ORIGINAL ARTICLE

COMPARATIVE INFLUENCE OF SELF-EFFICACY, SOCIAL SUPPORT AND PERCEIVED BARRIERS ON LOW PHYSICAL ACTIVITY DEVELOPMENT IN PATIENTS WITH TYPE 2 DIABETES, HYPERTENSION OR STROKE

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ABSTRACT

BACKGROUND: Type 2 Diabetes, hypertension and stroke are strongly linked, and patients with any of these disorders are usually advised to be physically active based on existing evidence. However, different psychosocial constructs are found in separate settings to influence the physical activity levels of these different groups of patients. Hence, there is a need to establish the most important of the constructs to influence low physical activity in these groups of patients from Nigeria.

METHODS: This cross-sectional study included 509 participants aged 35-80 years from randomly selected health facilities in South-western Nigeria. Physical activity level, self-efficacy, social support and perceived barriers of the participants were assessed using the International Physical Activity Questionnaire, Exercise Self-Efficacy Scale, Medical Outcomes Social Support Scale and Exercise Benefits and Barrier Scale, respectively.

RESULTS: The odds of having low physical activity was highest in those with low social support for Type 2 Diabetes (OR=3.95, 95% CI=3.13-5.24), stroke (OR=2.72, 95% CI=1.98-3.91) and mixed disorders (OR=1.59, 95% CI=1.19-3.15) while high perceived barriers was associated with the highest odds (OR=1.79, 95% CI=1.23-2.87) for low physical activity in hypertensive participants.

CONCLUSIONS: Low social support had the highest influence in establishing low physical activity in patients with Type 2 Diabetes, stroke and those with mixed disorders and the amount of influence was highest in those with Type 2 Diabetes. Psychosocial constructs should be considered by giving priority to social support when prescribing physical activity especially for patients with Type 2 Diabetes, stroke and those with mixed disorders.

KEYWORDS: Physical activity, diabetes, stroke, hypertension, psychosocial influences

INTRODUCTION

Four modifiable health risk behaviours including lack of physical activity, poor nutrition, tobacco use, and excessive alcohol consumption are responsible for much of the illness, suffering, and early death related to chronic diseases (1). While physical activity has been described as below recommended levels in patients with type 2 diabetes (T2D) and stroke (2-4), specific evidence on estimated levels of physical activity in hypertensive patients are not readily available. However, previous study reported that regular physical activity is recommended as a non-pharmacologic means in preventing left ventricular hypertrophy (5). The physical activity level of patients with chronic illnesses may be determined by a lot of factors depending on the circumstances in which the patient exists. Research suggests that the factors included in the Bandura's

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Social Cognitive Theory (SCT) account for much of the variance in a variety of health behaviors of individuals, including physical activity (6). The SCT provides a framework that simultaneously addresses self-efficacy, social support, perceived barriers, outcome expectancies and self-regulatory behaviors (7).

This study considered three selected psychosocial constructs of the SCT (self-efficacy, social support and perceived barriers) and three selected chronic illnesses namely T2D, hypertension and stroke because the conditions are closely related. For these conditions, evidence abounds on how physical activity is related with each of exercise self-efficacy (8-10), social support (11-13) and perceived barriers (3, 11, 14). We however observed that previous researches on these psychosocial issues and physical activity among patients with the selected chronic disorders were yet to provide an answer to an important research question - what is the most important psychosocial influence in the development of low physical activity in individuals with any one or combination of these selected chronic disorders? This is important in view of the fact that the psychosocial disorders may manifest simultaneously in a patient. It is anticipated that understanding of the most important psychosocial construct in making any of the group of patients physically inactive will be a long way in proffering solution when critical decision on intervention has to be prioritized.

