Uptake of Pedometer-based Physical Activity: Success and Challenges of a Church based Physical Activity Promotion Programme among Overweight and Obese Adults in Kenya

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Abstract: Physical inactivity is among the modifiable risk factors to overweight and obesity. Targeting community units in promoting active lifestyles is beneficial in offering social support. Technological devices such as pedometers can promote physical activity at individual level by providing feedback. This paper presents the success and challenges in implementing an on-going longitudinal pedometer- based PA programme in a selected church in Kenya. Baseline results of 100 participants indicated that 20% were overweight and 26% were obese with BMI scores being higher in those aged 30 years and above. There was significant correlation between BMI and WHR (r=0.67 for females, r=0.88 in males). Physical inactivity among 46 participants in the PA programme was at 52.4%. Most of them work in offices (81%) and use private (71.4%) or public (19%) motorized transport. Majority of them (75%) do not use pedometers to track PA and do not follow guidelines of the programme. Cost, time and competing priorities were cited to hinder participation. The 25% of pedometer users acknowledge their importance and influence to their participation in PA. This paper recommends that the church device strategies to navigate the challenges of physical inactivity while tapping into the resources available within the church settings.

1 INTRODUCTION

Obesity has over the years become a global pandemic with 650 million adults aged 18 years and above and 41 million children being obese in the year 2016(World Health Organization [WHO], 2020). Although there is no conclusive and current population-wide data on prevalence of obesity in Kenya, the Stepwise Survey for Non-Communicable Diseases (NCDs) Risk Factors (2015) showed that 28% of Kenyans aged 18-69 years are either overweight or obese with women recording a higher percentage (38.5%) than men (17.5%), while 4.1% of children under the age of five are either overweight or obese (Ministry of Health [MOH], 2015a).

Obesity has been associated with cardiovascular diseases, diabetes, musculoskeletal disorders and some forms of cancer (WHO, 2018).

These NCDs have reached pandemic levels in Kenya accounting for more than 50% of total hospital admissions and over 55% of hospital deaths (MOH, 2015a).They are indeed a major public health concern with significant social and economic implications in terms of health care needs, lost productivity and premature death thus presenting serious setback to the attainment of desired social, health and economic targets outlined in the United Nations (UN) 2015 Sustainable Development goals Number 3, Kenya's Vision 2030 and the Kenyan Government 2017 Big Four Agenda.

Energy imbalance between calories consumed and calories expended are the fundamental causes of obesity and overweight (WHO, 2020).

One proven way of increasing energy expenditure is participation in regular physical activity (PA) that leads to accumulation of at least 150 minutes of moderate-intensity aerobic physical activity throughout the week for adults and 60minutesperdayforchildren (MOH, 2017). Physical activity is recommended to reduce excess body weight, prevent body weight regain and decrease subsequent risks in developing metabolic and orthopedic conditions (Natel, Mathieu & Prince, 2011).

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Despite the health benefits of PA, there is reduced participation world over with a resultant increase in overweight and obesity. In Kenya, the rate of PA is estimatedtobeonly10%inmalesand14% in females (WHO 2014) with uneven distribution among rural and urban populations where levels of physical activity among rural populations are higher (Muthuri, et al, 2014).

Some of the barriers to PA in Kenya include rapid urbanization; wherein access to fields needed to play such games as soccer are not available due to dense populations and their subsequent demand for land, poor built environment, lack of safe environment in which to walk or cycle to work or to school or for physical play at home, inadequate information by the public on PA, increased use of motorized transport and social cultural factors (WHO, 2018).A combination of all these factors has lead Kenya to get into the fourth pattern of the nutritional and physical activity transition characterized by nutrition and physical inactivity related obesity and NCDs as identified by Popkin in2015.

1.1 Problem Statement

Although there is a lot of good information concerning prevention and management of obesity and associated NCDs in Kenya, including development of important documents outlining the strategies to be adopted at individual, community and society level, there seems not to be a commensurate change in occurrence of the pandemic.

If anything, the rise is on a positive incline. For instance, Strategic objective number three (3) in the Kenya National strategy for prevention and control of non- communicable diseases (2015-2020) is aimed at promoting healthy lifestyles and implementing interventions to reduce the modifiable risk factors for NCDs (MOH, 2015b).

