ORIGINAL ARTICLE

Moderate Intensity Physical Exercise Effectiveness on Stress and Happiness Level Among Parents of Physically Disabled Children

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ABSTRACT

The upbringing of a physically disabled child involves huge monetary funds and constant attention from the parent. It leads to minimal sociability and personal attention for the parents, which contributes to high stress and low happiness in the long run. Hence, this experimental study was conducted to measure the effect of moderate physical exercise on stress and happiness among parents of physically disabled children using the Perceived Stress Scale and Subjective Happiness Scale. The study goals were to evaluate the potential sociodemographic variables and the benefits of moderate-intensity exercise in stress and happiness management. Participants were allocated into either an exercise group or a control group; parents in the exercise group were given clear-cut instructions on moderate-intensity exercises to complete in 6 weeks. The data were analysed using Chi-square, Pearson correlation, and ANOVA from SPSS software. The findings showed sociodemographic variables and physical activity level have no significant relationship ($p>0.05$) on stress and happiness level among parents of physically disabled children except for employment status ($p<0.05$). The moderate intensity exercise has a significant effect on stress levels ($p<0.05$) but no significant effect on happiness levels ($p>0.05$) among parents of physically disabled children. Altogether, the findings from this study proclaimed that moderate-intensity exercise affects stress but not the happiness level of parents of physically disabled children. With that, a potential intervention tool through exercise adoption can be utilized as a medium to manage stress in parents of physically disabled children. On that account, elucidation on physical exercise towards stress levels in parents of physically disabled children can be achieved and explained in an informative manner. Further studies are warranted to confirm this study findings.

Keywords: Parents; Physically disabled children; Stress; Happiness; Exercise

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INTRODUCTION

The presence of disabled children in one's family has irreversible consequences for the family's mental health. Most physically disabled children have difficulty conducting their daily activities independently and need help from family members, especially parents. Having physically disabled children have changed parents' lives, and a huge burden falls on them as the primary caregiver (Lebni et al. 2020). The parents are affected by the emotional, physical, and psychosocial aspects (Qian et al. 2015). Most of the parents felt having physically disabled children have changed their life because they need to cope with the needs of their children (Wang et al. 2007). A higher level of emotional burnout was seen among parents with disabled children, especially mothers, compared to parents of children without disabilities (Kurtoğlu & Özçirpici 2019).

The emotional and physical burden of caring for disabled children can overwhelm the parent. The continuous effort in day-to-day activities related to the children, such as transferring, dressing, and so on, typically makes the parents fatigue and unintentionally affects their behaviour changes where they tend to isolate themselves from other peers (Vassilis 2017). Apart from that, time taken in managing the physically disabled children led to compromising the parent's usual activities, where they have less time for themself and socialize with their partners. This time-constraint

situation psychologically affects the parents and their social and marital relations, and they are socially isolated (Laskar et al. 2010).

Outdoor social lifestyles such as exercising and physical activities reduce stress and increase both parents' and children's happiness. However, in families with physically disabled children, parents and children cannot socialize or engage in outside physical activity for various reasons. Lack of sufficient local leisure facilities and accessible transportation for wheelchair users, such as the door or slope being too narrow, is one reason they feel disappointed in participating in outdoor social activities (Rimmer et al. 2017). The need to protect children from respiratory infections is also why parents limit outdoor programs, especially exercising, contact sports, or physical activities (Qian et al. 2015). In addition, the need for specialized equipment for these children to assist with their breathing or movement, causing preparing for out-of-the-house activities, time-consuming and overwhelming, resulting in the parents not interested in outdoor physical activities and socializing with others (Qian et al. 2015).

All this burden and complex situation will affect the parent's level of stress and happiness. The lack of social activity for parents to release all the stress will cause them to be in continued stress state with reduced happiness. Hence, looking into parents' ability to do exercise or physical activity to make them feel happy and less stress is important and should be included in a rehabilitation process to ensure both parents and children with physically disabled have a better health state and quality of life.

METHODS

Study design

A single blind randomized controlled trial design experimental study was used to determine the effect of moderate-intensity activity on stress levels and happiness among parents of physically disabled children.

