



Role of perceived benefits of Mauritians in accounting for physical exercise

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Abstract: Mauritius, which is a rapidly developing island in the Indian Ocean, has Type 2 Diabetes mellitus as public health issue. While the prevalence of diabetes is high, the prevalence of physical exercise remains low among Mauritians. This research work was designed with the following objectives: (1) To determine perceived benefits and barriers for physical exercise among a random sample of employees in a workplace setting, (2) To compare amount of physical exercise with work occupation of participants and (3) To look for association between perceived benefits and physical exercise. The study population was a random sample of employees, representative of the workforce in Mauritius. Two valid and reliable survey instruments were used: Global Physical Activity Questionnaire and Exercise Benefits/Barriers Scale. Findings of the survey revealed that perceived exercise benefits were high while participation in physical exercise was low. Findings of this study highlight the need for further studies to explore perception on health benefits of physical exercise and awareness on volume of physical exercise to achieve these health benefits. Moreover, there is a need to encourage initiatives to implement supportive workplace environment for the practice of physical exercise.

Keywords: Physical Exercise, Benefits, Type 2 Diabetes mellitus, Mauritius.

I. Introduction

A. The context

Mauritius which is an island situated off the eastern coast of Madagascar in the Indian Ocean, has a multi-ethnic population of 1.3 million Mauritians of Indian (68%), Chinese (3%), African (27%), European (2%) ancestry [1]. According to the World Bank, Mauritius is now classified as an upper middle income economy, with its Gross National Income per capita at US\$8,230 [2]. On the basis of the latest Human Development Index for 187 countries, Mauritius was ranked 78th globally and third in Africa [3]. In the wake of this economic growth, the country has undergone rapid industrialization over the past five decades [4]. The rapid industrialization along with the openness of the island to the external world has brought in its wake changes in lifestyles, in turn contributing to high prevalence of non-communicable disease risk factors in Mauritius [5]. Traditional ways of life in the multi-ethnic Mauritian society have shifted to western lifestyles with an increased consumption of carbohydrate-rich, high-calorie ready-made fast foods, along with high amounts of fat, sugar and salt in processed foods [6]. This nutritional transition and the increasingly sedentary behavior of Mauritians have led the country to undergo an epidemiological transition from communicable to non-communicable diseases in recent decades [4].

B. The public health issue

Mauritius had in 2010 the fourth highest prevalence of Type 2 Diabetes mellitus in the world [7]. This prevalence increased significantly from 12.8% in 1987 to 17.9% in 1998 [8]. The age-standardized prevalence of diabetes in the Mauritian population in 2009 was 22.3% among men and 20.2% among women [9]. In fact, Magliano et al. (2012) showed that diabetes prevalence has increased by 64% over 22 years in Mauritius, the increase being similar in men and women, greater in Mauritians of Indian and African descent but smaller in Mauritians of Chinese descent [9]. In fact, according to the Non Communicable Diseases Survey in 2009, the prevalence of diabetes in the Mauritian population aged 25-74 years was 23.6% [4]. Moreover, the prevalence of impaired glucose metabolism (otherwise known as pre-diabetes) in the adult population of the same age group was 24.2% [4]. Thus, almost 1 in 2 Mauritians has either diabetes or pre-diabetes. Moreover, the prevalence of obesity or overweight was found to be 65.6%, the rate being 62.8% for men and 68.2% for women [4]. On the other hand, the prevalence of physical exercise remains

low. Only 16.5% of Mauritian adults aged 25-74 years (10.9% women and 23.2% men) performed sufficient leisure time physical activity to meet the national guidelines of 30 minutes of moderate and/or vigorous physical exercise per day to maintain good health [4]. More than one out of two Mauritians, more precisely, 56.2%, with 65.8% of women and 45.7% of men, reported no participation at all in moderate or vigorous leisure time physical activity [4]. In fact, this prevalence has not increased since the previous Non Communicable Diseases Survey in 2004, which showed that only 10% of women and 25% of men perform leisure-time physical exercise [10]. According to the World Health Organization (WHO), physical inactivity has been identified as the fourth leading risk factor for global mortality [11]. In fact, physical inactivity is estimated to be the main cause for 27% of diabetes, approximately 30% of ischemic heart disease burden and about 21–25% of breast and colon cancers [11].