There seem to be a general lack of action on the available information with an estimated PA of only 10% in males and 14% in females (WHO 2014) which is unevenly distributed among rural and urban populations. Children are also showing transition towards sedentary behavior especially those in urban settings with only 12.6% of school children in Nairobi City meeting the recommended levels of daily physical activity (Muthuri et al, 2014). Onywera et al (2012) adds that about 50% of children in urban areas spend over 2 hours per week viewing television compared to<10% of rural children.

With this kind of lifestyle, there is compromised health, high cost to manage disease, loss of productivity due to absence from work and the lack of capacity to work as the health conditions deteriorate. The immediate effects are felt at family level as domestic expenditure on health increases, at institutional level as institutions commit big parts of their budget for health management of their employees, and at the community level as people come together in aid of health care expenses of the affected individuals. This consequently thwarts economic development of the nation.

Voluntary exercise is the most important component of total daily energy expenditure by individuals. This can be achieved at community level by provision of supportive environments within the communities where they come from. This will collectively challenge individuals to follow recommendations for physical activity that promotes and or maintain health.

Such a model is outlined in the midstream approach suggested in the Kenya National Strategy for prevention and control of NCDs (2015-2020) which has interventions targeting groups of people, institutions and communities.

Churches play an important role in communities especially in Africa; serving as primary organizational units and sources of social support and leadership. As such, they are potentially effective settings for implementing community health intervention programmes. In Kenya, the most predominant religion is Christianity with an adherence of 84.8% of the total population (World Factbook, 2020). Thus, targeting churches as the platform for the community-based lifestyle interventions ensures that majority of the population in terms of age group, gender and social economic class are included.

In addition to community-based approaches, technology has been used to promote PA and change exercise behavior (Heyward & Gibson, 2018). For instance, electronic pedometers are increasingly being used to measure PA among all populations because of their ability to count and monitor steps taken throughout the day during ambulatory activities such as walking, jogging and running. A study by Bravata (2007) indicated that participation in PA increased by 27% over baseline levels among pedometer users. According to Masi, Peterman and Kaminsky (2019), when adults accumulate 10,000 steps per day, this translates to an equivalent of walking roughly 8.045kilometers. These researchers recommend 10,000 to 12,500 steps per day for health and wellbeing.

This paper aims at highlighting the success and challenges of a community (church) based programme designed to promote PA among church

congregants using pedometers as the motivator that provides feedback necessary to help individuals track their levels of physical activity by tracking their step counts, sending reminders and real time alerts concerning their activity levels.

The paper highlights the overweight and obesity status of the congregants, the PA levels of the congregants as well as the success and challenges recorded during the implementation of the programme.

2 METHODOLOGY

2.1 Study Design

This paper is developed from an on-going programme that is longitudinal in overall design with an end point focusing on behavior change of the congregants from sedentary to active living. The programme is being carried out in two phases comprising of a baseline survey phase and intervention phase.

The baseline survey phase adopted a cross-sectional analytical design to conduct a Health Risk Appraisal (HRA) on overweight and obesity among the church members. Participation in PA was determined among other modifiable risk factors associated with overweight and obesity. This was followed by physical measurement of height, weight, waist circumference and waist to hip ratio for risk to CVD determination.

The intervention phase involved among other interventions use of pedometers to track daily PA levels of the participants.

2.2 Target Population

The baseline survey targeted all members of the selected church while the intervention phase targeted the overweight and obese adults identified during the health risk appraisal. Parents and guardians as well as the youth were to act as champions of wellbeing at family level serving as models to their children and siblings.

2.2.1 Inclusion and Exclusion Criteria

The programme included all congregants who consented. The programme excluded pregnant women because of the natural weight gain that accompanies pregnancy thus affecting the body mass index as well as the change in body morphology that may not allow objective assessment of waist circumference and determination of waist to hip ratio (WHR).

2.3 Sampling and Sample Size

Census sampling was used to include all the congregants (100) who took part in the first phase of the baseline study. Purposive sampling was used to target all the (46) youth and adult congregants within the overweight and obese category following the results of the baseline health risk appraisal. Convenience sampling was used to enroll willing and motivated congregants into the health promotion programme.

2.4 Data Collection Instruments

The baseline data on PA was obtained using a questionnaire where respondents self-reported on PA among other modifiable risk factors to obesity and NCDs. Physical activity related questions assessed the nature of occupation/work (either office or manual work), the means of transport to work (walking, motorized transport; either private or public) and involvement in other forms of physical activity apart from work (either at the gymnasium, jogging or other sports).

