intensity was monitored using the polar heart rate monitor not exceeding 60-70% of maximal heart rate (MHR). The treadmill's data panel showing speed and distance traveled was not visible to the participant for the period of 6 minutes. However, only the start, stop, and speed up or slow down buttons were accessible to the participant [22]. In addition, total rest time and the Borg dyspnea scale were recorded. The total distance covered was recorded by a rolling measure device attached directly to the treadmill. Post-exercise heart rate, systolic and diastolic blood pressures were taken again during the recovery time. Estimated VO_2 max during 6-TMW was derived from the predictive equation;

Computation: VO_2 max (maximal oxygen consumption) = walking distance/6 min × 0.1 + 3.5 (mL/kg/ min) [23].

Data analyses: Data obtained were summarized using descriptive statistics of frequency, percentage,

Table 1: Distribution of socio-demographic characteristics of participants.

Variable	n	%
Age group (years)		
40-50	35	23.3
50-60	48	32.0
> 60	67	44.7
Gender		
Male	54	36.0
Female	96	64.0
Occupation		
Artisan/farmer	32	21.3
Business	34	22.7
Civil servant	36	24.0
Retiree	48	32.0
Educational level		
Primary	26	17.3
Secondary	45	30.0
Post-secondary	79	52.7
Monthly income		
< 100,000	72	48.0
100,000-200,00	44	29.3
> 200,000	34	22.7
Onset of hypertension		
< 5 years	92	61.3
> 5 years	58	38.7
Antihypertensive medication prescribed†		
ACE-I	58	38.6
ARB	46	30.6
ASA	84	56.0
CCB	48	32.0
DIU	78	52.0
BB	42	28.0

ACE-I: Angiotensin Converting Enzyme Inhibitor; ARB: Angiotensin Receptor Blocker; ASA: Aspirin; CCB: Calcium Channel Blocker; DIU: Diuretics; BB: Beta Blocker; †Summation in percentage is greater than 100% due to combination of prescribed antihypertensive medications.

mean and standard deviation. Inferential statistics of independent t-test was used to compare male and female participants while paired t-test was used to assess the pre and post cardiovascular response to submaximal walk test, maximum oxygen consumption, exertion level. One-way ANOVA and LSD post - hoc analysis was used to determine point of significant difference in cardiovascular response (systolic blood pressure, diastolic blood pressure, heart rate, and rate pressure product) during 6-MTW between male and female participants. Pearson product-moment correlation analysis was used to determine the relationship between selected anthropometric variables, cardiovascular parameters and the two dependent variables [estimated DASI VO_2 max and 6-MTW VO_2 max].

Results

A total of 150 hypertensive patients comprising 54 males and 96 females participated in the study (Table 1). The mean age of participants was 52.0 ± 6.8 years. They were comparable in all physical characteristics except the body mass index (BMI) ($p < 0.05$). The means of heart rate (HR), systolic and diastolic blood pressure (SBP and DBP) and RPP were 71.5 ± 13.7) beat/min, 127.4 ± 18.6) mmHg, 82.3 ± 9.3 mmHg and 9.1 ± 1.9 ($\times 10^3$) respectively. There was no significant difference in all cardiovascular parameters between male and female participants except HR ($p < 0.05$) (Table 2). Table 3 showed the results of functional capacity assessed by DASI (VO_2 max) and 6-MTW (VO_2 max). The means of estimated VO_2 max for DASI and 6-MTW were 24.4 ± 5.7 and 12.5 ± 3.6) mL/kg/min respectively. There was no significant difference in functional capacity between male and female participants as measured by DASI ($t = 0.872$; $p = 0.388$). However, there was significant difference in functional capacity between male and female participants assessed by 6-MTW ($t = 2.105$; $p = 0.041$). The rate of perceived exertion during 6-MTW was not significantly different between male and female participants ($t = -1.126$; $p = 0.266$).