Scientific evidence indicates that 150 minutes per week of moderate to vigorous-intensity physical activity bring significantly lower risks with regard to diabetes and pre-diabetes conditions [12]. In fact, 30 minutes of moderate exercise a day, five days a week, is enough to promote good health and reduce the risk of developing Type 2 Diabetes [13]. Moreover, the health benefits of physical activity include a 50% reduction in the risk of developing diabetes [14]. The Finnish Diabetes Prevention Study [DPS] Group confirmed that non-pharmacologic lifestyle intervention of people at risk for diabetes does prevent or at least postpone the onset of type 2 diabetes [15]. The Diabetes Prevention Program Research Group [DPP] (2002) had also shown that people at risk for developing diabetes can prevent or delay the onset of diabetes by losing weight through diet and exercise [16]. The incidence of diabetes was reduced by 58% with the lifestyle intervention and by 31% with oral diabetes medication (metformin), as compared with placebo; these effects were similar in men and women and in all racial and ethnic groups [16]. This aspect of the findings is particularly relevant for the multi-cultural island of Mauritius. The risk reduction associated with the lifestyle intervention in the DPP study was the same as that in the Finnish study conducted in Finland [15] ,and was higher than the reductions associated with diet (31%), exercise (46%), and diet plus exercise (42%) in the Da Qing study in China [17] (Pan *et al.*, 1997). In fact, the DPP (2002) showed that modification of lifestyle was a highly effective means of delaying or preventing Type 2 diabetes, with one case of diabetes prevented per seven persons treated for three years [16]. The Da Qing Study in China demonstrated that the incidence of diabetes in impaired glucose tolerance patients decreased by 46% during a six-year period when exercise therapy was prescribed [17]. It is to be highlighted that increased physical activity delays the onset of diabetes or even prevents the disease in about 50% of susceptible individuals [18] and that the protective effect of physical activity is strongest for individuals at highest risk of developing diabetes [19].

C. Rationale for the study

Type 2 Diabetes mellitus has become a public health issue in Mauritius as this chronic disease impairs the quality of life of its people and impacts on its economy [4]. Moreover, its prevalence increases, while Mauritians are prone to lead a sedentary life. In light of the increasing prevalence of diabetes in Mauritius, the Ministry of Health & Quality of Life of Mauritius (MoH&QL) recommends the practice of at least 30 minutes of exercise on five days a week for the prevention of non-communicable diseases. However, more than 80% Mauritians fails to perform the recommended amount of physical exercise to achieve health benefits [4]. In order to understand the lack of physical exercise among Mauritians despite the health awareness campaigns of the MoH&QL there was a need to examine whether Mauritians have received and understood the health education messages about the need for physical exercise. Until now, there have been no studies carried out in Mauritius to explore the perception of Mauritians on benefits of physical exercise. This study was thus designed to explore their perception on the benefits of physical exercise among an employee population in a workplace setting.

The workplace identified for this study, a major educational institution in Mauritius, has the particularity of having in its midst various categories of workers, from the professional group and the administrative staff to the workers in the services section and the agricultural workers in its farm, who converge to the institution from various rural and urban places of the island. Moreover, the workplace was identified in line with the World Heart Day of 2010, whereby the theme was “Workplace wellness” [20]. The WHF's call to employers and employees to take responsibility for their workplace wellness was to encourage both companies and individuals to promote a heart-healthy working environment by adopting workplace-wellness programs [20] (WHF, 2010). In light of this call, this major educational institution aspires to become a role model with respect to the promotion of a healthy working environment by adopting workplace-wellness programs.

Prior to the promotion in the workplace setting of healthy lifestyle such as the practice of regular physical exercise, it was important to determine whether employees in the various work categories were at least performing the minimum amount of LTPA. This was thus achieved by the use of the Global Physical Activity Questionnaire (GPAQ), developed by the WHO [21]. The GPAQ was chosen because it includes components, such as intensity, duration, and frequency of physical activity and the setting in which physical activity is performed (at work, during travel from and to places and activity during leisure time). In fact, it allows the determination of individuals meeting the minimum amount of physical exercise recommended by various bodies, namely the WHO, American College of Sports Medicine and American Diabetes Association [12].

