Original Article in Health Behaviour

Explaining physical activity behavior among university students in Fiji Islands using the multi-theory model of health behavior change: A cross-sectional study

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Abstract

Introduction: The Fiji Non–Communicable Disease National Strategic Plan embraces physical activity (PA) as an important component of its strategic directions. Therefore, it is critical to assess the correlates of PA behavior with the help of a robust theoretical framework. This study aims to examine the testing of the fourth-generation multi-theory model (MTM) of health behavior change in predicting the initiation and sustenance of PA behavior among university students in Fiji.

Methods: This cross-sectional study was conducted from 29 July 2021 to 1 September 2021 using a non-probability sample of 334 students enrolled at a Fiji national university. A 40-item MTM-based psychometric valid tool was utilized to collect the data. Data were analyzed using Pearson correlation, independent samples/Welch t-tests, and hierarchical multiple regression.

Results: Of 334 participants, 15.6% reported not being engaged in any sort of PA. The sample was predominately females (65.9%), undergraduates (93.7%), and Indo-Fijians (68.0%). The physically active participants had higher mean scores of "perceived advantages," "behavioral confidence, "changes in the physical environment," "emotional transformation," "practice for change," and "changes in a social environment," as opposed to their physically inactive counterparts. Gender, age, race/ethnicity and MTM constructs significantly predicted initiation (R^2 = .525, F (5, 46) = 8.293, p<0.001; adjusted R^2 = .462) and sustenance (R^2 = 0.460, F (6, 46) = 6.391, p<0.001; adjusted R^2 = 0.388).

Discussion: This study demonstrates the importance of developing PA promotion strategies for university students in Fiji. MTM can play a role in delineating such strategies through the implementation of educational and promotional interventions. Motivational interviewing along with structural development, including improvement of the facilities of running track, gym, swimming pool, etc. is required to influence changes in the physical environment.

INTRODUCTION

Physical inactivity is now identified as the fourth leading risk factor for global mortality [1]. Physical inactivity levels are rising in many countries with major implications for the prevalence of non-communicable diseases (NCDs) and the general health of the population worldwide. In 2018, the World Health Assembly (WHA) approved a new Global Action Plan on Physical Activity (GAPPA) 2018–2030 and adopted a new voluntary global target to reduce levels of physical inactivity in adults and adolescents by 15% by 2030 [2]. The most recent global estimates indicated that one in four (27.5%) adults and over 80% of adolescents do not meet the recommendations for aerobic exercise, as outlined in the 2010 global recommendations on Physical Activity (PA) for health [3].

Changes in lifestyles and the developing of healthy behaviors, such as regular PA behavior are essential to preventing non-communicable diseases. The World Health Organization (WHO) member nations were encouraged to develop PA action plans and policies to increase PA levels in their populations. In the Pacific Island region, Fiji lacks a national PA guideline specifically for adolescents. However, the national guidelines adopted from the "Pacific Physical Activity Guidelines for Adults" urge people to 'Move for Health' every day, especially for those living a more sedentary lifestyle or who are inactive.

According to the 2017 population and housing census, Fiji has a population of 884,887 people with a median age of the population of 27.5 years. The age groups 15-19 years and 20-24 years account for 16.7% of the population [4]. The Fiji STEP Survey (2011) reported that there has been a major increase in levels of overweight and obesity in Fiji with a higher proportion among females (42.0%) than men (22.4%). Among race/ethnic groups, i-Taukei were significantly more likely to be obese than Indo-Fijians [5]. According to the Fiji National Nutrition Survey Draft Report (2019), about 8.1 percent of children aged 15 and 17 years were overweight [6]. A recent report by the World Bank states that obesity-related diseases are now among the leading causes of mortality at a global level [7]. Due to the well-documented high prevalence of NCDs in the Pacific Islands, researchers are endeavoring to establish the levels of PA in children's daily lives to determine whether this is a potential target for preventive intervention [8]. The Fiji Non–Communicable Disease National Strategic Plan embraces PA as an important component of its strategic directions. The plan proposes strategic interventions in policy environments that enable a physically active environment in Fiji. It also suggests population-based interventions, providing advocacy on the Fiji PA Guidelines, and having systematic monitoring and evaluation processes [9].

It is important to understand the factors that influence PA during the college/university years, a time of transition to lifelong behavior. College students have reasons for participating or deterrence at an individual level (e.g., perceived advantages, perceived hurdles, enjoyment), at psychosocial levels (e.g., social conjunction, modeling, self-efficacy), and at environmental levels reasons. (e.g., availability and reach) indicated PA participation [10–13]. To promote PA behavior, there is a need to develop PA promotion interventions among university students.