Table 4 showed cardiovascular response of the participants to submaximal walk test. There were significant changes between pre and post SBP ($t = 3.171$; $p = 0.003$), HR ($t = 8.633$; $t = 0.001$) and RPP ($t = 8.566$; $p = 0.001$). Furthermore, Table 5 showed one-away ANOVA comparison of pre and post cardiovascular response to submaximal walk test between male and female participants. The results showed that there were significant changes in HR (F-ratio = 23.168; $p = 0.001$) and RPP (F-ratio = 18.837; $p = 0.001$). Table 6 showed the relationship between selected anthropometric variables, DASI and 6-MTW. The results showed that there were significant inverse correlations between age and DASI ($r = -0.34$; $p= 0.006$) and 6-MTW ($r = -0.39$; $p = 0.005$). Similarly, there were significant inverse correlations between body mass index and DASI ($r = -0.40$; $p = 0.012$) and 6-MTW ($r = -0.31$; $p = 0.043$). Furthermore, there was significant correlation between estimated VO_2 max assessed by DASI and 6-MTW ($r = 0.58$; $p = 0.001$).

Discussion

This study investigated the functional capacity of patients with hypertension using the self-reported daily tool; Duke Activity Status Index (DASI) and correlated its outcomes with the results obtained from six-minute treadmill walk (6-MTW). Findings from our study showed that there was a significant inverse correlation between estimated DASI's VO_2 max and some physical characteristics including age

Table 2: Comparison of the physical characteristics and cardiovascular parameters of male and female participants.

Variable	All (N = 150) Mean ± SD	Male (n = 54) Mean ± SD	Female (n = 96) Mean ± SD	t - cal.	p-value
Age (years)	52.0 ± 6.8	52.6 ± 8.13	51.8 ± 6.0	0.399	0.692
Weight (kg)	80.1 ± 14.9	75.9 ± 15.60	82.5 ± 14.3	-1.524	0.134
BMI (kg/m^2)	29.7 ± 6.5	26.0 ± 4.19	31.8 ± 6.7	-3.319	0.002*
SBP (mmHg)	127.4 ± 18.6	128.0 ± 17.9	127.3 ± 19.2	0.158	0.875
DBP (mmHg)	82.3 ± 9.3	81.8 ± 10.56	82.6 ± 8.7	0.283	0.778
HR (beat/min)	71.5 ± 13.2	77.6 ± 9.01	68.1 ± 14.0	2.585	0.013*
RPP (× 10^3)	9.1 ± 1.9	9.9 ± 1.9	8.6 ± 1.9	2.371	0.817

*p < 0.05; BMI: Body Mass Index; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; HR: Heart Rate; RPP: Rate Pressure Product

Table 3: Comparison of functional capacity measures and exertion level between male and female participants.

Variable	All (N = 150) Mean ± SD	Male (n = 54) Mean ± SD	Female (n = 96) Mean ± SD	t-cal.	p-value
DASI (VO_2 max) mL/kg/min	24.4 ± 5.7	25.4 ± 4.4	23.9 ± 6.3	0.872	0.388
DASI (METs)	7.0 ± 1.6	7.3 ± 1.3	6.8 ± 1.8	0.872	0.388
6-MTW (VO_2 max) mL/kg/min	12.6 ± 3.6	12.4 ± 3.4	10.6 ± 2.3	2.105	0.041*
6-MTW (METs)	3.6 ± 1.1	3.6 ± 1.0	2.9 ± 0.7	2.105	0.041*
Exertion level	3.3 ± 1.1	3.1 ± 0.8	3.5 ± 1.2	-1.126	0.266

DASI: Duke Activity Status Index; METs: Metabolic Equivalents; 6-MTW: 6-Minute Treadmill Walk; VO_2 max: Maximal Oxygen Consumption

Table 4: Cardiovascular response to 6-minute treadmill walk (n = 150).