D. Aim and objectives of research work

The aim of this study was to examine the role of perceived benefits in accounting for amount of physical exercise (Leisure-Time Physical Activity) among employees in a workplace setting. The objectives of this study were as follows: (1) To determine the perceived benefits of and the perceived barriers to physical exercise among employees in a workplace setting, (2) To compare amount of physical exercise with work occupation of participants and (3) To look for association between perceived benefits and physical exercise. Findings of this study will pertinently meet the needs of the country by providing an understanding of the perceptions of Mauritians on the general benefits of physical exercise and their role in accounting for the performance of the recommended amount of physical exercise.

II. Methodology

A. Study design

A questionnaire survey was carried out among a random sample of employees of an educational institution in Mauritius.

B. Survey instrument

The research instrument was a questionnaire with three sections: Section I collected socio-demographic data. Section II assessed the perceived benefits and perceived barriers of engaging in physical exercise by means of the Exercise Benefits/Barriers Scale (EBBS) developed by Sechrist *et al.* (1985) [22]. Permission to use this scale was granted by authors. Participants were asked to rate their agreement to perceived benefits/barriers on a 4-point Likert scale (strongly agree to strongly disagree). Section III determined the amount of physical exercise through the relevant questions of the Global Physical Activity Questionnaire (GPAQ). Mixed data types (scale, nominal and ordinal data) were expected from the questionnaire. Prior validation of the whole questionnaire was performed by a pilot study.

C. Study population

The 1006 employees of the institution were categorized according to the International Standard Classification of Occupations (ISCO) (International Labor Organization (ILO), 2008). In order to adapt to the staff organization of the institution, the nine ISCO categories of employees were merged into four groups. Thus, the categories of employees studied were:

- Group 1: Managers, Professionals, Technicians and associate professionals
- Group 2: Administrative and Secretarial Staff
- Group 3: Service Workers
- Group 4: Skilled agricultural, forestry and fishery workers.

D. Sample size

Using data available from the Central Statistics Office for these four groups, a sample size of 286 participants, stratified for occupation level, was obtained. The sample size was determined according to calculation by Israel (2009) [23]. The following criteria were used: Population size of 1000 employees, Confidence Level of 95%, +/-5% Precision Level and p-value of 0.05. Based on the above, a sample size of 286 was obtained. For proportional representation, a random sample of employees was drawn from each category using Microsoft Excel™ 2007. The targeted sample size was as follows: n= 65 for Group 1, n= 35 for Group 2, n= 72 for Group 3 and n= 114 for Group 4. In case of unwillingness to participate, the employee was replaced by another one with the same socio-demographic characteristics.

E. Inclusion / Exclusion criteria

All employees of the institution were eligible for participation in the study. Participants were included regardless of their age, gender, ethnicity and general appearance. Pregnancy was an exclusion criteria. During field work, one person having a congenital heart problem and one person operated for knee joint problem were excluded.

F. Ethical consideration

Prior to the start of this study, ethical approval from the relevant Research Ethics Committee in Mauritius was obtained.

G. Data collection

Each potential participant received an invitation letter, the survey questionnaire and a participation information sheet, which explained clearly the nature of the study. Prior to the start of the survey, oral explanation was provided to highlight the anonymous, confidential and voluntary aspects of the research process. Participants were requested to sign the participation consent form before starting the questionnaire.

H. Data analyses

Data collected were input and analyzed using SPSS 17TM. Weights were added to the data in view of rendering this sample representative of each category of the work force of Mauritius. Weights were calculated for each group (work category) according to Weight for a specific group being equal to Targeted Sample Size for the group divided by Number of Respondents in the same group for the Survey. For each respondent, the corresponding weights are allocated according to their respective work category. The weighted data was used for analysis in SPSS.

The EBBS instrument, which was scored as recommended by Sechrist *et al.* (1985), has a four-response, forced-choice Likert-type format with responses ranging from 4 (strongly agree) to 1 (strongly disagree) [22]. Barrier Scale items are reverse-scored. Items on the Barrier Scale are numbers 4, 6, 9, 12, 14, 16, 19, 21, 24, 28, 33, 37, 40 and 42. Scores on the total instrument can range from 43 to 172. The higher the score, the more positively the individual perceives exercise. When the Benefits Scale is used alone, the score range is between 29 and 116. When the Barriers Scale is used alone, scores range between 14 and 56.