Anthropometric measurements of body weight, height and waist circumference were taken using portable digital Seca Robusta 813 weighing scales (Hamburg Germany), Seca 214 portable stadiometer (Hamburg, Germany) and anthropometric tapes respectively. Overweight and obesity was determined using BMI.

Classification for risk category was followed by measuring waist and hip circumferences using anthropometric tapes. These measurements were then used to determine the WHR.

Given the different financial abilities of the participants, they were advised to purchase pedometers of their choice, so long as they would take step counts and provide distance covered per day in kilometers. The pedometers were also required to be able to give alerts on sedentarism when participants were seated for too long without walking. The pedometers were also supposed to have the ability to synchronize with mobile phone applications that would allow data interpretation and sharing on the WhatsApp platform.

2.5 Study Procedure

Permission was sought from the church leadership to conduct a church-wide one day health risk appraisal camp for the congregants at the church premises in August, 2019. During this camp, the participants were presented with a talk on obesity and its associated risk

factors and NCDs. The camp was a diagnostic and not curative forum with the aim of collecting baseline information that would inform development of the pedometer-based PA promotion programme. General feedback on the health risk appraisal was presented on another day to the church after analysis. It is during this feedback meeting that congregants were recruited to the PA promotion programme. During the launch of the programme, participants signed the informed consent for the intervention and guided on the basic specifications of the pedometers and how to acquire them. The participants were allowed to purchase pedometers of their choice so long as they could take step counts, distance in kilometers, give real time alerts on sedentarism and could be synchronized with mobile phone applications to allow data sharing and report their engagement in PA on a daily basis. A WhatsApp account was created and all the consenting participants registered.

The participants were to engage in self- directed PA throughout the week from their homes or work, and were to take screenshots of their workouts as recorded by their pedometers and post them on the WhatsApp forum. They were encouraged to share their experiences in the forum. They were also provided with an opportunity to ask questions or discuss topics related to PA and obesity in the forum. Once every week on Saturday morning from 7.00am, they were taken through a one hour aerobic dance session by a qualified fitness instructor. This allowed for a face to face interaction with one another.

2.6 Data Analysis

Anthropometric data was analyzed in Microsoft excel programme. Frequencies were used to summarize the raw data. Pearson product moment correlation coefficient was used to relate BMI scores with the WHR scores. Self-report data on participation in PA was analyzed using Google forms to accord the study real time responses from the participants. Data on uptake of pedometer-based PA at community level (church) were analyzed under two main themes namely; success and challenges. The results are presented in tables, charts and bar-graphs.

2.7 Logistical and Ethical Considerations

Permission to recruit the congregants was sought from the Vicar In-charge of the selected church. Members were provided with information concerning the program and given opportunity to give written informed consent. For sustainability, it is hoped that, promotion of self-directed active lifestyle will ensure that congregants are in control of their weight and health in general. The church will play the role of social support structure offering the desired social environment for continued engagement of its members on healthy active practices beyond the programme. The documented success of the intervention will act as evidence for scaling up to other community settings countrywide.

3 RESULTS

Figure 1 indicates that a total of 100 congregants were assessed of their weight status, out of which 20 were overweight with a BMI=25<30 while 26 were obese with their BMI ≥30.00.

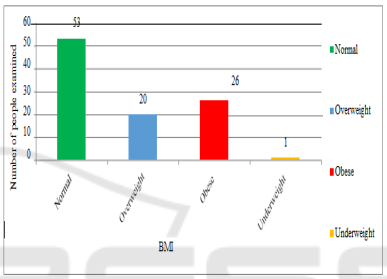

Figure 1: Overweight and Obesity Status of the congregants.

BMI scores for the participants in the obese category were distributed against age and the results presented in figure2.

The results in figure 2 indicate that out of the 26 obese participants, 6 participants (11-20years), 5 participants (21-30 years), 4 participants (31-40 years) and 2 participants (51-60 years) were in the class 1 of obesity (BMI=30<35). Twoparticipants (41-50years) and 1 participant (51-60 years) were in class II of obesity (BMI=35<40. One participant (31-40 years) was in category III of obesity (BMI=40) while 1 participant (41-50years) was in the category for morbid obesity (BMI>40.