Participants

The total sample size calculation was based on literature that described the involvement of 30 participants using G-Power version 3.1.9.7 software with a significant level (α) of 5% and the effect size of 0.8; participants became 15 with a 20% attrition rate per group. The inclusion criteria were parents of physically disabled children diagnosed with Spinal Muscular Atrophy Type I, II or III, Cerebral Palsy, Dandy-Walker Syndrome and Tyrosine Hydroxylase Deficiency. In addition, parents diagnosed with a psychiatric or neurological disorder, a history of cardiovascular, respiratory, metabolic, or renal diseases, were pregnant or had any former or current physical impairment unsuitable for moderate-intensity exercise were excluded. Participants' consent was obtained using the informed consent form before answering the selected questionnaires.

Instrument

The instruments used to measure the desired objectives are the Sociodemographic questionnaire, Perceived Stress Scale, and Subjective Happiness Scale. The two scales were self-administered in nature.

Procedure

Participants were randomly assigned into two groups: the control and intervention groups. Participants need to answer a sociodemographic survey which includes age, household economic status, employment status, physically disabled children's age, Perceived Stress Scale, and Subjective Happiness Scale using a google form. Participants submitted the questionnaire the week before the program started (T1). Then for six weeks, the control group was not given any intervention except usual education while the intervention group completed the exercises prescribed for six weeks. Finally, after six weeks of study, all participants were asked to answer the questionnaire again (T2).

Intervention

An indoor moderate-intensity aerobic exercise was prescribed to the intervention group using a live online session via Google Meet and Skype twice weekly for six weeks. The intensity of the exercise was increased every fortnightly. Initially, the exercise intensity started with 6 minutes for week 1 and week 2, and was increased to 12 minutes for week 3 and week 4, and 18 minutes for week 5 and week 6. The exercise was divided into two types, exercise 1 (E1) every Wednesday and exercise 2 (E2) every Saturday (Table 1) and was conducted by an experienced physiotherapist.

Statistical analysis

All data were analysed using SPSS version 22 (SPSS Inc., Chicago, IL, USA). A two-way repeated measures ANOVA was used to measure the effect of 6 weeks of moderate-intensity exercise on stress and happiness among parents of physically disabled children. Chi-square and Pearson correlation tests were used to measure the relationship between the sociodemographic variables and physical activity level with stress and happiness among parents of physically disabled children. The level of significant differences was set at $p < 0.05$. Data were expressed as mean and standard deviation (M ± SD).

RESULTS

A total of 26 of 38 parents of physically disabled children successfully completed the study intervention. The parents' mean age was 37.73 ± 7.28 years old (ranged from 28 to 53 years old) and with the children's mean age was 7.28 ± 4.94 years old (range between 1 and 18 years old) (Table 2). The mean pre-test score mean for Perceived Stress Scale and Subjective Happiness Scale for all 26 participants were M=21.11±3.66 and M=4.74 ± 1.03, respectively.

In this study, for the control group, the number of employed and unemployed was 5 (38%) and 8 (62%) people, respectively. The participant according to

Table 1: E1 and E2 exercise program (Herbert, Meixner, Wiebking, & Gilg, 2020)

	E1 (Continuous jog on the spot during the entire exercise)	E2 (Continuous hopping on the spot during the entire exercise)	
Warm-up	Run on the sport	Hop on the sport	20 sec
	Turn In hips while running	Turn In hips while jumping	15 sec
	Butt kick exercise with hands on hip	Butt kick exercise with hands on hip	15 sec
	Windmill arm rotation exercise	Jumping with arms to the front	20 sec
Exercise	• Overhead arm raises • Side air punches • Front air punches • Kicks to the front • High knees forward • Kicks with wrist touch the opposite toe • Overhead arm raises • Side air punches • Front air punches • Kicks to the front • High knees forward • Kicks with wrist touch the opposite toe	• Arm circles • Uppercuts • Punches overhead • Arms crossed and jump side to side • Side taps squat • X - jumps • Arm circles • Uppercuts • Punches overhead • Arms crossed and jump side to side • Side taps squat • X - jumps	Week 1 & 2: 30 sec each exercise Week 3 & 4: 45 sec each exercise Week 5 & 6: 60 sec each exercise
Cooling down	Shake out arms while run on the spot	Lift heels and wiggle on tiptoe	15 sec
	Straddle stretch in standing with arms relax	Straddle stretch in standing, shake out thighs	15 sec
	Dynamic stretching to the side by upper body twist	Arms stretched by reach arm overhead slowly	15 sec
	Bent over twist	Bent over twist	15 sec

household income status in this group were 3 (23%) for T20, 5 (38%) for M40 and 5 (38%) for B40, respectively. On the other hand, the intervention group participants consist of 9 (69%) for employed and 4 (31%) for unemployed, respectively. The participants household income status for this group were 10 (77%) M40 and 3 (23%) for B40, respectively. None of the participant in the intervention group falls into the T20 category. Then, the general effect of employment status and household income on stress and happiness level among parents of physically disabled children were measured using chi-square.

