

Analysis of Psychometric Properties of Gujarati and Hindi Version of International Physical Activity Questionnaire- Long form in Indian Kidney Transplant Recipients

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Abstract

Background: Systematic data on physical activity level in Indian kidney transplanted patients are limited. Physical activity is considered an essential part of healthy life style for all population including kidney transplant recipients. The International Physical Activity Questionnaires (IPAQ) is internationally accepted self-reported screening tool for assessment of physical activity. However, till date Gujarati and Hindi version of IPAQ is not validated for Indian kidney transplant recipients.

Aim: To validate the Gujarati and Hindi translated version of IPAQ long form in Indian kidney transplant recipients. **Method:** Original English version of IPAQ-long form was translated in Gujarati and Hindi language and evaluated for face, construct, concurrent validity and test retest reliability among Gujarati and Hindi transplant recipients.

Result: 4 questions out of 27 were modified with 80% consensus of panelist to achieve face validity of both version of questionnaire. Total physical activity score of Gujarati ($r=0.83$) and Hindi ($r=0.72$) version were positively correlated with 6MWD in male transplant patients suggesting accepted construct validity. There was high positive correlation noted between all component of English, Gujarati and Hindi version ($r>0.8$, $p<0.05$) having good concurrent validity and acceptable test retest reliability.

Conclusion: The modified Gujarati and Hindi version of IPAQ long form showed acceptable validity and reliability for the assessment of physical activity among kidney transplant recipients.

Keywords: International physical activity questionnaire, Kidney transplantation, Psychometric properties.

Introduction

Kidney transplantation is the best line of treatment for patients suffering from irreversible kidney disease in term of functionality and outcome.¹ Kidney transplant

recipients(KTR) has to take lifelong immunosuppressive therapy which may be associated with secondary development of metabolic syndrome and cardiovascular morbidity.² KDIGO guideline for the care of kidney transplant recipients suggest a healthy life style, with exercise, proper diet and weight reduction.³ The KDOQI guidelines for patients with kidney diseases recommended at least 30 minutes of moderate intensity physical activity five times per week (corresponding to a minimum range from 450 to 750 MET-minutes per week).⁴ Same guideline are endorsed by American college of sports medicine.⁵ Despite a consensus among nephrologists that PA is important for patients, PA advice is not a part of the routine management of KTR.

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Systematic data on physical activity level in Indian renal transplanted patients is scarce.

Accurate assessment of PA is helpful in determining the relationship between inactivity and development of secondary diseases after transplant and derive the rehabilitation protocol. The most common method to evaluate the PA are based on self-reported questionnaires which are easy to use and inexpensive in contrast to objective measure like accelerometers, but it has to be validated for cross cultural adaptation for specific population.⁶

The International Physical Activity Questionnaire (IPAQ) long form⁷ is comprised of total 27 questions involve a 7-day recall for the assessment of the frequency and duration of sitting, walking, moderate-intensity and vigorous-intensity physical activity across the domains of work-related activities, domestic and yard activities, transportation activities and leisure-time activities. Energy expenditure is expressed as Metabolic equivalents of task -minutes/week (MET-minutes/week) by computing the domain specific or intensity specific sub-scores. Sedentary behaviour is also evaluated indirectly by calculating time spend during sitting. Whether or not the study population meet the recommended physical activity guideline is assessed by categorical score in the form of low, moderate and high.⁸

Muras-Szwedziak K et al evaluated of the physical activity and sedentary time in 25 stable Kidney Transplant Recipients using IPAQ to find the effect of the structured Physical Activity Program on bio-markers of kidney disease.⁹ Yanishi Met al evaluated sarcopenia and PA in 58 kidney transplantation recipients found IPAQ useful tool.¹⁰ IPAQ has been validated in hemodialysis patients in China.¹¹ Rathod S. have evaluated validity for Gujarati version of IPAQ in 10 healthy individuals¹² Current study is the part of in-depth study of assessment role of physiotherapy intervention on functional capacity among kidney transplant recipients. Evaluation of psychometric properties of translated version of IPAQ in form of validity and reliability should be done prior to utilize it in larger Indian kidney transplant population.

Ethics approval and consent to participate:

This study was approved by the IKDRC-ITS Ethical committee. Permission for translation of questionnaire was taken from original author. Written informed consent were taken from all participants.

