DEVELOPMENT OF PHYSICAL ACTIVITY PYRAMID IN BRAILLE FOR VISUALLY IMPAIRED ADULTS

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ABSTRACT

People with vision impairment (VI) are usually physically and socially inactive. 39% of visually impaired (VI) and physical disability youth were classified as sedentary. The aim of this study was to develop an education tool to educate and encourage the visually impaired (VI) population to be more physically active and thereby prevent health problems, improve their well-being, enhance social skills and help them to build self-confidence. Interview sessions with the VI adults (n=4) and two experts in this field were carried out and the inputs collected were used to modify the current Malaysian physical activity pyramid. The modified physical activity pyramid for the VI population was then being printed in Braille. It was also being tested by a small group of VI adults (n=10). All the participants understood the diagram and guidelines carried by the Braille physical activity pyramid and it was well-accepted by them. Finally, the physical activity pyramid in Braille for adults with VI was developed. It can be served as an education tool for the VI population as it has been tailored to their capability and daily lifestyle.

Keywords: Vision impairment, physical activity pyramid, Braille

ABSTRAK

Individu yang mengalami kecacatan penglihatan biasanya tidak aktif secara fizikal dan sosial. 39% remaja cacat penglihatan (VI) dan cacat fizikal dikelaskan sebagai tidak aktif. Tujuan kajian dijalankan untuk membangunkan alat pendidikan bagi mendidik dan menggalakkan populasi cacat penglihatan (VI) menjadi lebih aktif secara fizikal dan dengan itu dapat mencegah masalah kesihatan, menambahbaik kesejahteraan hidup, meningkatkan kemahiran sosial dan membantu mereka membina keyakinan diri. Sesi wawancara dengan empat orang dewasa VI dan dua pakar dalam bidang ini telah dijalankan dan hasil yang dikumpul digunakan untuk memodifikasikan piramid aktiviti fizikal Malaysia. Piramid aktiviti fizikal yang diubah suai untuk populasi VI kemudiannya dicetak dalam bentuk Braille. Ia juga telah diuji oleh sekumpulan kecil orang dewasa VI (n=10). Semua peserta memahami rajah dan garis panduan yang dibawa oleh piramid aktiviti fizikal Braille dan ia diterima dengan baik oleh mereka. Akhirnya, piramid aktiviti fizikal dalam bentuk Braille untuk dewasa VI telah dibangunkan. Ia boleh berfungsi sebagai alat pendidikan untuk populasi VI kerana ia telah disesuaikan dengan kemampuan dan gaya hidup harian mereka.

Kata kunci: Kecacatan penglihatan, piramid aktiviti fizikal, Braille

1 INTRODUCTION

The importance and health effects of physical activity have been well documented by many researchers. Regular physical activity for adults has been linked to decreases in the risk of various chronic diseases and non-communicable diseases including coronary heart disease, hypertension, obesity, diabetes, osteoporosis, colon cancer, and anxiety and depression (CDC, 2011; Reiner et al. 2013; Warburton et al. 2006). Furthermore, the replacement of sedentary behaviours with moderate intensity physical activity may enhance the overall health of children by enhancing their immune defence, while assisting to prevent chronic disease during childhood and adolescence (Sothern et al. 1999). In addition, regular physical activity and physical fitness also promotes healthy ageing in elderly population, improves their cognitive function, improves functional ability, enhances independence and improves quality of life (American College of Sports Medicine, 1998; Gregory et al. 2012).

Physical activities and sports for visual impairment (VI) population have been studied and showed in the literature. The involvement of VI population in physical activities and sports is generating multiple benefits in physiological, sociological, psychological and even neuropsychological aspect (Santer, 2013; Constancio, 2010; Partavi, 2013; Arazi et al., 2016; Jahromi & Gholami, 2015; Yildirim et al. 2013). Some research have been conducted on individuals with vision impairment (VI) in relating to their physical activity level or pattern. Marmeleira et al. (2014) found out blind adults in Portugal had low level of physical activity and were considerably less active when compared with the general population. A review done by Haegele & Porretta (2015) summarized that students with VI participated less in physical activity. When comes to the engagement of physical activity, several reports indicated that Malaysian were practicing sedentary lifestyle and seldom exercise (MANS, 2003; Poh et al. 2010; Murad et al. 2016; Althoff et al. 2017). Up-to-date, there is no study has been conducted on assessment of physical activity level among VI population in Malaysia, although there were some studies regarding this population.