PARTICIPANTS AND METHODS

Participants in this study were a convenience sample of patients with selected chronic illnesses managed either exclusively for T2D, hypertension or stroke in the past six months or as a combination of any two or three of these disorders. They were recruited consecutively from two randomly selected tertiary health facilities (University College Hospital, Ibadan, Oyo State, and University Teaching Hospital, Ado-Ekiti, Ekiti-State) and two randomly selected secondary health facilities (General Hospital, Ikere-Ekiti, Ekiti-State and Ring Road State Hospital, Ibadan, Oyo State) from South-West, Nigeria between February 2011 and May 2011. Participants were recruited from the Diabetic, Hypertension, Neurology, Medical Outpatients and Physiotherapy Clinics of these hospitals. All consenting patients seen within the data collection period participated in the study. Inclusion criteria included being managed for either one or a combination of any of T2D, hypertension or stroke, not presenting with additional disabling conditions such as blindness and amputations and willingness to fill the informed consent forms.

This study was a cross-sectional survey of patients managed in the selected hospitals for T2D, hypertension, stroke or a combination of any of these disorders. Ethical approval was sought and obtained from the University of Ibadan /University College Hospital Research Ethics Committee (UI/EC/10/0175). The aims and procedure of the study were explained to prospective participants before they were eventually registered. Thereafter, a written informed consent was obtained from each participant prior to their involvement in the study.

Four instruments were used for data collection. They were the International Physical Activity Questionnaire (IPAQ); Exercise Self-Efficacy Scale (ESES); Medical Outcome Study Social Support Questionnaire (MOSSSQ) and Exercise Benefits and Barrier Scale (EBBS). Because the study was conducted in the Yoruba-speaking part of Nigeria, the questionnaires were translated into Yoruba language and back-translated by a team of experts from the Department of Yoruba language, University of Ibadan. Nigeria. This was undertaken to minimise exclusion of prospective participants on the basis of language. The English versions of the questionnaires were first pre-tested in the study area before the translation which was undertaken after noting that there were no difficult areas in the questionnaires. Afterwards, a test-retest reliability of these questionnaires was done by the researchers prior to the use for this study. Twenty-five individuals made up of patients from the selected disorders who could read and understand both Yoruba and English languages were recruited for the pre-test and test-retest reliability of the instruments. The English versions of the questionnaires were first administered to the participants. A week later, the Yoruba versions were administered to the same 25 participants. The IPAQ (ICC = 0.86, 95% CI = 0.82 - 0.94), ESES (ICC= 0.90, 95% CI = 0.68 – 0.96), MOSSSQ (ICC = 0.91, 95% CI= 0.86 – 0.94) and EBBS

(ICC = 0.80, 95% CI = 0.70 -0.88) recorded good test-retest reliabilities.

The IPAQ, an internationally developed self-administered questionnaire was used to assess physical activity of the participants. It was administered and scored based on stipulated criteria (15). The ESES developed by Bandura (16) was used to assess the physical activity specific exercise self-efficacy of the participants. The scale is a self-administered questionnaire used as a measure of the confidence in one's ability to persist with exercise in various situations representing the areas of negative affect, resisting relapse, and making time for exercise. The scale asked participants to rate how certain they were that they could exercise for most days of the week in a range of situations that could likely affect their exercise participation. A response scale of 0 to 3 for each question was used with 0 representing "Not at all true" and 3 "Always true".

The amount of social support available to the participants was measured using the MOSSSQ. The scale is a 19-item scale developed by Sherborne and Stewart (17). The instrument consists of four separate social support subscales and an overall functional social support index (17). A higher score for an individual scale or for the overall support index indicates more support. Each item is scored on a 5-point Likert scale and the scores indicate the degree to which the respondent agrees or disagrees with a particular item question (1 = none of the time, 5 = all of the time). The minimum possible score is 19 which indicate low social support and the maximum possible score is 95.

The barrier component of the EBBS developed by Sechrist et al (18) was used to assess the barriers to physical activity of participants. The barrier component of the EBBS which could be used separately as described by the authors consists of 14 items which is rated on a 4-point Likert-type scale. The barrier component comprised 14 barrier items categorized into four subscales: exercise milieu; time expenditure; physical exertion; and family discouragement. The minimum score for the barrier scale is 14 indicating less perceived barriers to physical activity while the maximum score is 56.