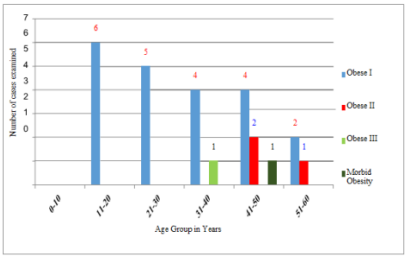

Figure 2: Overweight and Obesity Status by Age and Gender.

3.1 Self-report on PA

Out of the 46 congregants who consented to take part in the health promotion programme, 21 completed the self-report questionnaire on participation in PA and their results are presented in figures 3, 4 and 5. Figure 3 indicates that out of the 21 respondents, 19% are involved in manual work while 81% work in the offices.

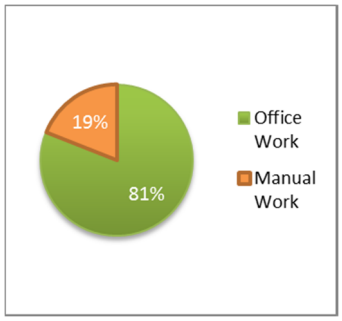

Figure 3: Type of Work/Occupation.

Figure 4 indicates that out of the 81% respondents who work in the office, 9.5% walk to the office, 19% use public means while 71.4% use private vehicles to travel to work.

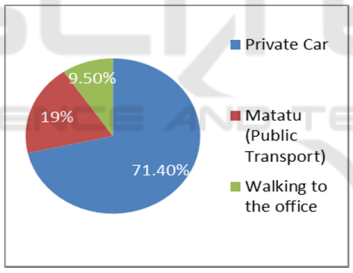

Figure 4: Means of travel to work.

Figure 5 shows that other than work 19% engage in jogging activity, 21.8% are engaged in activities at the gymnasium, 4.8% are engaged in other sports while 52.4% are not involved in any other physical activity.

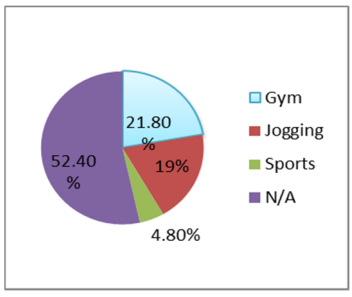

Figure 5: Activities other than work.

To determine the risk status of the recruited congregants to disease, waist to hip ratios were measured against their BMI by gender.

Out of the 16 female participants, 9 were under the high-risk category, 3 were in the low risk while 4 were in the very low risk. On the other hand, out of the 6 male participants, 2 were in the high-risk category, 2 in the low while 2 were in the very low risk category.

In addition, a relationship between BMI and waist to hip ratio was determined using the Pearson product moment correlation coefficient for each gender. The analysis indicated a significant relationship between BMI scores and WHR scores for females($r=0.67$) and males ($r=0.88$).

3.2 Uptake of Pedometer-based PA at the Church

Although all the participants were sufficiently sensitized on the role of wearable technology devices such as pedometers and their importance in monitoring an individual's PA level and volume, it was solely based on voluntary acquisition and self-motivated daily use of the gadget. This was important for a sustainable self-driven approach that can be carried forward even after the intervention period lapses. However, this study shows a poor uptake of the recommended pedometer based PA monitoring approach with 75% opting not to acquire or use the device. They cited conflicting demands of resources (money and time) while directing their focus on other non-health and wellness needs.

There was however a positive adoption by a quarter (25%) of the sample who found pedometers valuable and a positive influence in PA participation. This included 2 males and 2 female participants aged between 25 and 35 years. It is interesting to note that all the 25% of the pedometer users were in the overweight category and all were in the very low risk to development of CVDs as categorized by their waist to hip ratios. One would expect to see the obese individuals being enthusiastic about taking PA as a weight remedy and using pedometers for motivation, however is was not the case so far in this study. Additionally, all the pedometer users were among the youth category aged 25 to 35 years who may find technology use easy and friendly in offering solutions. Probably the older congregants, besides the financial challenge, found the use of pedometers to be technically challenging.

3.2.1 Success

The following successes emanated from an interview conducted among the 21 participants of the pedometer-based PA promotion programme. They opined that:

i. The programme has been useful in creating awareness about overweight and obesity status of the congregants
ii. It has been useful in helping the congregants understand the role of exercise among other interventions in management of overweight and obesity
iii. It has brought people together to work towards a common goal of leading healthy active lives.