In Malaysia, the number of cases who were registered as people with disabilities (PWD) is increasing every year, from 314,247 cases in 2010 to a total number of 531,962 in year 2014, where 50,827 people from it had vision impairment. (Department of Social Welfare and Department of Statistics, Malaysia). Qualitative study on vision loss population by Stevelink et al. (2015) described this population were facing low self-esteem and less socially active. Therefore, attention should be given to this minority group as well. Anand et al. (2011) revealed that even medical students were having low knowledge and practices regarding physical activity. It is vital to educate the VI population about the knowledge of physical activities and sports in order to encourage them to be more physically active and thereby prevent health problems, improve their well-being, enhance social skills and build self-confidence. The physical activity pyramid (MOH Malaysia, 2012) is a simple and useful guide on how to be physically active every day. Activities listed at the base of the pyramid, such as housework and walking up and down the stairs, are activities that should be incorporated in the daily life and what an individual should do most often.

This study aims to develop a physical activity pyramid in Braille that tailored to VI population's capabilities and well-accepted by them, to serve as education tool for a lifestyle intervention programme, which aims to educate blind adults on healthy lifestyle, focusing on healthy food intake and active living.

2 METHODOLOGY

2.1 Interview

Interview session with adults (n=4) who visually impaired from Malaysian Association for the Blind (MAB) and *Persatuan Orang-orang Cacat Penglihatan Islam Malaysia* (PERTIS) was carried out. Questions and topics about the daily lifestyle, work, physical activity, exercise, hobby, transportation and obstacles were asked and discussed to understand their daily lifestyle, type and frequency of physical activity or sport that they usually involved. Two experts[1,2] in this field were also being interviewed to obtain their professional inputs for this development.

2.2 Modification

Current Malaysian physical activity pyramid was then being modified based on the outcome of interview to create the physical activity pyramid in Braille for VI.

2.3 Braille printing

The modified physical activity pyramid was converted into Braille by Braille Publishing Unit (BPU) of MAB.

2.4 Checking and proof read

The finished Braille physical activity pyramid was being checked to make sure the figure and Braille dots were properly drawn and printed, and being presented in a neat and organised way. Then, a blind adult was asked to read it to make sure the content was correct and no spelling or printing error.

2.5 Testing

VI adults (n=10) from MAB were requested to study the Braille physical activity pyramid and their comments were recorded.