At least, people being physically active are averting 3.9 million early deaths worldwide every year [14]. Many scientific studies results indicate that most of the youth globally are not meeting current PA recommendations proposed by the WHO. In an analysis of data from 146 countries, and 1.6 million participants aged 11-17 years, Guthold et al. [15] found that 81% were insufficiently active.

According to the Ministry of Health, Fiji NCDs are responsible for nearly 80% of deaths in Fiji, and this burden is continuously rising. With 188 deaths per 100,000 people, Fiji has the diabetes death toll among all other countries in 2018 [16]. Aging, improper eating, a lack of PA, high blood pressure, and high blood sugar, which are getting worse because of high cholesterol and excess weight, etc., are the dangers of NCDs [1]. Scientific literature has suggested that PA has many long-term and short-term benefits. Long-term benefits include morbidity from all causes, heart disease, high blood pressure, type 2 diabetes, metabolic syndrome, and a reduced risk of some cancers [1,17].

In order to develop successful interventions to promote PA, a theory-based approach is essential. Therefore, a fourth-generation theoretical model called the multi-theory model (MTM) was developed to explain and predict transient and long-term changes in health behavior at the individual, group, and community levels [18]. MTM splits behavioral changes into two components i.e., initiation and sustenance. Several cross-sectional studies have demonstrated that MTM is useful in predicting behavioral changes (both initiation and maintenance).

The purpose of this study was to investigate the usefulness of the emerging contemporary MTM of changes in health behavior in foreseeing the initiation and sustenance of PA among university students. The findings of the research can contribute and provide inputs to national action strategies to improve PA promotion in young people in Fiji.

METHODS

Study design and procedure

This cross-sectional study collected data from 29 July 2021 to 1 September 2021 using a Qualtrics modality as a means of survey dissemination tool. Potential participants were recruited via a convenience sampling method.

Study participants and sampling

The sample of this study belongs to the full-time students enrolled in the semester (2021) at Fiji National University across different campuses. Participants included in this study were at least 18 years of age; did not have any medical condition that prevented them from being physically active. The Qualtrics link was shared with the principal lecturers and further, they disseminated the link to all the enrolled students in their courses via Moodle or Viber groups. The survey was sent to approximately 800 students, and we received responses from 400 students.

Study instrument

We used the MTM tool, which has been validated as a robust theoretical framework for predicting PA behavior change in the United States [19,20]. Grounded in MTM, a 40-item survey questionnaire was adapted from a previously validated survey to measure PA change. The survey comprised 11 items related to the demographic background and the remaining 29 items are related to the seven constructs of MTM. The MTM has two main constructs: initiation and sustenance of the behavior and these are described in Table 1 [21,22].

Table 1. Domains and constructs of MTM theoretical framework.

Domain	Constructs		Meaning	Items	Range
Initiation model	Participatory dialogue: The score of disadvantages was subtracted from the score of advantages to obtain the score on participatory dialogue.	Advantages	Perceived benefits of the target PA behavior	5	0-20
		Disadvantages	Perceived disadvantages of the target PA behavior	5	0-20
	Behavior confidence		Futuristic surety from multiple sources is enhanced to promote PA behavior	5	0-20
	Changes in the physical environment		An environment conducive to increase uptake of PA behavior	3	0-12
Sustenance model	Emotional transformation		Feelings are directed toward developing goals for PA behavior	3	0-12
	Practice for change		Constant reflection about PA change is fostered	3	0-12
	Changes in the social environment		Leveraging social support to promote PA behavior	3	0-12

Data analysis

All responses collected through the Qualtrics survey were downloaded and data were preprocessed/cleaned for analysis. All descriptive and inferential statistics were performed using IBM SPSS version 27.0 (IBM Corp. Armonk, NY, USA). All assumptions, including the normality, homogeneity of variances, and independence were assessed to ensure the appropriate application of the statistical tests. Normally distributed continuous variables were presented as means and standard deviations. For skewed and those with negative values (e.g., participatory dialogue), a square root transformation and back transformation were used for inferencing. Categorical outcomes were presented as frequencies and percentages. The normal approximation to the binomial distribution method was used to calculate 95% confidence intervals of proportion. Inferential statistics were conducted through Pearson correlation, independent samples-tests/Welch test-test, and hierarchical regression. All analyses were conducted at $\alpha = 0.05$. All p values were two-sided.