Based on the statistical analysis, there was no

Table 2: Descriptive statistics for control and intervention group

	Control group (n=13)		Intervention group (n=13)	
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**
Participant's age (years old)	35.23	6.33	40.23	7.54
Children's age (years old)	5.88	5.10	8.68	4.53
Pre-Test score for Perceived Stress Scale	21.54	3.20	20.69	4.15
Post-Test score for Perceived Stress Scale	20.61	4.48	14.69	4.48
Pre-Test score for Subjective Happiness Scale	4.63	1.01	4.85	1.07
Post-Test score for Subjective Happiness Scale	4.65	1.09	5.15	1.26

Table 3: The association between gender, employment status and household income classification with stress level among the participants

Variables		Low stress	Moderate Stress	High Stress	X^2
Gender	Male	0	4	0	X^2 (2, 26) = 0.35, *p=0.82*
	Female	1	20	1	
Employment Status	Employed	0	14	0	X^2 (2, 26) = 2.53, *p=0.28*
	Unemployed	1	10	1	
Household Income Classification	B40	0	8	0	X^2 (4, 26) = 1.59, *p=0.81*
	M40	1	13	1	
	T20	0	3	0	

significant association where $p>0.05$ between employment status and household income classification of the parents of physically disabled children's stress level (Table 3).

On the contrary, the happiness level and employment status show a significant association ($p<0.05$).

However, household income classification has no impact with $p>0.05$ on parents of physically disabled children's happiness level (Table 4). Furthermore, the relationship between the Perceived Stress Scale and Subjective Happiness Scale score was also analysed using the Pearson correlation test, showing significant results ($r=-0.51$, $p< 0.05$). From these results, we can conclude that stress and happiness were negatively associated; the lesser the stress, the happier the participants were.

The two-way repeated measures ANOVA analysis on the effect of 6 weeks of moderate-intensity exercise (Table 5) showed that the 6-week moderate intensity exercise have significant effects (F (1,12) =9.501, p=0.02, η_p^2=0.38) where p<0.05 on the Perceived Stress Scale score among the participants. Furthermore, the effect size of η_p^2=0.38 showed that moderate-intensity exercise greatly affects practical significance.

Table 4: The association between gender, employment status and household income classification with happiness level among the participants

Variables		Less Happy	Happier	X^2
Gender	Male	4	0	X^2 (1, 26) = 0.86, p=0.35
	Female	18	4	
Employment Status	Employed	10	4	X^2 (1, 26) = 4.05, p=0.04*
	Unemployed	12	0	
Household Income Classification	B40	8	0	X^2 (2, 26) = 2.44, p=0.29
	M40	12	3	
	T20	2	1	

Table 5: The effect of the 6-week moderate intensity exercise on Perceived Stress Scale score among control and intervention group

	F	Sig. (p)	Partial Eta Squared (η_p^2)
Between 6 weeks × group	7.19	0.02*	0.38
Between 6 weeks	9.50	0.01*	0.44
Between-group	3.26	0.09	0.21

The estimated marginal mean of the Perceived Stress Scale score for the pre-test and post-test between control and intervention groups is shown in Figure 1. Based on the figure, the intervention group significantly reduced the estimated marginal means of Perceived Stress Scale score after 6 weeks of a moderate exercise intensity program compared to the control group. In contrast, there was no significant difference in Subjective Happiness Scale score among the control and intervention groups after 6 weeks of moderate-intensity exercise (F (1,12) =1.43, p=0.26, η_p^2=0.06) where p>0.05.