Obtained scores for the ESES, and EBBS were divided by total possible score and multiplied by 100 to obtain a percentage score. The MOSSSQ scale scores was transformed to a 0 -100 scale using the following formula: 100 × (observed score – minimum possible score)/ (maximum possible score- minimum possible score) (17). The 25th, 50^{th} and 75^{th} percentiles were used to label transformed-scores into lower, middle and upper quartiles representing "low", "medium" and "high" levels of self-efficacy, social support or perceived barriers respectively. Socio-demographic and clinical data such as age, gender, occupation, level of education, marital status, medical condition and duration of illness since diagnosis were also documented for each participant.

Proportions of percentages were used to present the socio-demographical data of the participants. Chi squared test was used to determine if there were significant associations between physical activity and each of the psychosocial constructs. Regression analysis was used to determine the influence of psychosocial constructs on physical activity level of the participants in the different groups. Level of significance was set at $p < 0.05$ and analysis was conducted using the SPSS for Windows Version 15 (SPSS Inc, Chicago, IL, U.S.A.).

RESULTS

This study was made up of 509 participants who cut across three selected but closely related chronic illnesses. At the end of the data collection period, it turned out that 122 (24.0%) were T2D patients, 212 (41.6%) were hypertensive patients, 104 (20.4%) were stroke patients and 71 (13.9%) were patients who had a combination of two or three of these disorders. Overall, male participants were 269 (52.8%) and participants in the age group of 61 and above had the highest number of participants (33.8%) (Table 1).

Figure 1 displays the levels of physical activity, self-efficacy, social support and perceived barriers presented by all the participants combined. Low physical activity was reported by 63.1% of the participants. Low levels of self-efficacy and social support were reported by 87.2% and 99.8% of the participants respectively while high perceived barriers to physical activity was reported by 88.8% of the entirety of participants. The combined physical activity segment of the participants presented in figure 1 is

extracted and presented in table 2 to have a full description of the group-by-group physical activity level of the participants.

Table 1. Socio-Demographic Characteristics of Respondents (N= 509)

Characteristics	*Number (%)*
Sex	
Male	269 (52.8)
Female	240 (47.2)
Age group (Years)	
31-40	58 (11.4)
41-50	147 (28.9)
51-60	132 (25.9)
61 and above	172 (33.8)
Occupation	
Self employed	125 (24.6)
Civil servant	137 (26.9)
Retiree	112 (22.0)
Unemployed	135 (26.5)
Highest educational level	
None	45 (8.8)
Primary	58 (11.4)
Completed secondary	112 (22.0)
Polytechnic/College of Education	113 (22.2)
University education	181 (35.6)
Marital Status	
Single	30 (5.9)
Married	358 (70.3)
Divorced	27 (5.3)
Widowed	94 (18.5)

Statistical test showed that physical activity level was significantly associated ($p<0.05$) with each of self-efficacy ($p = 0.04$), social support ($p <0.0001$) and perceived barriers ($p = 0.02$). For all the groups, most cases of low levels of physical activity were seen in participants having low self-efficacy, low social support and high perceived barriers. In view of the overwhelming amount of low physical activity level observed in our participants and the fact that this was linked with poor states of the psychosocial constructs, we analysed our data to reveal the influence of each poor psychosocial construct in the development of low physical activity level of the participants based on the groups of selected disorders. To do this, a regression analysis was conducted on the participants who presented with low physical activity levels in all the groups.