The first objective (to determine perceived benefits / barriers for physical exercise) was achieved by computing the means of each EBBS item. Possible scores ranged from 1 to 4; 4 represented the highest perception of benefit and perception of barrier.

The second objective (to compare amount of physical exercise with work occupation) was calculated by multiplying the amount of physical exercise per day by the number of days per week when physical exercise was performed. The participants were classified in two categories of amount of physical exercise: [< 150 minutes] and [≥ 150 minutes].

The third objective (to look for association between perceived benefits and amount physical exercise) was determined by Chi Square (χ^2) test to identify any significant relationship ($p < 0.05$) between perceived benefits and amount of physical exercise. The exercise benefits scale which ranges from 29 to 116 was categorized as Benefits score < 73 and Benefits score ≥ 73 , the score 73 being the average between the maximum and minimum score. The mean score on the Benefits Scale was used as a cut-off value to classify participants into the 2 categories, in the absence of guidelines from Sechrist *et al.* (1985) and in the absence of any similar study. Those scoring greater than the mean on the Benefits Scale were grouped into “high perception of benefits” while those scoring less than the mean were grouped into “low perception of benefits”.

III. Results

A. Characteristics of the study sample

Table 1 shows the weighted profile of respondents.

Table 1. Characteristics of the study sample	
Variable	Percentage Total = 286
Gender	
Male	77.3
Female	22.7
Groups of Workers	
1. Professional	22.7
2. Administrative	12.2
3. Service	25.2
4. Agricultural	39.9
Level of Education	
$<$ Tertiary Education	71.6
Tertiary Education	28.4
Age Group	
< 40	36.8
≥ 40	63.2

B. Perceived exercise benefits

Participants either agreed or strongly agreed with all the listed benefits of regular physical exercise. Participants agreed the most with: “Exercising increases my level of physical fitness” (3.48 ± 0.54), followed by “Exercising helps me sleep better at night” (3.42 ± 0.59). Participants agreed the least with the item: “Exercising increases my acceptance by others” (3.64 ± 0.77).

Table 2 shows the perceived exercise benefits scale with the mean (X) and standard deviation (sd) of the study sample for each item of the benefits sub-scales.

Table 2.The Exercise Benefits Scale*

	Perceived Benefit Items	X	Sd
Life Enhancement Sub-scale			
25	My disposition is improved by exercise	3.06	0.61
26	Exercising helps me sleep better at night	3.42	0.59
29	Exercise helps me decrease fatigue	2.94	0.59
32	Exercising improves my self-concept	3.18	0.49
34	Exercising increases my mental alertness	3.17	0.44
35	Exercise allows me to carry out normal activities without becoming tired	3.19	0.54
36	Exercise improves the quality of my work	3.01	0.72
41	Exercise improves overall body functioning for me	3.33	0.52
Physical Performance Sub-scale			
7	Exercise increases my muscle strength	3.31	0.60
15	Exercising increases my level of physical fitness	3.48	0.54
17	My muscle tone is improved with exercise	3.25	0.59
18	Exercising improves functioning of my cardiovascular system	3.37	0.56
22	Exercise increases my stamina	3.22	0.59
23	Exercise improves my flexibility	3.25	0.63
31	My physical endurance is improved by exercising	3.29	0.60
43	Exercise improves the way my body looks	3.30	0.62
Psychological Outlook Sub-scale			
1	I enjoy exercise	3.37	0.62
2	Exercise decreases feelings of stress and tension for me	3.33	0.70
3	Exercise improves my mental health	3.32	0.71
8	Exercise gives me a sense of personal accomplishment	3.26	0.63
10	Exercising makes me feel relaxed	3.32	0.49
20	I have improved feelings of well-being from exercise	3.30	0.55
Social Interaction Sub-scale			
11	Exercising lets me have contact with friends and persons I enjoy	3.02	0.77
30	Exercising is a good way for me to meet new people	2.83	0.75
38	Exercise is good entertainment for me	3.24	0.68
39	Exercising increases my acceptance by others	2.64	0.77
Preventive Health Sub-scale			
5	I will prevent heart attacks by exercising	3.21	0.67
13	Exercising will keep me from having high blood pressure	3.09	0.79
27	I will live longer if I exercise	2.99	0.74
All Benefit items of all subscales		3.20	0.32

*Acknowledgement to Sechrist, Walker and Pender for permission granted to use the Scale.