A priori power analysis

Sample size determination was done through G*Power software using Cohen's effect sizes of 0.5 and 0.35 for t-test and hierarchical regression respectively, and an alpha level of 0.05, and the desired power of 80% [23,24]. For the hierarchical regression analysis, sample determination was based on the number of test variables, which were six out of a total of ten variables. The minimum sample required was 128 (64 in each group) for the t-test and 47 for the hierarchical regression, which met the sample size requirements to investigate hypothesized effects.

Ethical aspects

Approval for conducting this study has been obtained from the Committee on Human Research Subjects (FNU-HREC-21-005, July 15, 2021), Fiji National University, Fiji Islands. Participation in the study was completely voluntary, and details about the study's objectives and significance were provided to participants before completing the survey. Personal identifiers were not collected to ensure confidentiality. Multiple responses from the same participants were restricted by enforcing the Ballot Box Stuffing option. In other words, only one response per participant was allowed.

RESULTS

Out of 400 responses, 24 were incomplete responses, 5 students did not give their consent, and 37 reported having medical conditions, so were excluded from the study. In a sample of a total of 334 participants (83.5%), only 15.6% indicated that they were not engaged in any sort of PA. The mean age of the sample population was 23.70±6.30 years. For participants who indicated performing PA, the median minutes of PA were 60 minutes/week. The sample was predominately females (65.9%), undergraduates (93.7%), and -Indo-Fijians (68.0%, Table 1). Every 3 of 10 participants reported having a family history of lifestyle diseases or chronic conditions. Nearly 50% of the respondents were living in rural areas (Table 1). An independent-samples t-test was run to determine if there were differences in the scores of MTM subscales among physically active and inactive participants. There were no outliers in the data, as assessed by inspection of a boxplot. Subscale scores for each level of PA were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$), and variances were homogeneous, as assessed by Levene's test for equality of variances with non-significant values in all scales except sustenance. Except for "perceived disadvantages" and "participatory dialogue," the mean score differences were different among groups, with physically active participants having higher mean scores of "perceived advantages" (14.5±3.46 vs. 12.8±4.1, p =0.002, Table 2); "behavioral confidence" (11.43±3.88 vs. 8.96±4.11, p<0.001); "changes in the physical environment" (6.72±3.06 vs. 5.11±2.58, p<0.001); "emotional transformation" (7.65±2.81 vs. 6.05±3.09, p=0.002); "practice for change" (6.35±2.72 vs. 5.32±2.52; p=0.009) and "changes in a social environment" (6.65±2.95 vs. 5.62±3.07, p =0.03), with a statistically significant mean difference (Table 2).

Table 2. Demographic characteristics of the sample population (*n*=334).

Variable name	Categories	n (%)	95% CI of proportion
Perform PA			
	Yes	282 (84.4)	80.5, 88.3
	No	52 (15.6)	11.7, 19.5
Age (Mean ± SD)	-	23.70±6.30	-
Gender	Male	114 (34.1)	29.0, 39.2
	Female	220 (65.9)	60.8, 80.0
Degree program	Undergraduate	313 (93.7)	91.1, 96.3
	Graduate	21 (6.3)	3.7, 8.9
Race/Ethnicity	Indo Fijian	227 (68.0)	63.0, 73.0
	Itaukei*	87 (26.0)	21.3, 30.7
	Other	18 (5.4)	3.0, 7.9
	Preferred not to say	2 (0.6)	0.0, 1.4
Location of residence	Urban	109 (32.6)	27.6, 37.6
	Semi-urban	63 (18.9)	14.6, 23.0
	Rural	162 (48.5)	43.1, 53.8
Family history of lifestyle risk factors and chronic diseases			
	Yes	99 (29.6)	24.7, 34.5
	No	168 (50.3)	44.9, 55.6
	May be	66 (19.8)	15.5, 24.0

* Indigenous Fijians

Table 3. Comparison of Multi-theory model (MTM) constructs among regularly physically active and physically inactive groups.