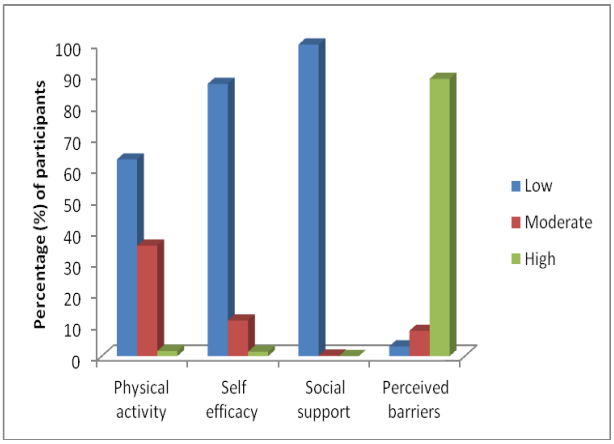

Figure 1: Overall Levels of physical activity, self-efficacy, social support and perceived barriers among the patients with type 2 diabetes, hypertension and stroke (N = 509)

Table 3 presents the amount of influence wielded by each of the poor psychosocial construct in the development of poor physical activity level in each group of participants. Compared with low self-efficacy, low social support increased the risk of having low physical activity in T2D patients by about four times (OR = 3.95, 95% CI = 3.13-5.24) and high perceived barriers increased the risk near double (OR = 1.66, 95% CI = 1.02-2.71). Similarly, low social support had the highest significant influence (OR = 2.72, 95% CI = 1.98-3.91) on the development of low physical activity in patients with stroke followed by high perceived barriers (OR = 2.11, 95% CI = 1.86-3.44). The odds of having low physical activity in hypertensive patients was however highest due to high perceived barriers (OR = 1.79, 95% CI = 1.23-2.87).

DISCUSSION

The common feature among the group of participants (T2D, hypertension, stroke and mixed) in this study was that they were all patients with chronic illnesses. Our observations were: 1) generally, two-thirds of all the patients presented with low physical activity, and almost all of them presented with low self-efficacy for physical exercise, low social support and high perceived

Table 2. Physical Activity Levels in each of the selected Chronic Condition groups

Chronic condition group	***Levels***			***Total***
	Low	**Moderate**	**High**	
Diabetes Only	63 (51.6 %)	55 (45.1 %)	4 (3.3 %)	122 (100%)
Hypertension only	119 (56.1 %)	90 (42.5 %)	3 (1.4 %)	212 (100%)
Stroke only	83 (79.8 %)	21 (20.2 %)	0 (0.0 %)	104 (100%)
Mixed	56 (78.9 %)	14 (19.7 %)	1 (1.4 %)	71 (100%)

Table 3: Odds ratios of psychosocial variables by group of disorders

	Diabetic Patients (Low PA) n = 63 OR (95%CI)	*Hypertensive Patients (Low PA) n = 119 OR (95%CI)*	*Stroke Patients (Low PA) n = 83 OR (95%CI)*	*Mixed Patients (Low PA) n = 56 OR (95%CI)*
Low SE	1	1	1	1
Low SS	*3.95 (3.13-5.24)	0.68 (0.25-1.36)	*2.72 (1.98-3.91)	*1.59 (1.19-3.15)
Low PB	*1.66 (1.02-2.71)	*1.79 (1.23-2.87)	*2.11 (1.86-3.44)	1.24 (0.88-1.61)

PA = Physical activity, SE = Self-efficacy, SS = Social support, PB = Perceived barriers, OR = Odds ratio, CI = Confidence interval, * = Significant

barriers to exercise 2) low physical activity level was associated with each of low self-efficacy, low social support and high perceived barriers 3) of all the three psychosocial constructs, low social support had the highest influence in the development of low physical activity in patients with T2D, stroke and those with mixed disorders but the influence was highest in those with T2D and 4) high perceived barrier was the most important influence factor in the establishment of low physical activity for participants with hypertension.

The reason why most of the participants presented with a low physical activity level could be because the general population from which they were recruited were equally physically inactive. Our participants were largely urban and studies in the African context have shown that urban dwellers were largely of low physical activity levels (19-20). Although our participants were patients, it is expected that they would have some similarity with the general population in terms of physical activity levels. We viewed the poor states of the psychosocial constructs presented by the patients as a possible manifestation of the various unpleasant experiences accumulated by the patients over the period of the disorders. Stroke and diabetic patients have been shown to have low self-efficacy for doing exercise (10, 21) and low social support (11-12, 22-23).