C. Perceived exercise barriers

Table 3 shows the exercise barriers scale with the mean and standard deviation of the study sample for each item of the barriers sub-scales. Participants either agreed or strongly agreed with all the listed barriers to regular physical exercise. Participants agreed the most with: "I am too embarrassed to exercise" (3.33 ± 0.68), followed by "I think people in exercise clothes look funny" (3.21 ± 0.68). Participants' disagreed most with: 'Exercise tires me' (2.57 ± 0.85), followed by "Exercise facilities do not have convenient schedules for me" (2.61 ± 0.90).

Table 3.The Exercise Barriers Scale*

	Perceived Barriers Items	X	sd
Exercise Milieu Sub-scale			
9	Places for me to exercise are too far away	2.83	0.86
12	I am too embarrassed to exercise	3.33	0.68
14	It costs too much money to exercise	3.14	0.76
16	Exercise facilities do not have convenient schedules for me	2.61	0.90
28	I think people in exercise clothes look funny	3.21	0.68
42	There are too few places for me to exercise	2.90	0.74
Time Expenditure Sub-scale			
4	Exercising takes too much of my time	2.97	0.75
24	Exercise takes too much time from family relationships	2.82	0.76
37	Exercise takes too much time from my family responsibilities	2.94	0.66
Physical Exertion Sub-scale			
6	Exercise tires me	2.57	0.85
19	I am fatigued by exercise	2.79	0.71
40	Exercise is hard work for me	3.11	0.60
Family Discouragement Sub-scale			
21	My spouse (or significant other) does not encourage exercising	2.91	0.88
33	My family members do not encourage me to exercise	3.12	0.76
All Barriers items of all Sub-scales		2.95	0.44

*Acknowledgement to Sechrist, Walker and Pender for permission granted to use the Scale.

D. Benefits to barriers ratio

Benefits and barriers scores (mean scores) being non-normal, non-parametric tests were used. The normality of data was tested in SPSS using the Kolmogorov-Smirnov Test. As the p-value was greater than 5%, the data under test was considered to follow a Normal Distribution.

The use of Wilcoxon Signed Ranks Test showed that benefits scores were higher than barriers scores and it was significantly different at 5% level; Participants had significantly higher perceived benefits ($X = 3.20$, $sd = 0.32$) than barriers ($X = 2.95$, $sd = 0.44$) to exercise. This equated to a benefit/ barrier ratio of 1.08. In fact, the majority (72%) had the ratio benefits to barriers higher than 1.

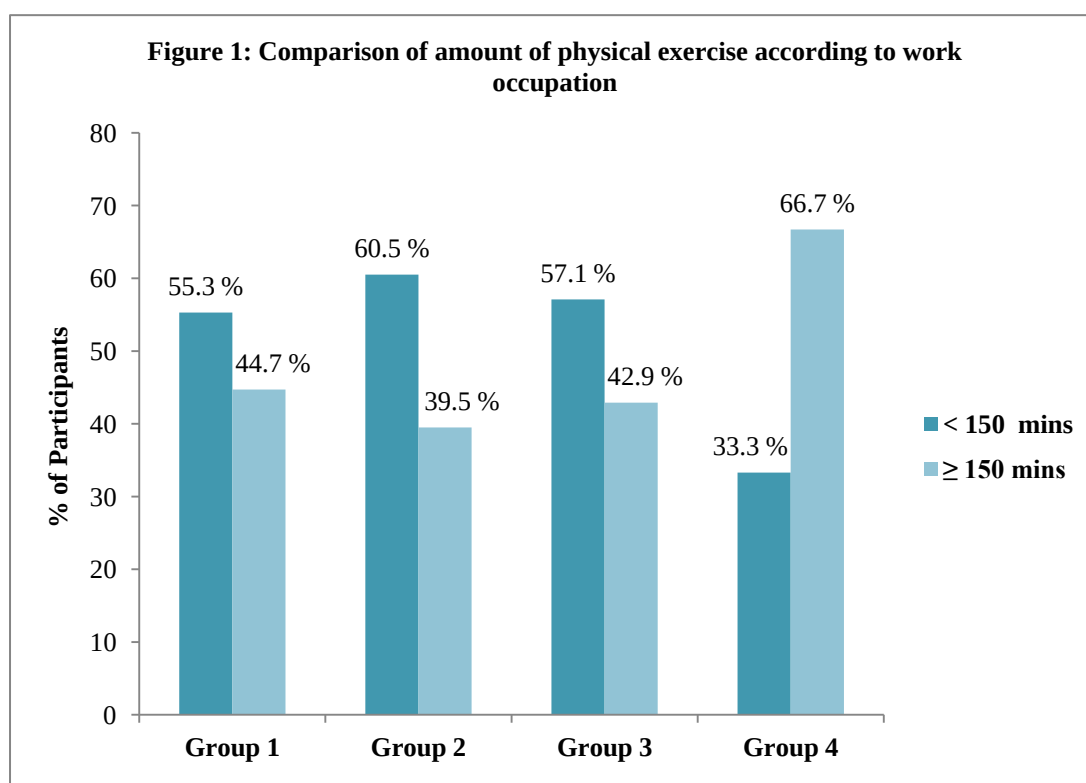
E. Calculation of Mean of the Sub-scales of the Benefits Scale