MTM Construct	Perform regular PA		P-value
	Yes (*n*=282)	No (*n*=52)	
Overall Initiation Score	2.45±1.02	2.00±1.00	0.004*
Subscales			
Perceived Advantages	14.5±3.46	12.8±4.1	0.002*
Perceived Disadvantages	8.50±3.78	7.96±3.33	0.3
Participatory Dialogue	5.57±1.16	5.29±1.21	0.7
Behavioral Confidence	11.43±3.88	8.96±4.11	<0.001*
Changes in the Physical Environment	6.72±3.06	5.11±2.58	<0.001*
Overall Sustenance Score	2.75±0.97	2.10±1.20	0.002*
Subscales			
Emotional Transformation	7.65±2.81	6.05±3.09	0.002*
Practice for Change	6.35±2.72	5.32±2.52	0.009*
Changes in the Social Environment	6.65±2.95	5.62±3.07	0.03*

*P values less than 0.05 are considered statistically significant

Table 4. Pearson correlations, and reliability estimates for study variables in the sample population (*n*=334).

Variables	1	2	3	4	5	6	7
1. Advantages	-	-0.032	.39**	.30**	.33**	.21**	.16**
2. Disadvantages	-.032	1	-.06	-.06	-0.07	.04	.07
3. Behavioral Confidence	.39**	-.06	1	.69**	.69**	.63**	.48**
4. Changes in the Physical Environment	.30**	-0.06	.69**	1	.69**	.63**	.48**
5. Emotional Transformation	.33**	-0.07	.69**	.69**	1	0.67**	0.65**
6. Practice for Change	0.21**	.04	.63**	.63**	0.67**	1	0.65**
7. Changes in the Social Environment	0.16**	0.07	.48**	.69**	0.65**	0.65**	1
Reliability Diagnostics	0.78	0.70	0.82	0.80	0.85	0.76	0.74

**p < .01; The Cronbach alpha value of the entire scale is 0.89

As shown in Table 4, the construct of "perceived advantages" was directly and moderately correlated with behavioral confidence (r=0.39, p<0.001), changes in the physical environment (r=0.30, p<0.001), emotional transformation (r=0.33, p<0.001). The construct of behavioral confidence was directly correlated with the changes in the physical environment (r=0.69, p<0.001), practice for change (r=0.63, p<0.001), and changes in the social environment (r=0.48, p<0.001). The emotional transformation and changes in the physical environment had a strong correlation (r=0.69, p<0.001). The reliability measure of all the MTM subscales ranged from 0.70-to 0.85 and the overall Cronbach alpha value was 0.89.

Table 5. Hierarchical multiple regression to predict the likelihood for initiation and sustenance of PA behavior among physically inactive participants (*n*=52).

Variables	Model 1		Model 2		Model 3		Model 4	
	B	*B*	**B**	*β*	**B**	*β*	**B**	*β*
INITIATION MODEL								
Constant	1.944		1.561		0.902		0.756	
Age	0.009	0.055	0.005	0.030	-0.001	-0.008	-0.002	-0.012
Gender (ref: Female)								
Male	0.257	0.112	0.229	0.100	0.191	0.083	0.067	0.029
Race/Ethnicity (ref: *iTaukei*)								
Indo- Fijians	-0.316	-0.143	-0.094	-0.043	-0.481	-0.217	-0.620*	-0.280
MTM Constructs								
Participatory dialogue	-	-	0.068*	0.359	0.027	0.142	0.034	0.180
Behavioral confidence	-	-	-	-	0.141**	0.553	0.056	0.219
Changes in the physical environment	-	-	-	-	-	-	0.199*	0.491
R²	0.040	-	0.157	-	0.405	-	0.525	-
F	0.659	-	2.194	-	6.260**	-	8.293**	-
Δ R²	0.040	-	0.118	-	0.248	-	0.120	-
Δ F	0.659	-	6.568*	-	19.139*	-	11.389*	-
SUSTENANCE MODEL								
Constant	1.572	-	0.375	-	0.064	-	0.078	-
Age	0.014	0.079	0.010	0.056	0.006	0.035	0.007	0.039
Gender (ref: Female)								
Male	0.450	0.172	0.249	0.095	0.295	0.112	0.237	0.090
Race/Ethnicity (ref: *iTaukei*))								
Indo- Fijians	0.227	0.090	0.298	0.118	0.273	0.108	0.242	0.096
MTM Constructs								
Emotional transformation	-	-	.215**	.555	0.096	0.249	0.068	0.174
Practice for change	-	-	-	-	0.209**	0.439	0.135	0.282
Changes in the social environment	-	-	-	-	-	-	0.103	0.264

R^2	0.038	-	0.338	-	0.437	-	0.460	-
F	0.629	-	5.994**	-	7.154**	-	6.391**	-
ΔR^2	0.038	-	0.300	-	0.100	-	0.023	-
ΔF	0.629	-	21.295**	-	8.146*	-	1.888	-