Of all the three psychosocial constructs, it was observed that low social support had the highest influence in the development of low physical activity in patients with T2D, stroke and those with mixed disorders but the risk was highest in those with T2D. Although associations among psychosocial constructs and physical activity indicates that interventions targeting multiple social constructs could increase activity levels of adults (13), observation from this present study suggests that prioritizing social support ahead of self-efficacy and perceived barriers may prevent low physical activity in a typical patient with T2D. The reason why social support was most important in patients with T2D is not clearly known. A previous study provides evidence that social support can have a favourable influence on diabetes-related health behaviours among African Americans with T2D (23) but the study did not consider social support relative to the other psychosocial constructs. For social support to have highest influence in patients with T2D, the observation may imply that the T2D patients had additional social support burden in view of the fact that all the selected chronic disorders could in the same manner lead to disabilities, reduced quality of life and require fairly equal burden of cost to

manage. For instance, T2D patients must employ several complex cognitive and physical tasks to carefully balance their food intake, medications, and physical activity to maintain target glucose levels (24). As overwhelming as this may be (24), compliance is usually strictly and persistently advised. This strict regimen may require patients with T2D to look unto others for companionship, assistance or other types of support thereby increasing their demand for social support.

An important clinical strength of this study is that it has addressed the issue of the most important psychosocial construct involved in the development of low physical activity in each of these conditions, an issue which the few previous studies in this area did not address. This is of major importance because in the clinic, patients are usually observed to be confronted with almost all the psychosocial problems at the same time. This finding will help physical exercise and activity clinicians and educators to understand which problem to be addressed first when handling any of the conditions. This may enhance quick establishment or restoration of physical activity among the patients. Although the clinical relevance of this study has been highlighted, it will be important to note the obvious weaknesses of the study. The study was a cross-sectional survey and data collected through the use of questionnaires. This limits the strength of the inference that can be made from the study while also noting that there may be some recall bias in the response of the participants. Another weakness is that the patients in each of the groups may have additional health problems or some level of minimal overlap of conditions because most of these conditions do not occur in isolation. We however made effort to ensure that any patient managed for additional problem presently or in the last six months during data collection were classified as those with mixed disorders which was the fourth group in this study.

In conclusion, this study shows that physical activity level was generally low in patients with T2D, hypertension, stroke and combination of these disorders. In the same manner, all the patients presented with poor psychosocial constructs and these poor psychosocial constructs were linked with low physical activity levels. Even though the poor psychosocial constructs were associated with low physical activity among all the groups of patients, the main highlight of the study was that low social support had the highest influence on developing low physical activity in patients with T2D, stroke and in those with mixed disorders while perceived barriers was the most important influence in hypertensive patients. We recommend that these psychosocial issues including self-efficacy, social support and perceived barrier be considered closely in general when prescribing physical activity for these conditions, and prioritize social support specifically when dealing with patients with T2D, stroke and those with mixed disorders. For those with hypertension, we recommend prioritizing perceived barriers in order to improve their physical activity level.

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REFERENCES

1. Centre for Disease Control: http://www.cdc.gov/chronicdisease/ Accessed on 14 December, 2011; 5.23 pm.
2. Bernhardt J, Dewey H, Thrift A, Donnan G. Inactive and alone: physical activity within the first 14 days of acute Stroke Unit Care. *Stroke*, 2004; 35: 1005-1009.
3. Thomas N, Alder E, Leese GP. Barriers to physical activity in patients with diabetes. *Postgrad Med J*, 2004; 80: 287-291.
4. Rand D, Eng JJ, Tang P, Jeng J, Hung C. How active are people with stroke? use of accelerometers to assess physical activity. *Stroke*, 2009; 40: 163-168.
5. Palatini P, Visentin P, Dorigatti F. et al. Regular physical activity prevents development of left ventricular hypertrophy in hypertension: HARVEST Study Group. *Eur Heart J*, 2009; 30: 225-232.