The greatest perceived benefit from exercise was Psychological Outlook ($X = 3.32 \pm 0.42$) followed by Physical Performance ($X = 3.31 \pm 0.38$), Life Enhancement ($X = 3.17 \pm 0.35$), Preventive Health ($X = 3.10 \pm 0.52$), and Social Interaction ($X = 2.93 \pm 0.53$).

F. Amount of physical exercise and work occupation

With reference to the second objective of this study, 46% of participants performed the recommended amount of at least 150 minutes of physical exercise per week while 54% did insufficient amount of physical exercise (that is, not at all or less than 150 minutes).

Figure 1 depicts the various groups of work occupation with the corresponding percentage of participants of each group in relation with the amount of physical exercise.



The highest percentage (66.7%) of participants performing the recommended amount of physical exercise was among Group 4, which comprised mainly of agricultural workers. The lowest percentage (39.4%) of participants performing the recommended amount of physical exercise was in Group 2, which comprised mainly of administrative staff. However, using the ANOVA test, there was no significant relationship ($p = 0.215$) between amount of physical exercise and work occupation.

G. Perceived benefits and physical exercise

To answer the third objective of this study, Table 6 presents a two-way frequency table for exploring the association between the variables “perceived benefits” and “amount of physical exercise”. Chi Square (χ^2) test, which was performed to test whether the variables are independent, showed that there was no association, the level of significance being $\alpha = 0.05$.

Table 6. Relation between perceived exercise benefits scale and amount of physical exercise

Amount of physical exercise	Low perception of benefits	High perception of benefits
< 150 minutes	40.0%	54.5%
≥ 150 minutes	60.0%	45.5%

Participants' perceptions of benefits from exercise did not relate to their amount of physical exercise as Chi Square (χ^2) testing showed there was no significant relationship ($p = 0.662$) between perceived exercise benefits and amount of physical exercise. Findings demonstrate that there is no evidence of a relationship between "Perceived benefits" and "Performance of at least 150 minutes of physical exercise per week".

IV. DISCUSSION

A. Key findings in relation to the objectives of the study

1. Perceived benefits / barriers for practice of physical exercise

Mauritian participants perceived that the most important benefits of exercise relate to "physical performance" and to "psychological outlook" sub-scale while the three items of the "preventive health" sub-scale with items No. 5 (I will prevent heart attacks by exercising), No. 13 (Exercising will keep me from having high blood pressure) and No. 27 (I will live longer if I exercise) were not on the forefront of Mauritians perceived exercise benefits. Nonetheless, 54% of the participants reported that they were not performing the recommended amount of at least 150 minutes of moderate physical exercise per week. This figure is in concordance with national data as 56.2% reported no participation at all in moderate or vigorous physical exercise [4]. Moreover, both data from this study and from national report are in line with the WHO data with respect to the fact that at least 60% of the world fails to perform the recommended amount of physical exercise to achieve health benefits [24]. In fact, this study revealed that perceived benefits do not account for the amount of physical exercise among the studied employee population. As health interventions to promote physical exercise have been strengthened by the MoH&QL, participants demonstrate that they have received the health messages as they have a high perception of the benefits of physical exercise.