Setting and Design: This is the single center cross

sectional study. Inclusion criteria were Gujarati and Hindi speaking kidney transplant recipients from various states of India having stable graft function (eGFR > 60ml/min/1.72m²) and more than six month of post-transplant duration. Exclusion criteria were hemoglobin level ≤ 9 gm/dL, history of hospital admission within 6-month, post-operative complication, hernia, clinical evidence of cardio respiratory or neuromuscular disorder.

Method

According to guideline provided by the IPAQ committee original English version of IPAQ-long form was translated in Gujarati and Hindi language by dual language experts, synthesized and back translated. Each item was analyzed for its relevancy of content, measurability, specificity and practicability by two nephrologist, one transplant coordinator, one physiotherapist and two transplant recipients in Likert's four-point scale to evaluate face validity. Open questions were also asked regarding opinion on each question. This process was repeated until all reach to 80% consensus for all items.

KTR with mother tongue either Gujarati or Hindi were enrolled. Demographics variables like age, gender, height, weight, waist circumference was noted. Socio-economical classification was done on bases of modified kuppuswamy socioeconomic scale.¹³ Duration on dialysis before transplant (dialysis vintage), duration after kidney transplant, type of transplant, serum creatinine level and hemoglobin level were noted down. As the physical functional capacity is surrogate measure of level of physical activity; the six-minute walk test, body mass index and waist circumference were calculated in all subjects to find out construct validity of IPAQ-G and IPAQ-H. For assessment of concurrent validity; subjects expert in dual language e.g. English as well as Gujarati and English as well as Hindi were given both questionnaires randomly at four-hour distance. Subjects were called after 4 weeks to fill the same Questionnaire for evaluation of test retest reliability.

Analysis: According to data processing and scoring guideline provided by IPAQ committee; moderate PA and vigorous PA time variables below 10 minutes were scored as 0 min. Days of activity per week were multiplied by time to calculate weekly minutes of each intensity. Domain specific score for work, Active transport, Domestic and garden as well as Leisure time; Intensity specific score for walking, Moderate and vigorous intensity were evaluated as per guideline.

Total PA score was calculated in METmin/week and expressed in form of median and inter quartile range. Categorical scoring for low, moderate or high volume was evaluated to compare with current health guideline for physical activity.⁴

Statistical analysis was performed using SPSS version 20. Confidence interval of 95% was kept with a p value <0.05. Descriptive data were computed as mean and standard deviation. As the data was non-parametric; Spearman’s correlation co-efficient was used for evaluation of validity. Test retest was computed using appropriate reliability statistics.

Result

In the original questionnaire the word ‘after your transplantation’ was added in all 5 domain of physical activity. Out of total original 27 questions 23 were accepted without modification. 4 questions were accepted with modification for both version. Most common mode of transportation in India is two-wheeler, car and public transport so in question number 8 and 9 the word scooter, bike or other public transport were used instead of tram. Inquestion number 14 the word snow shoveling was omitted as an activity. In question number 24 instead of double tennis; cricket,badminton,other light sports were replaced.

Table 1: General characteristic of Gujarati and Hindi kidney transplant recipients.

Subjects	Kidney transplant recipients (n= 102)			
	Gujarati		Hindi	
Language spoken				
Gender (n)	Male (47) (Mean±SD)	Female (13) (Mean±SD)	Male (31) (Mean±SD)	Female (11) (Mean±SD)
Age in years	38.9±10.5	34.4±8.2	42.4±11.2	38.2±11.0
Height (cm)	167.5±4.9	165.9±4.1	164.7±5.2	166.4±3.5
Weight (Kg)	68.6±6.8	65.9±4.2	70.2±8.1	69.3±7.8
Socio- economic class (Upper, Middle,Lower)	(1,37,9)	(1,9,4)	(1,28,2)	(1,10,0)
Dialysis Vintage (months)	14.7±9.5	14.1±6.7	12.9±6.5	16.2±6.7
Post-transplant duration (months)	34.4±24.8	20.2±14.5	21.0±9.5	22.4±9.7
Type of transplant (LRKT, DDKT, LURKT)	32, 12,3	10,3,0	27,3,1	10,1,0

LRKT: live related kidney transplant, DDKT: diseased donor kidney transplant, LURKT: live unrelated kidney transplant.

Table 2: Clinical characteristic of Gujarati and Hindi kidney transplant recipients.