6. Resnick B, Palmer MH, Jenkins LS, Spellbring AM. Path analysis of efficacy expectations and exercise behavior in older adults. *J Adv Nurs*, 2000; 31: 1309–1315.
7. Bandura A. Self-efficacy: The efficacy of control. New York: W. H. Freeman & Company. 1997
8. Allen NA. Social Cognitive Theory in Diabetes Exercise Research: An Integrative Literature Review. *Diabetes Educ*, 2004; 30: 805-819.
9. Jørstad EC, Hauer K, Becker C, Lamb SE. Measuring the psychological outcomes of falling: a systematic review. *J Am Geriatr*, Soc 2005; 53: 501–510.
10. Noroozi A, Ghofranipour F, Heydarnia AR, Nabipour I, Tahmasebi R, Tavafian SS. The Iranian version of the exercise self-efficacy scale (ESES): Factor structure, internal consistency and construct validity. *Health Educ J*, 2011; 70: 21–31.
11. Gordon NF, Gulanick M, Costa F. *et al*. Physical activity and exercise recommendations for stroke survivors: An American Heart Association Scientific Statement from the Council on Clinical Cardiology, Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention; the Council on Cardiovascular Nursing; the Council on Nutrition, Physical Activity, and Metabolism; and the Stroke Council. *Stroke*, 2004; 35: 1230-1240.
12. Gleeson-Kreig J. Social support and physical activity in type 2 diabetes: A social-ecologic approach. *Diabetes Educ*, 2008; 34: 1037-1044.
13. Ayotte BJ, Margrett JA, Hicks-Patrick J. Physical activity in middle-aged and young-old adults: the roles of self-efficacy, barriers, outcome expectancies, self-regulatory behaviours and social Support. *J Health Psychol*, 2010; 15: 173–185.
14. Brazeau A, Rabasa-lhoret R, strychar I, mircescu H. Barriers to physical activity among patients with type 1 diabetes. *Diabetes Care*, 2008; 31: 2108–2109.
15. International Physical Activity Questionnaire. http://www.ipaq.ki.se/. Accessed on 6 October, 2011; 11.30 a.m.
16. Bandura A. Guide for constructing self-efficacy scales. In: Pajares, F., Urdan, T. (Eds.), Self-efficacy Beliefs of Adolescents. *Information Age Publishing, Greenwich, CT*, 2006; 307–337.
17. Sherbourne CD, Stewart AL. The Medical Outcomes Survey Social Support Survey. *Soc Sci Med*, 1991; 32: 705-714.
18. Sechrist KR, Walker SN, Pender NJ. Development and psychometric evaluation of the Exercise Benefits/Barriers Scale. *Res Nurs Health*,1987; 10: 357-365.
19. Sobngwi E, Mbanya JCN, Unwin NC. et al. Physical activity and its relationship with obesity, hypertension and diabetes in urban and rural Cameroon. *Int J Obes*, 2002; 26: 1009-1016.
20. Assah FK, Ekelund U, Brage S, Mbanya JC, Wareham NJ. Urbanization, physical activity, and metabolic health in sub-Saharan Africa. *Diabetes Care*, 2011; 34: 491-496.
21. Pang MYC, Eng JJ, Miller WC. Determinants of satisfaction with community reintegration in older adults with chronic stroke: role of balance self-efficacy. *Phys Ther*, 2007; 87: 282–291.
22. Kim C, McEwen LN, Kieffer EC, Herman WH, Piette JD. Self-Efficacy, Social Support, and Associations with Physical Activity and Body Mass Index among Women with Histories of Gestational Diabetes Mellitus. *Diabetes Educ*, 2008; 34: 719-728.
23. Tang TS, Brown MB, Funnell MM, Anderson RM. Social Support, Quality of Life, and Self-Care Behaviours Among African Americans With Type 2 Diabetes. *Diabetes Educ*, 2008; 34: 266-276.
24. Parkin CG, Hinnen DA, Tetrick DL. Effective use of structured self-management of blood glucose in type 2 diabetes: lessons from the STeP Study. *Clin Diabetes*, 2011; 29: 131-138.