2. High perception of benefits v/s Low performance of physical exercise

The absence of relationship between perceived health benefits of physical activity and practice of physical exercise could have been explained by the perceived barriers which participants expressed. However, participants had significantly higher perceived benefits than barriers to exercise, with a benefit/ barrier ratio of 1.08. Yet, they did not perform the recommended amount of physical exercise. These findings imply the need to explore Mauritians' intention for behavior change and to determine the participant's status, either "pre-contemplating" or "contemplating" stage of the Trans-Theoretical Model of Change developed by Prochaska&DiClemente (1984) [25]. Moreover, although Mauritians are aware of the benefits of physical exercise, there is need to investigate whether they are aware of the volume of physical exercise required to achieve health benefits. Nonetheless, as the prevalence of physical exercise remains low and nearly unchanged over the past five years [4], Hodge et al. (1996) had rightly highlighted the difficulty of reversing the adverse effects of lifestyle change in rapidly modernizing populations [26]. Moreover, Chan Sun (2010) highlighted the absence of a supportive environment in Mauritius contributing to the weak impact of the health awareness campaigns done by the MoH&QL [6]. If there had been as many physical exercise facilities as fast food outlets in Mauritius, Mauritians would have shifted more easily to the "Action" stage of the Trans-Theoretical Model of Change.

3. Diabetes-related Preventive Health Scale

The EBBS by Sechrist et al. (1985) was the ideal tool for this ever-first study on perception of Mauritian employees on general benefits of physical exercise. This is because it addresses the benefits of physical exercise pertaining to physical performance, psychological outlook, social interaction, life enhancement and preventive health. However, the items, as stated in the "preventive health" sub-scale of the EBBS, are not up-to-date. In fact, Sechrist et al. did not incorporate in their preventive health sub-scale the "new" and "potential" diabetes-related benefits which have been confirmed over the last recent decades. The mechanisms by which regular physical exercise confers these new benefits are now better understood, through advances made in basic science, large clinical trials and large cohort studies [27].

There has been no study at all carried out in Mauritius to investigate the awareness of Mauritians on the usefulness of physical exercise in the prevention of diabetes. It is therefore being recommended for future studies to investigate perception on health benefits of physical exercise, specifically in relation to Type 2 Diabetes mellitus prevention, by means of a *Diabetes-related Preventive Health Scale*. This scale is to be incorporated in a questionnaire which has a component to assess the amount of physical exercise performed, with particular emphasis on duration, intensity and frequency of physical exercise. In comparison with the International Physical Activity Questionnaire (IPAQ), both

GPAQ and IPAQ have been developed for international assessment of overall physical activity and apply the same cut-points [21]. In contrast, GPAQ refers to the amount of physical exercise performed in a typical week whereas IPAQ queries the amount of physical exercise during the previous seven days. As both contexts have their relevant advantages and disadvantages, the determination of the average amount of physical exercise in a typical week and during the previous week will provide a more realistic amount of physical exercise actually performed.

B. Comparison of findings

Lovell *et al.* (2010) who explored the perceived exercise benefits and barriers among female non-exercising university students in United Kingdom showed that these participants either agreed or strongly agreed with most of the benefits in the EBBS, although they were non-exercising participants [28]. This study found similar findings, that is, Mauritian participants either agreed or strongly agreed with all the listed benefits of regular physical exercise. In line with Lovell *et al.* (2010) who showed that the greatest perceived benefit from exercise was physical performance, Mauritian participants perceived that the most important benefit of exercise was: "Exercising increases my level of physical fitness". Moreover, 'Exercising increases my acceptance by others' was the item with which participants agreed the least in both studies. However, Lovell *et al.* (2010) focused only on female non-practising university students who are mostly under 40 years; this study included both male and female gender, both practising and non-practising employees and finally both above and below 40 year-old participants.