Subjects	Kidney transplant recipients (n= 102)			
	Gujarati		Hindi	
Language spoken				
Gender(n)	Male (47) (Mean±SD)	Female (13) (Mean±SD)	Male (31) (Mean±SD)	Female (11) (Mean±SD)
Serum Creatinine (mg/dL)	1.2±0.2	1.07±0.3	1.1±0.4	1.1±0.3
Hb (mg/dL)	11.1±0.6	9.8±1.5	10.8±0.8	9.7±1.9
BMI (Kg/m ²)	24.4±2.3	24.0±1.9	25.9±2.9	25.0±2.6
Waist circumference (inches)	36.6±2.3	36.3±1.4	38.2±2.7	37.6±1.7
RBP mmHg (Systolic/Diastolic)	131±10/80±10	120±10/80±0.5	137.2±12.4/83±11.9	127.5±82.5±4.7
RPR (ppm)	87.3±9.4	77.9±13.04	83.82±13.93	76.7±12.3
6MWD (meters)	418.4±80.5	415.3±90.7	347.2±79.7	380.9±75.4

BMI: Body Mass Index, RBP: Resting blood pressure, RPR: Resting pulse rate, 6MWD: six-minute walk distance.

Out of total 102 KTR; 60(47M; 13F) were Gujarati and 42(31M; 11F) were Hindi speaking. Their general and clinical characteristic are described in Table 1 and Table 2 respectively. As shown in Table 3; there was positive correlation with spearman's correlation coefficient in the range of 0.6 to 0.8 noted between the total physical activity and 6MWD in both version of IPAQ. There was moderate negative correlation noted with BMI and waist circumference. Average sitting time was positively correlated with waist circumference and negative with 6MWD. 14 Gujarati subjects and 10 Hindi subjects had proficiency in English. There was strong positive correlation (Spearman's correlation $r=0.9$) except for

moderate physical activity ($r=0.79$) was noted as shown in Table 4. Graph I and Graph II showing the scattered plot diagram of correlation of result of TPA in Gujarati and Hindi version with original English version. 30 Gujarati and 26 Hindi transplant recipients appeared for retest after 4 weeks. There was good recall analyzed in both version. Detail results are shown in table 5. Out of total 102 participants 31% males and 25% female were in obese category of BMI.¹⁴ Abdominal circumference was high in 45% males and in 22% females.¹⁵ Fewer than 50% participants were following the international KDOQI guidelines for kidney patients⁵.

Table 3: Analysis of construct validity

Spearman's correlation *($p<0.01$)		IPAQ-G		IPAQ-H	
		M(n=47)	F(n=13)	M(n=31)	F(n=11)
TPA	6MWD	0.83*	0.84	0.72*	0.66
	BMI	-0.19	-0.45	-0.60	-0.41
	WC	-0.49	-0.43	-0.21	-0.45
Avg. Sitting	6MWD	-0.68	-0.67	-0.59	-0.65
	BMI	0.18	0.17	0.28	0.05
	WC	0.55	0.59*	0.42	0.48

TPA: Total physical activity, Avg. Sitting: Average sitting hour, 6MWD: six-minute walk distance, BMI: Body Mass Index, WC: Waist circumference.

Table 4: Analysis of Concurrent validity

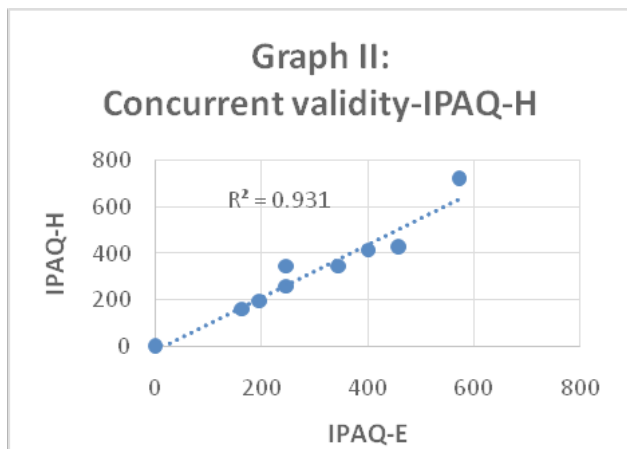
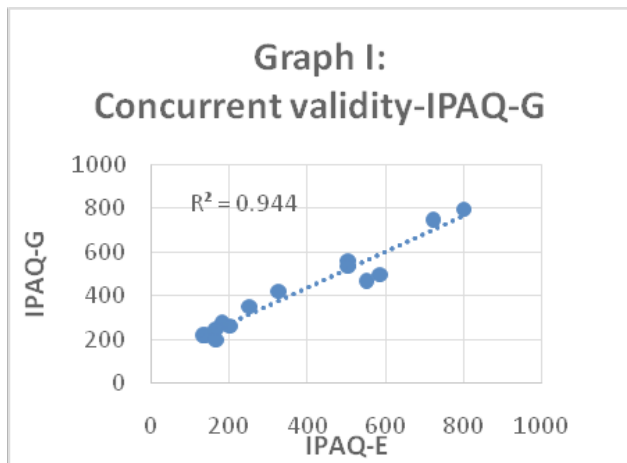
Components of PA	IPAQ-G and IPAQ-E n=14 (10M/4F)	IPAQ-H and IPAQ-E n=10 (7M/3F)
Spearman's correlation ($p<0.01$)	$r=$	$r=$
Working	0.91	0.95
Active Transport	0.97	1.00
Domestic/Yard	0.99	1.00
Leisure time	0.99	0.97
Walking	0.96	0.98
Moderate Intensity	0.79	0.89
Vigorous Intensity	1.00	1.00
TPA	0.94	0.96
Average sitting	0.90	0.92