3 RESULTS

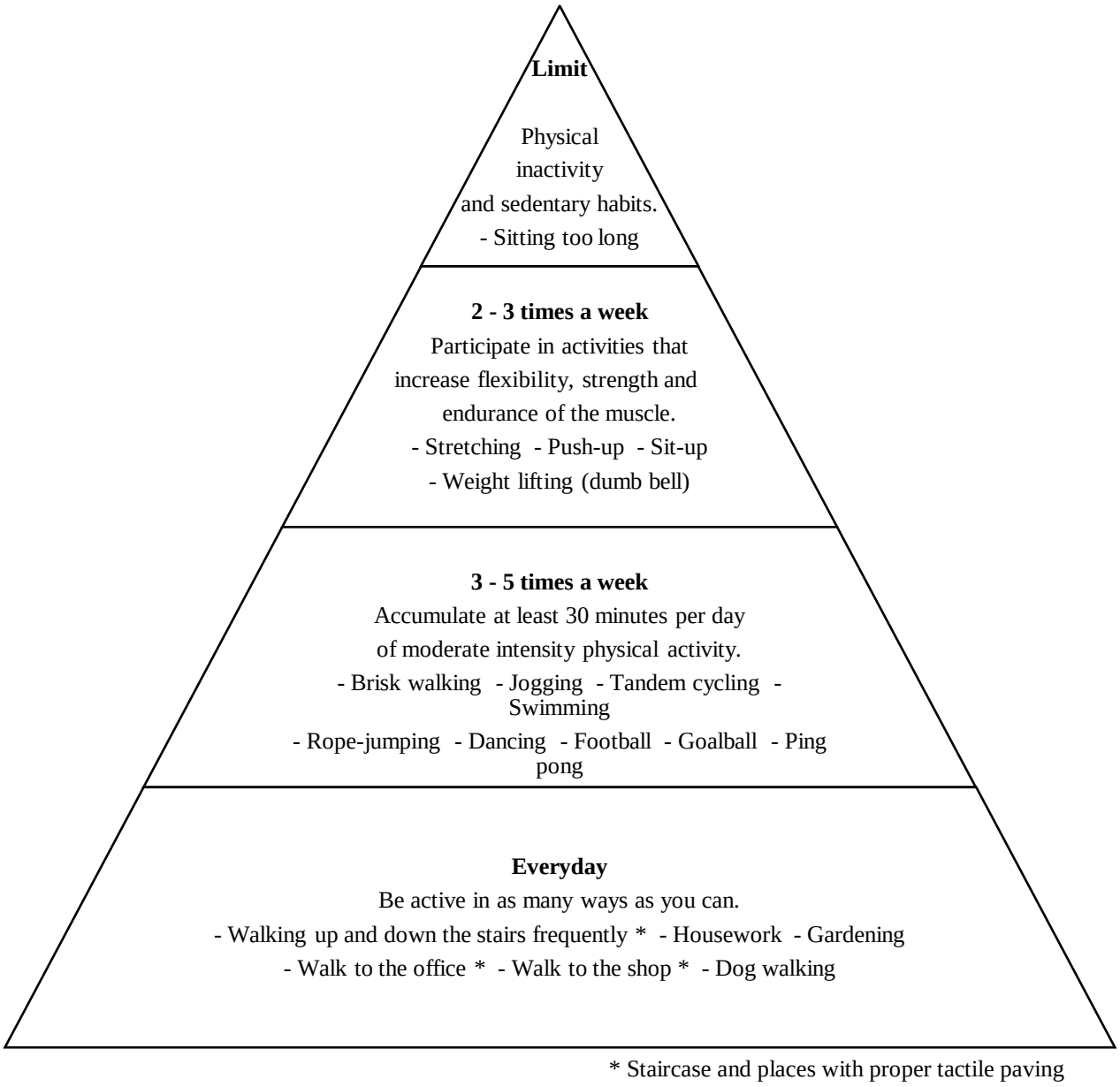

Figure 1: Physical activity pyramid developed for visually impaired population

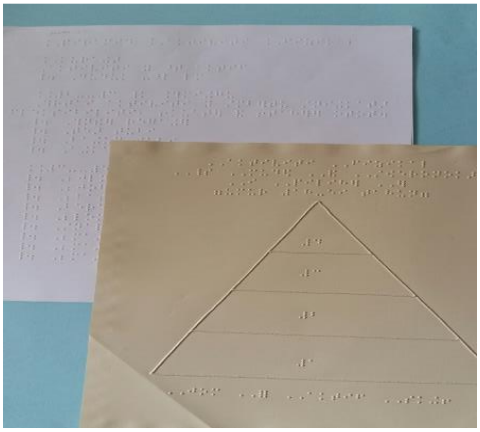

Figure 2: Braille physical activity pyramid

During leisure time, visually impaired population do not watch television, they mostly listen to the radio or music. Despite there are restrictions and limited capabilities, VI people still able to perform some simple cooking, house works and gardening works at the places that are safe and they are very familiar with.