3.2.2 Challenges

The participants cited the following as challenges that are possibly slowing down the program.

i. There is lack of capacity at institutional level to support frequent mass activities.
ii. The uptake of the PA has not been felt at the health club level.
iii. Conflicting demand for resources (time and money) whereby investing in pedometers, PA support equipment and facilities are considered as opportunity cost over other priorities.

4 DISCUSSION

4.1 Overweight and Obesity Status of the Congregants

Twenty percent of the congregants are overweight while 26% are obese indicating that the pandemic is increasing in Kenyan communities. Although there are cases of obesity among younger populations (6 in 11-20years) the serious cases of obesity (categories, II, III and morbid obesity) are more prevalent in later years especially 30- 60 years. This finding agrees with that of Mkuu et al, (2018) who observed high prevalence of overweight (20.5%) and obesity (9.1%) among Kenyan women aged 35-44years.

4.2 Physical Activity Status

From the self-report on participation in PA, most congregants are inactive with majority working in offices (81%) where they probably sit all day long. They also use motorized transport (90%) to and from work with majority of them using private vehicles (71%) offering them less or no opportunity to be active. Worse still, majority of the congregants (52.4%) do not engage in PA other than office work further compromising their activity levels leaving no avenue for energy expenditure.

This provides good ground for overweight and obesity to develop and blossom. These results agree with the observations by King and Jacobson (2017) who in their review observed that though fast and convenient, automobiles are replacing PA involved in walking or cycling with sedentary activity of driving thus increasing obesity by reducing energy expenditure.

4.3 Uptake of Pedometer-based PA at the Church

On use of objective monitoring of PA using wearable devices such as pedometers proposed in this project, it is noteworthy that although this represents a valuable mode of monitoring volumes and influencing participation, its uptake at community level may be low and poor at the beginning due to other competing priorities (costs and time). This may be addressed through continuous sensitization, encouragement and follow-up by peers until lasting habits and appreciation of the initiatives are established. The 25% of the participants who used pedometers were mainly youth aged 25-35 years. This pointed to the fact that younger generation may embrace technology faster and better than the older ones. The use of pedometers was equal among gender on a ratio of 1:1 and therefore the use of pedometer may not be influenced by gender. However, those that used pedometers were the young and were all in the overweight category with none from the obese category. This indicates the need to continuously target the older congregants in promoting the PA programme while encouraging them to use the pedometers for they are likely to sustain the motivation for self-directed PA. Another area of focus in this study would be to encourage the obese congregants to engage in PA and offer personalized support to them towards developing a self-directed PA routine. The 25% who used pedometers referred to them as useful and had significant influence on their daily participation in PA. This finding is similar to that of Baker et al., (2008) who observed significant increases in step counts among the intervention group as well as the time spent in leisure walking and a reduction in sitting time among pedometer users.

5 CONCLUSIONS

The uptake of pedometer-based PA promotion programme is slow at the community-church level even though cases of overweight and obesity are increasing. The few congregants that have embraced pedometer use to monitor their PA levels are among the youth age category and are mainly in the overweight category. This leaves out a key population of the church; the older where majority of obesity cases lie. There is a noticeable percentage of physical inactivity among the congregants a reason that can be associated with the high levels of overweight and obesity. The increase in overweight and obesity is likely to predispose most of the congregants to developing one or more of NCDs whose risk factors include among others physical inactivity.

6 RECOMMENDATIONS

This paper recommends that the church by virtue of being an organized and well- structured social unit in the society should promote and device strategies to help the congregants navigate the challenges of physical inactivity while at the same time tapping into the resources available to it including facilities and health experts within its reach to address the rising cases of obesity and related comorbidities in the society. Among the proposed recommendations is continued sensitization on use of pedometers by the congregants and the importance of acquiring pedometers for PA promotion. One of the main limitations of this programme is lack of provision of pedometers to the participants. May be if this was achieved, there would be a higher level of uptake which would enable the researcher to track the step counts attained by the participants against the recommended number of 10,000 steps per day. This would help address issues of adherence and allow further analysis of the uptake of pedometer-based PA promotion on health outcomes especially on overweight and obesity status of the congregants.

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