TPA: Total physical activity, IPAQ-G: International physical activity questionnaire Gujarati version, IPAQ-E: International physical activity questionnaire English version, IPAQ-H: International physical activity questionnaire Hindi version.

Table 5: Analysis of Test-Retest reliability

Components of PA	IPAQ-G n=30	IPAQ-H n=26
Test-retest reliability (p<0.05)	At Week 0 and Week 4	At Week 0 and Week 4
Working	0.99	0.97
Active Transport	0.97	0.91
Domestic/Yard	0.89	0.83
Leisure time	0.98	0.99
Walking	0.98	0.97
Moderate Intensity	0.71	0.81
Vigorous Intensity	1.00	1.00
TPA	0.89	0.89
Average sitting	0.93	0.85

IPAQ-G: International physical activity questionnaire Gujarati version, IPAQ-H: International physical activity questionnaire Hindi version.



Discussion

This study was performed with the objective to translate and analyses the psychometric properties of Gujarati and Hindi modified version of International physical activity in post kidney transplant recipients. Face validity was achieved with more than 80%

consensus of panel lists by modification in 4 questions out of original 27 questions.

We found the negative correlation of total physical activity with BMI and waist circumference where as positive correlation with 6MWD can be justified by study done by Heather J. MacKinnon et al¹⁶ and Zelle DM¹⁷ suggesting good construct validity. Result of 6MWD are consistent with the similar study done by S. Anwar.¹⁸ Kumar TGS et al found a positive correlation between the physical activity and physical health domains of quality of life in Indian KTR.¹⁹ The result of 6MWD were low as compared with the western KTR population studies but the variability may be demographic, anthropometric and Disease specific attributes.²⁰ Chan. W. Bosch JA et al discussed the obesity related mechanism in kidney transplant.²¹ Sedentary behavior is major confounder after transplant for the development of abdominal obesity. Our results are consistent with the results got by ECH van den Ham et al²²

There was positive correlation noted in Gujarati and Hindi version with original English version having spearman’s correlation coefficient more than 0.9 in almost all components except for moderate intensity activities (r=0.79 for IPAQ-G, r=0.89 for IPAQ-H). There was minimal recall bias found in present study except for moderate activity (r=0.71 for IPAQ-G, r=0.81 for IPAQ-H). This change may be attributed to wide variation in moderate intensity activities carried out at work, home and leisure time and accumulated throughout the day.²³

TPA was low in this study group. Socio-environmental factors, co-morbidities, lack of motivation, fear of graft rejection are the main barriers for PA in solid organ transplantation as discussed by Edwin j. Van Adrichem et al.²⁴ Study done by same author in 2018 in 656 solid organ transplant recipients found similar result as more than 60% of subjects did not fulfilled the PA guideline.²⁵

Conclusion

International physical activity questionnaire in Gujarati and Hindi version can be accepted for Indian kidney transplant recipients. Physical activity and physical function are low in study population. Sedentary behavior is highly prevalent in this population attribute to high risk for abdominal obesity.

Recommendation: The awareness of transplantation

rehabilitation is new in India. Transplant healthcare provider should encourage and educate the transplant recipients for more active lifestyle and barrier to physical inactivity should be short out.

Limitation: Criterion validity was not analyzed.

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Conflict of Interest: None

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