VI population do not play sports that involving the ball passes through up in the air and the speed, angle and direction of the ball is unpredictable, such as basketball, tennis, badminton, volleyball and sepak takraw. However, certain sports like table tennis and football, some modifications have been done to it to suit or make visually impaired people able to play it.VI people do go to gymnasium, where there are gymnasium facilities in schools or certain sport clubs that they attend. There are trained coaches that will help them to use the equipments without hurting themselves. Some sport clubs also organize swimming, judo, yoga and bowling classes weekly or occasionally. VI people, no matter which category, is not able to drive, but by using tandem bicycle, which has two seats and two sets of pedals for two riders, sighted people ride in the front and VI people ride at the back, they are able to enjoy the fun of cycling.

As shown in Table 1, there were 10 VI adults being requested to study the Braille physical activity pyramid. Overall, they understood the diagram, guidelines or content, and commented it improved their knowledge regarding physical activity. One student was found to be not able to read the content properly, however, after verbal explanation was given, the student reported to understand the guidelines carried by it.

Table 1: Characteristics of the VI adults who study Braille physical activity pyramid

Characteristic	**Participants**
Number	10
Gender	
Male	7
Female	3
Age	20.7 ± 2.9
Vision category	
Low vision	6
Totally blind	4

Table 2: The feedbacks from VI students after studying the Braille physical activity pyramid

Parameters	Feedback
Able to read	9/10
Understand the diagram and guidelines	10/10

4 DISCUSSION

The Braille physical activity pyramid was generally well-accepted by the VI adults. Although one student was found to be not able to read the content properly, but after verbal explanation was given, the student reported to understand the guidelines carried by it. This was due to the Braille physical activity pyramid was delivering in second grade of Braille. Braille is actually divided into three grades.

According to American Council of the Blinds (2008), first grade or grade 1, each possible arrangement of dots within a cell represents only one letter, number, punctuation sign, or special Braille composition sign - it is a one-to-one conversion. In grade 2 Braille, a cell can represent a shortened form of a word. Many cell combinations have been created to represent common words, making this the most popular of the grades of Braille. The last of the grades of Braille, grade 3, is essentially a system of Braille shorthand. Because it has not been standardized, it is not used in publications. Instead, it is typically used by individuals for their own personal convenience.

A new sport named goalball is being introduced and put into the physical activity pyramid as one of the recommendations. Goalball is a sport or game that specifically created and designed for VI people. According to International Blind Sports Federation, goalball was invented in 1946 by Austrian, Hanz Lorenzen, and German, Sepp Reindle, in an effort to help in the rehabilitation of blinded war veterans. Now, goalball is a Paralympic sport exclusively for athletes who are visually impaired or blind. The game is played by two teams of three players on a volleyball-sized court. They try to throw a ball that has bells embedded in it into the opponents' goal, the ball is thrown by hand and never kicked. A Turkish study (Colak *et al*. 2004), found that goalball players did better in various motor fitness aspects. So, this study suggest that goalball may be considered a very effective option in improving motor skills in those with vision impairment.

The reading barrier by the VI should be taken into consideration in future studies. Some VI people, especially those who are not totally blind, could only able to read Braille grade 1 or not able to read Braille at all because they are not being taught Braille. Hence, the grading of Braille became a limitation for the development of physical activity pyramid in Braille. Therefore, suggestion like audio form of education tool needs to be introduced to the VI or incorporated into future related studies.

The Braille educational tool, which is the physical activity pyramid in Braille that being developed in this study actually could be incorporated into teaching materials in schools for the blinds. This could also be used by the healthcare professionals as counselling tool to VI patients. In addition, it would be beneficial and much appreciated if some blind associations would make it into booklet and distribute it for free to the VI population.

5 CONCLUSION

Physical activity or sport is one of the factors in promoting healthy lifestyle, and it is more important to VI population because they are less active than general population and it is considered a challenging task for them. Therefore, the physical activity pyramid in Braille for VI adults was developed to serve as an education and counselling tool for the VI population in order to help increase their physical activity level, community involvement and quality of life as well. This Braille concept physical activity pyramid conveys safe and appropriate physical activity guidelines to VI population as it has been tailored to their capability and daily lifestyle.

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NOTES

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2. Major Azhari bin Abdullah, Deputy President of MBSA, Council Member of MAB, Athlete for Blind Shooting**.**