* *p*-value < 0.05; ** *p*-value < 0.001; adjusted R^2 for initiation model = 0.462; adjusted R^2 for sustenance model 2 = 0.388

Two separate models of hierarchical multiple regression were fit to determine if the addition of MTM subscales beyond demographic variables improved the prediction of initiation and sustenance. Please see Table 4 for full details on each regression model. The full model of gender, age, race/ethnicity and MTM constructs to predict initiation (Model 4) was statistically significant, R^2 = .525, $F (5, 46) = 8.293$, p<0.001; adjusted R^2 = .462. The addition of behavioral confidence to the prediction of initiation (Model 3) led to a statistically significant increase in R^2 of .248, $F (1, 46)$ = 19.139, p < .001. The addition of participatory dialogue to the prediction in (Model 2) also led to a statistically significant increase in R^2 of .118, $F (1, 47) = 6.568$, p=0.01. Additionally, the full model of gender, age, race/ethnicity and MTM constructs to predict sustenance (Model 4) was statistically significant, $R^2 = 0.460$, $F (6, 46) = 6.391$, p<0.001; adjusted $R^2 = 0.388$. The addition of practice for change to the prediction of sustenance (Model 3) led to a statistically significant increase in R^2 of .100, $F (1, 46) = 8.146$, p=0.006. The addition of emotional transformation to the prediction in (Model 2) also led to a statistically significant increase in R^2 of 0.300, $F (1, 47) = 21.295$, p<0.001.

DISCUSSION

The purpose of this study was to understand how a fourth-generation health behavior theory with a predictive capacity for behavior initiation and sustenance can provide information on the likelihood of engaging in PA among university students in the small island country of Fiji. In our findings, about 15% of sample participants were found to be physically inactive. A current prevalence of 15% physical inactivity among college students in Fiji National University may appear a favorable situation when compared with a developed nation like the United States. In the US, it is reported that over 20% of college students in the age range of 18 to 24 years do not meet the recommended guidelines for physical activities [25,26]. However, it would be crucial to see this rate in comparison to the past 15 years and with college populations on other islands of Fiji nation to understand the trend of physical inactivity. Also, it is to be acknowledged that the survey was conducted during the COVID-19 pandemic, which may have increased the PA among students due to myriad factors such as being confined and cut off from other activities that may have led to greater interest in PA. A study conducted in Spain that assessed the level of physical activities during Covid-19 among university students found an increase in physical activities which happened, as a result, to overcome the feeling of social isolation due to confinement and the pressure of doing homework [27].

In relation to the MTM, the score of participatory advantages was statistically significantly higher among participants engaged in physical activities regularly compared to those who were inactive indicating a putative role of participatory dialogue with an emphasis on advantages in the initiation of the behavior. The participatory dialogue was not statistically significant in the overall initiation model among physically inactive participants in predicting initiation of the physically active behavior. However, as mentioned earlier, the role of advantages from this construct was found significant for those already engaged in PA behavior. This highlights that more efforts through interventions are needed to convince those who are physically inactive of the benefits of PA and once they are convinced, they can take it up regularly.

The construct of behavioral confidence was also not found to be a significant predictor in the initiation model for those who were physically inactive. However, there were significant differences between the two groups of physically active and physically inactive participants where the behavioral confidence levels of physically inactive participants were lower than that of physically active. A logical explanation of this is that they had not experimented with physical activities and were low in their confidence levels once again pointing to the need for interventions. Behavioral confidence is an internal psychic capability of an individual which may be difficult to measure but if it is enhanced with activities, it could impact internalized and externalized behaviors [28]. Furthermore, behavioral confidence can influence mental executive functions, resulting in a positive thought process for participatory dialogue [29]. Nahar et al [30] have also found behavioral confidence a predictor of physical activities among medical students in the USA.

Another study conducted to promote physical activities based on the MTM also found behavioral confidence and change in physical environment predictor factors for the initiation of the

behavior [31]. According to Nahar et al. [30], behavioral confidence operates uniquely and dynamically in the MTM. It utilizes external and internal sources of confidence which strengthens the conceptualization of futuristic behavior goals. The college population is highly overloaded with academic work and therefore finds less time to engage in physical activities. Self-efficacy that focuses highly on the psychological beliefs and strength of an individual has been found the biggest contributor to deciding for engaging in physical activities among college students around the world despite their academic priorities [31,32]. Behavioral confidence in MTM plays a similar role to self-efficacy when it comes to physical activities for the college population and thus proves its importance in his study which is also consistent with other studies [19]. Sharma and Nahar [31] suggested demonstration and re-demonstration of skills for building behavioral confidence. Consistent with this suggestion, role modeling of being in the gym, engaging in sports, and recreational activities such as walking, biking, running, and swimming can be utilized for college students.