DISCUSSION

From this study, we found that employment status has a significant association with parents' happiness levels. This finding is similar to another study conducted by Gagat-Matula (2021). It shows that employed parents with a better financial status have a better quality of life and satisfaction since they have the economic freedom to bring their children for medical and rehabilitation treatment without hesitation, making them happy and satisfied.

Since parents of physically disabled children are financially burdened, those employed can utilize their earnings to better provide for their children's needs, such as better treatment, medications, or rehabilitation programs. In contrast, for unemployed parents, financial restriction limits the capabilities of providing

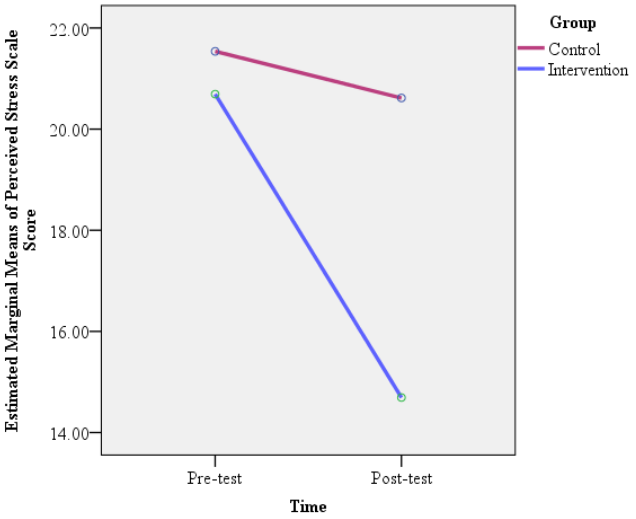

Figure 1: Estimated marginal mean of Perceived Stress Scale score for pre-test and post-test for the control and intervention group. The symbol asterisk (*) represents significant values with p<0.05.

extra intervention programs in helping their disabled children obtain better treatment and lifestyle. Also, employed parents have a better social lifestyle than unemployed parents, who work daily and can eliminate stress by communicating with colleagues or friends (Sheikh et al. 2018). At the same time, the burdened feeling of having to take care of disabled children can be minimized through interaction and socializing with friends at work.

On the other hand, unemployed parents live almost daily with their disabled children, which could lead to tiredness, loss of focus, and lack of socializing as they are compulsory to care for the children's necessities. Simultaneously, these unemployed parents are limited in socializing and interacting with other people as their focus is on the children's wellbeing (Sheikh et al. 2018). This limitation may lead to the accumulation of stress as they face hardship in expressing their emotions and are burdened since communication and socializing are at minimum levels, eventually leading to unhappiness. Hence, these situations explain the happiness level based on the employment status criteria.

Throughout the observation in this study, the moderate intensity exercise has shown a significant effect on the stress level of parents with physically disabled children. The goal of these exercises prescribed to parents is to help improve their life by reducing their stress levels. Like other study findings, exercise was also proven to be a way to release stress. Doing exercise eliminates the negativity and toxic emotions which normally contribute to high stress as physical activity positively impacts cognitive- emotional processes, such as mood, rumination, concentration, social experiences, tiredness,

and physical strength (Brand et al., 2018). Physical inactivity or insufficient physical activity is linked to high levels of psychological anguish (Štefan et al., 2018). Another study has also established that adhering to physical activity requirements is connected to lower levels of psychological stress (Ramírez-Muñoz et al., 2016). Regular moderate physical activity, on the other hand, is recommended as a non-pharmacological countermeasure in increasing people's quality of life (Piercy et al., 2018), reducing psychological distress (Elkington et al., 2017), and promoting vitality (Liao et al., 2015).

On top of that, the moderate-intensity exercises prescribed to the intervention group in this study also help improve the parents' muscle strength and endurance in handling physically disabled children. This kind of exercise helps enhance endurance and properly used muscle when taking care of their disabled children, which in a way, lessens the stress level among parents. The exercises prescribed in this study are active free exercises using body weight without any external weight or equipment. The exercises chosen involve simple movement that interacts with muscle strength and balance and enhances cardio endurance. The movement integrates the limb's movement, involving the upper and lower limbs. The upper limb exercise focused on side-to-side and overhead movement. It helps normalize and activate all upper limb muscles while improving the upper limb strength and endurance to make it easier for the parents to lift and transfer their children in performing daily living activities. Conversely, the lower limb movement goals are to improve leg strength and endurance with an exercise utilizing squat, jumping, and kicking activities. This movement is vital in parents' daily life to take care of their physically disabled children, such as during bathing, they need to carry the children and squat down to bathe them, and then they need to carry and lift the children back to bed for dressing and so on.