Considering the exercise barriers scale, Mauritian participants either agreed or strongly agreed with all the listed barriers to regular physical exercise. However, Lovell *et al.* (2010) showed that UK participants fairly agreed with many of the barriers items, while they expressed strong disagreement for barrier items, No. 24, No. 33 and No. 12 [28]. With reference to the last barrier item No. 12 ("I am too embarrassed to exercise"), findings of this study were in total contrast with Lovell *et al.*, as this study revealed that this item was the most important barrier for Mauritians. In fact, Mauritian participants agreed the most with barrier item No. 12, followed by barrier item No. 28 ("I think people in exercise clothes look funny"). The context of a developing island state with multi-ethnic origins is reflected through these findings which reveal the conservative cultural tendencies with respect to sportswear.

C. Strengths and limitations of research work

The use of internationally validated and reliable survey instruments constitutes the major strength of this research work. The GPAQ is a questionnaire which is not only valid and reliable [29], but also adaptable to incorporate cultural and other differences, making it an appropriate instrument for developing countries [21]. Around 50 countries have so far been using it for data collection [21]. With respect to the use of the EBBS, its effectiveness as an instrument to measure perceived benefits and barriers of physical activity was confirmed with test-retest reliability of 0.89 on the total instrument, 0.89 on the Benefits Scale and 0.77 on the Barriers Scale [22]. Moreover, Sechrist *et al.* (1987) tested the instrument among 650 individuals, whereby calculation of Cronbach's alpha for the 43-item instrument, the 29-item Benefits Scale and the 14-item Barriers Scale generated a standardized alpha of 0.952, 0.9534 and 0.866 respectively [30]. Another study on the validity and reliability of the EBBS among Turkish female university students yielded similar positive results [31].

The random representative sample of employees, used for this study, reflects the actual workforce population of Mauritius, and thus allows generalization of results to this population. On the other hand, there were some limitations to the study. Data collected were self-administered by workers of Group 1 and 2 while data were collected through interview for the other workers. This situation arose as a result of assistance sought by these workers to fill in the questionnaire. Nonetheless, overestimation is applicable to all survey instruments involving self-reported measurement of physical activity [32]. Another difficulty encountered was related to the fact that the EBBS was a forced Likert scale, whereby participants could not express neutrality, they had to either agree or disagree.

D. Implications and Recommendations

This survey among employees in a workplace setting showed that there was no association between perceived benefits and the practice of the recommended amount of physical exercise to achieve health benefits. Findings of this study highlight the need for further studies to explore perception on health benefits of physical exercise and awareness on volume of physical exercise to achieve these health benefits. Moreover, there is a need to encourage initiatives to implement supportive workplace environment for the practice of physical exercise.

This research work implies that for the design of interventions for promotion of physical exercise among Mauritians, there is a need to address the perception of the two strong barriers revealed by this study, namely "I am too embarrassed to exercise", "I think people in exercise clothes look funny". It is pertinent to develop among Mauritians the acceptance of the social norm that physical exercise can be practised in just casual clothes, usually worn for daily activities at home, and not necessarily in sportswear. Being given that this study revealed that Mauritian adults are too embarrassed to exercise, brisk walking should be the recommended activity to promote for preventive health benefits of physical exercise. Nonetheless, the youth can be involved to support their parents and/or other relatives through initiatives to practise physical exercise.

Moreover, the workplace as a setting for interventions to promote physical activity is being recommended for Mauritius. This recommendation, relevant to this study in a workplace setting, is based on the Global Strategy on Diet, Physical Activity and Health which highlights the workplace as an important setting for health promotion [11] and on the Global Plan of Action on Worker's Health 2008-2017 which advocates physical activity, among other health-related behavior, among workers [33]. Engaging employees in this healthy settings approach will encourage them to take responsibility for their health and ensure that the designed programs will meet the specific needs of the relevant employee population [34]. Moreover, the workplace offers several advantages in that a substantial number of the working population can be reached and multiple levels of influence on behavior can be targeted [5].

V. Conclusion

Findings of the survey revealed that perceived exercise benefits were high among the random sample of employees, representative of the Mauritian workforce. However, only 46% of participants performed the recommended amount of physical exercise to achieve health benefits. Based on the fact that diabetes is a contemporary public health issue with high level of morbidity and mortality, there is need to design and implement interventions for the promotion of physical exercise in workplace settings. Supportive work environment with basic exercise equipment will lead employees who contemplate to undertake physical exercise to shift from sedentary to healthy lifestyle.

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