The construct of changes in the physical environment contributed significantly to the final initiation model among those who were physically inactive. The differences between those physically active and those physically inactive in this construct were also apparent when statistical significance was compared between the two groups. This finding emphasizes the need for more accessibility to gyms, playgrounds, and other physical resources that appeal to a large section of Fiji college students. A variety of popular sports activities with the availability of necessary equipment by the university can go a long way in strengthening the habit of PA among the students.

With regard to the sustenance of PA, all three constructs of MTM were significantly higher in the physically active group when compared to the physically inactive group. This finding emphasizes the role of the constructs of "emotional transformation", "practice for change," and "changes in the social environment". Participatory dialogue in model 2, behavior confidence in model 3, and change in physical environment indicate some role in the initiation of physical activities in the sample population. Emotional transformation in model 2 and practice for change in model 3 demonstrates a role in the sustenance of physical activity behavior in this study. The findings of this study appear to be in partial agreement with the earlier conducted study by Nahar et al. [30] in which they found behavior confidence a predictor for initiation and change in social environment predictor for sustenance. Another study conducted pre-COVID-19 times in ethnically somewhat similar areas in India also found practice for change as a predictor for sustenance behavior in a different target population of upper elementary school children [34]. The practice for change in the MTM model can be explained by constant active and reflective thinking. It could be difficult to encourage people psychologically for engaging in the practice of change in relation to physical activities. However, this factor can be increased with the application of learning principles. Probably, in the college setting an opportunity-based action of encouraging physically inactive people on any occasion when they engage in any kind of activity can help advance practice for change. Overall, the MTM offers a useful approach to predicting the initiation and sustenance of PA among college students in Fiji. This study can be instrumental in advancing research to investigate contributing factors of physical inactivity and the applicability of the MTM in developing interventions in Fiji or other similar geographical settings.

Implications for practice

This study demonstrates the importance of developing PA promotion strategies for university students in Fiji. MTM can play a role in delineating such strategies through the implementation of educational and promotional interventions. First, motivational interviewing can be an effective method of enhancing participatory dialogue [35]. Second, for influencing changes in the physical environment, the universities may consider some structural development such as running tracks, sidewalks for walking, gyms, swimming pools, and sports facilities. Some neighborhoods experience safety issues and if that is the case in that area, then it is important to build a safety net that way people are not afraid to go out. Students are preferring more motor-operated vehicles and in place of that bicycles can be promoted and the use of stairs, walking, and bicycle rides may be incentivized. Emotional transformation is a determinant that can move a person from inactivity to the active phase. However, redirecting feelings to set goals is not so easy. Emotions are power, they mostly harbor in

the fluid stage of thinking. For some people, their emotions could be little fixed while malleable for others [36]. Different methods such as yoga, introspective meditations [37], and even therapeutic activities based on emotional transformation theory such as lights of different wavelengths and eyeball movement can be applied to help people for influencing emotional transformation. Modifying the construct of changes in the social environment is not very challenging. It can be done by making interest groups, having targeted discussions around the topic, and pairing physically inactive college students with physically active students [38].

Study limitations

Being the first study of MTM on Fiji university students, this research offers several important outcomes. However, research faces some limitations which are important to be acknowledged here. A small sample size of physically inactive students was a limitation in our study. Further, it was a cross-sectional study that lacks the ability to make a temporal relationship between variables. We used self-reported data which always has a risk of different biases including recall, contextual, and conscious bias. Internet accessibility was an issue due to COVID-19-related restrictions and lockdown when this survey was implemented. This might have restricted people from participating in the research. Also, the participation of females in the survey could not be achieved as targeted which limited us in studying the effect of gender. Importantly, the findings are limiting us in generalizing its scope to both genders.

CONCLUSION

As mentioned earlier, this was the first study that utilized a fourth-generation behavioral model in explaining the correlates of PA among Fiji National university students. However, due to various factors including the COVID-19 pandemic, the number of physically inactive students in our sample was rather limited which makes it difficult to draw firm conclusions from the modeling of the constructs. Given that limitation, the study still underscored the role MTM can play in influencing PA patterns among Fiji college students. Future research should reify MTM toward further testing of the determinants of PA and designing PA promotion interventions for Fiji university students.

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