Adults are encouraged to perform moderate-intensity physical activity for at least 150 minutes or vigorous-intensity physical activity for at least 75 minutes weekly. However, parents of physically disabled children have limited time as they devote most of their time to handling the children. Hence, the exercises prescribed for intervention group participants in this study are tailored to their time limit. This minimum of 6 minutes and a maximum of 18 minutes of exercise twice a week significantly reduces their stress level. It is similar to another study that found that those who engage in simple exercise, as little as 15 minutes of moderate-intensity exercise, have health benefits and have about half the perceived stress compared to those who do not exercise (Crush, Frith, & Loprinzi, 2018). It shows that moderate exercise, particularly aerobic activity, to reduced levels of stress perception (Felez-Nobrega et al., 2020). Füzéki, Groneberg, and Banzer (2020) elaborated that those who exercise two or three times a week had less stress than those who exercise less frequently or do not exercise at all. Nonetheless, it was discovered that physical activities play a substantial role in reducing hassles, as seen by decreased levels of hassles and increased physical activity (Nguyen-Michel et al., 2016). This study also observed no significant impacts of 6 weeks moderate intensity exercise on happiness levels. When compared to inactive people, happiness was found to be positively associated with physical activity volume. Increased physical activity volume was linked to a higher sense of happiness. Although the impact is minor, engaging in any form of vocational or recreational physical activity positively impacts happiness (Richards et al., 2015). A happier individual appears to exercise daily and regularly (Piqueras et al., 2011). Physical activity has been shown to benefit people's mental health by increasing the output of neurotransmitters like endorphins and serotonin. These neurotransmitters aid in reducing stress and enhancing sleep quality, hence enhancing overall quality of life and wellbeing. As a result, regular moderate intensity physical activity has been found to be an effective technique for lowering depression and enhancing happiness. However, in study, there are no significant effects observed were probably due to differences seen in the descriptive analysis (Table 2) among parents in control and intervention group.

The mean parent's age in the control group is younger, which is 35.23 years, compared to the intervention group, 40.23 years old. In conjunction with it, a recent study shows that young parents are happier as they are physically and mentally strong. They are not so much affected by the physical demands of taking the children (Westerståhl et al., 2018). Furthermore, the mean children's age for the control group is also younger, which is 5.88 years, compared to the intervention group, which is 8.68 years. It is known that taking care older physically disable children are more complicated and challenging compared to younger kids, mainly in terms of their weight and physical demand needed for the parents (Cho & Hong, 2013; Devi et al., 2019). Younger kids are lighter, making it easier and less exhausting for parents to handle them compared to older kids, who are heavier.

In practical application, referring to this study, it is recommended that parents with physically disabled children spare their time occasionally to do short bout moderate intensity exercise two times a week to reduce their stress level while improving their quality of life. A few recommendations could be prepared for future studies involving the measurement of stress and happiness level among parents of physically disabled children. The recommendations are to increase the number of weeks of exercise and the number of participants. These approaches could provide a better understanding of and effect of exercise on stress and happiness level. Another suggested approach is to conduct face-to-face physical exercise. A clear-cut explanation of the effect of exercise intensity on the stress and happiness level among parents of physically disabled children can be achieved and elucidated adequately with face-to-face approaches, and a

comparison can be made with the online approaches. Lastly, exploiting the sociodemographic variables by adding more variables such as type of work, residence area, education status, etc is also recommended. This could provide a better and more conclusive understanding of exercise intensity's effect on the stress and happiness level among parents of physically disabled children.

CONCLUSION

Throughout this study, we evaluate and construe moderate intensity physical exercise effectiveness on stress and happiness level among parents of physically disabled children via different instruments, namely the Sociodemographic questionnaire, Perceived Stress Scale and Subjective Happiness Scale. Altogether, we can conclude that simple exercise without any equipment and used for a short time, not more than 20 minutes twice weekly, does have a significant and practical effect on parents of physically disabled children. Hence, it is necessary to let parents understand they must spare a little time for themselves doing simple, moderate intensity activities to reduce their stress levels and improve their quality of life.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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