Variable	Pre-6-MTW Mean ± SD	Post-6-MTW Mean ± SD	t - cal.	p-value
SBP (mmHg)	133.9 ± 20.0	127.4 ± 18.6	3.171	0.003*
DBP (mmHg)	83.7 ± 11.3	82.3 ± 9.32	1.132	0.263
HR (beat/min)	94.9 ± 16.4	71.5 ± 13.17	8.633	0.001*
RPP (× 10^3)	12.7 ± 2.9	9.1 ± 1.9	8.566	0.001*

*p < 0.05; 6-MTW: 6-Minute Treadmill Walk; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; HR: Heart Rate; RPP: Rate Pressure Product

Table 5: Pre and post cardiovascular response to 6-minute treadmill walk between male and female participants.

Variable	Male (n = 54)		Female (n = 96)		F - ratio	p-value
	Pre-6-MTW Mean ± SD	Post-6-MTW Mean ± SD	Pre-6-MTW Mean ± SD	Post-6-MTW Mean ± SD		
SBP (mmHg)	128.0 ± 17.9	128.6 ± 19.2	127.1 ± 19.2	130.9 ± 20.2	1.642	0.185
DBP (mmHg)	81.8 ± 10.6	81.9 ± 12.8	82.6 ± 8.7	84.8 ± 10.4	0.483	0.695
HR (beat/min)	77.6 ± 9.1^a	96.9 ± 17.7^b	68.1 ± 14.0^c	93.8 ± 15.9^d	23.168	0.001*
RPP (× 10^3)	9.9 ± 1.9^a	26.2 ± 6.1^b	8.6 ± 1.9^c	13.9 ± 3.2^d	18.837	0.001*

*p < 0.05; 6-MTW: 6-Minute Treadmill Walk; SBP: Systolic blood pressure; DBP: Diastolic Blood Pressure; HR: Heart Rate; RPP: Rate Pressure Product; Superscripts ($^{a, b, c, d}$) for a particular variable, mode means with different superscript are significantly different (p < 0.05); Mode means with same superscripts are not significantly (p > 0.05) different when only one contrast is significant, one of the cell means has no superscript attached. The pair of cell means that is significant has different superscripts.

and body mass index (BMI). This is contrary to the findings of Satipati, et al. [24] who reported that age and BMI had direct relationship with VO_2 max among young sedentary subjects. The plausible explanation for the difference might due to the type of study participants in our study compared to previous study.

Table 6: Correlation between self-reported activity, submaximal walk test and selected anthropometric variables.

	Self-reported Activity DASI		Sub-maximal Walk Test 6-MTW	
Variable	**r**	**p**	**r**	**p**
Age (year)	-0.39	0.006*	-0.38	0.005*
BMI (Kg/m^2)	-0.35	0.012*	-0.29	0.043*
DASI	1.00	0.001**	0.58	0.001**
6-MTW (m)	0.58	0.001**	1.00	0.001**
VO_2 max mL/kg/min	0.58	0.001**	0.58	0.001**

*Correlation is significant at p < 0.05 level (2-tailed); **Correlation is significant at p < 0.001 level (2-tailed); BMI: Body Mass Index, DASI: Duke Activity Status Index, 6-MTW: 6-Minute Treadmill Walk

Our participants were middle aged patients with hypertension who were slightly overweight and obese. There is growing evidence that age and high BMI have direct relationship with etiological development of hypertension [25]. Similarly, hypertension has been reported to be linked with reduction in VO_2 max due to epithelial dysfunction. More importantly, most patients with hypertension usually engage in sedentary lifestyle and low physical fitness level with poor exercise tolerance. All these factors might be responsible for inverse relationship between VO_2 max, age and BMI.

Findings from our study showed that there was no gender difference in the functional capacity between male and female participants as estimated by DASI. This is similar to the findings of a previous study reporting no gender difference in functional capacity between male and female subjects [17]. The reason why there was no gender difference might due to low activity of daily living involved DASI's assessment of VO_2 max. However, we observed a significant difference during a six-minute treadmill walk (6-MTW) test between male and female. Although, 6-MTW is a submaximal walk test, differences in body weight and BMI between male and female could account for significant higher VO_2 max in male. During the 6-MTW, findings from our study showed that there were significant differences in the pre and post exercise heart rate (HR), systolic blood pressure (SBP), and rate pressure product (RPP) among participants. This finding is in support of a previous study by Pescatello, et al. [26] who investigated the short-term effect of dynamic exercise on arterial blood pressure and concluded that dynamic exercise temporarily induces elevation of HR, SBP and RPP. Thereafter, a significant reduction in the cardiovascular parameters ensued during recovery stage. Furthermore, Nicholas, [27] also reported that the HR increases at onset of exercise training rapidly which was associated with normal cardiovascular functioning which has been identified as a powerful predictor of patient's prognosis during exercise rehabilitation. However, comparison of male and female participants' response to 6-MTW showed that there was no significant difference in the SBP and DBP. This is in agreement with findings of some previous study that gender has no significant effect on response to dynamic exercise as both genders respond the same way to exercise regimen [28]. It has been observed that the integrated efforts and health of the pulmonary, cardiovascular, and skeletal muscle systems dictates an individual functional capacity [29].

The result of this study showed a statistically significant correlation between estimated DASI's VO_2 max and that of 6-MTW. This is in agreement with a previous report that DASI is capable of measuring VO_2 max accurately [30]. Hiltalky, [17] also reported that the DASI is a valid measure of VO_2 max and estimates VO_2 max based on individual ability to perform variety of common activities. In addition, Phillips, et al. [30] examined the clinical role of the DASI in selection of the optimal type of stress myocardial perfusion imaging study in patients with known or suspected ischemic heart disease. They concluded that the DASI was a useful pre-test tool to determine patients' ability to achieve appropriate metabolic equivalents (METs) and have the potential to guide selection of exercise treadmill versus pharmacological stress and ultimately improved laboratory efficiency. Previously, Alonso, et al. [31] had examined the reliability, validity and responsiveness to clinical change of the DASI in patients with cardiac challenges. They concluded that the DASI is reliable, valid and responsive to clinical changes in patients with chronic coronary disease. Furthermore, Leslee, et al. [32] reported the prognostic value of estimated functional capacity using the DASI's assessment among women with suspected myocardial ischemia. The finding showed that functional impairment estimated by the DASI correlated with indeterminate exercise test results associated with an adverse prognosis. Hence, functional capacity reflects the ability to perform activities of daily living that require sustained aerobic metabolism and oxygen utilization in different disease pathologies. It is noteworthy that easy and rapid application of DASI in the assessment of functional capacity is of clinical importance in busy clinical schedules in many hospitals especially in low and middle income countries. Findings from this study may help to limit problems with

laboratory facilities and inadequate experts in the assessment of functional capacity in many patients with cardiac challenges.

Conclusions

In conclusion, the estimated functional capacity assessed by self-reported activity; the Duke Activity Status Index demonstrated significant positive correlation with submaximal walk test in patients with hypertension. Therefore, DASI may be an easy tool for assessing functional capacity of patients with comorbidities that limits walking ability or for quick assessment of functional capacity during busy clinical schedule among patients with hypertension.

Limitations

There are limitations in our study and findings from this study should be interpreted with caution. First, this study was a cross-sectional survey and causal inference cannot be made, thus limiting its generalizability to other patients with hypertension. Also, participants in our study were patients with mild to moderate hypertension who were placed on different anti-hypertensive medications and perhaps might affect the outcome of this study. Furthermore, patients with severe hypertension might not present with similar results due to severity of the condition. More importantly, the overall physical activity level of these patients was not assessed prior to this study; hence, level of physical fitness may differ from one patient to the other. However, despite these limitations, comparison of our DASI VO_2 max results with that of submaximal walk test showed significant correlation.

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Disclosure of Interests

The authors have no competing interests to declare.

Ethics

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