

## RESEARCH ARTICLE

## EFFECTS OF PHYSICAL ACTIVITY ON QUALITY OF LIFE AMONG FEMALE UNDERGRADUATE STUDENTS

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## ABSTRACT

**Objective:** to determine the effects of physical activity on quality of life among female undergraduate students. **Material & Methods:** A randomized clinical trial was conducted on n=52 female students, after taking approval from higher authorities of the Bilquis Postgraduate College for Women PAF Nur Khan Base Rawalpindi, The inactive female students >1month between 18-25 years were included in the study. The participants were randomly divided into three groups, such as Light Physical Activity (LPA), Moderate Physical Activity (MPA) and Vigorous Physical activity (VPA) group. The short form (SF-36) was used to observe Quality of Life (QOL), among participant at baseline and after six weeks of intervention. The One Way ANOVA with Tukey HSD post hoc was applied on mean differences for comparison. The clinical significance eta squared ( $\eta^2$ ) was used. **Results:** The result showed that Role limitation (mental) was significantly improved in vigorous activity group than the light (MD=21.20, d=0.85, 95% CI=0.97 to 43.37) and moderate (MD=23.94, d=0.96 95% CI=4.05 to 43.83) activity group. While social function showed significant improvement in moderate activity group as compared to light (MD=15.30, d=1.01, 95% CI=3.83 to 26.76) activity and vigorous (MD=9.60, d=0.63, 95% CI=1.68 to 20.88) activity group. The pain also showed significant improvement in moderate activity as compared to light (MD=20.32, d=1.09, 95% CI=5.48 to 35.16) and vigorous (MD=21.97, d=1.18, 95% CI=9.67 to 34.26) activity group. **Conclusion:** PA significantly improved QOL of female undergraduate students. It was also found that VPA improves role limitation (emotional) while MPA improves social function and body pain.

**Keywords:** Mental health, physical activity, physical health, quality of life.

## INTRODUCTION

Physical activity (PA) is significant for healthy life which also reduces the health care cost.<sup>1</sup> But unfortunately working and living environment of present day has clearly reduced the daily PA.<sup>2</sup> In both developing and developed countries, PA is important for public health policy system to being considered as a healthy behavior.<sup>3</sup>

Any bodily movement produced by skeletal muscles that results in energy expenditure is physical activity and classified as light, moderate and vigorous PA.<sup>4</sup> According to WHO, due to physical inactivity 3.2 million deaths occurs each year? Worldwide, 81% of adolescence and 23% of adults are physically inactive.<sup>5</sup> High level of PA if performed daily, diminish the chances of all-cause mortality by 21–27% in males as well as females.<sup>6</sup>

Physical activity has greater impact on body composition and energy balance. According to the previous literature, PA is modifiable risk factor which can prevent cardiovascular disease, type-2 diabetes, stroke and cancers. Also, mental health, injuries and risk of fall is also associated with physical activity.<sup>7</sup> Therefore, WHO recommendations for PA aimed at adolescents and children stated that at least 60 min of moderate-

vigorous intensity of physical activity is crucial for healthy life.<sup>8</sup>

The key benefit of PA is quality of life (QOL) is multidimensional including physical, psychological, social and environmental domains.<sup>9</sup> In a study, positive correlation has been found between levels of PA and QOL domains.<sup>10</sup> When comparing both genders, females were found to be less physically active and have poor QOL than males.<sup>11</sup> In a meta-analysis it has been found that PA improves the QOL which increases the motivation and participation and thus creates a positive health cycle.<sup>9</sup>

According to WHO female are more physically inactive as compared to males. Thus practice of PA among females reduces non communicable disease, increase psychological well-being and improve quality of life.<sup>12</sup> Majority of studies available in the literature are analytical studies. But this study will evaluate the cause and effect relationship between physical activity and quality of life. The objective of the study was to determine the effects of physical activity on quality of life among female undergraduate students.

## METHODOLOGY

A randomized clinical trial (NCT04941014) was conducted on 18-25 years old female students at Bilquis Postgraduate College for Women Pakistan Air force (PAF) Nur Khan Base Rawalpindi. The study was initiated after taking approval from higher authorities of the college. Written Informed consent was taken from study participants according to the Declaration of Helsinki, and assured confidentiality. The inactive female students for more than a month were included in the study. While students with diagnosed psychological disorders, systematic diseases were excluded from the study.

A total of n=371 participants were recruited through non-probability convenient sampling technique. Of which n=57 participants fulfilled the

inclusion criteria and were thus randomly divided into three groups, as the Light Physical Activity (LPA), Moderate Physical Activity (MPA) and Vigorous Physical activity (VPA) group as shown in figure 1. There was loss of follow-up in LPA (n=03) and VPA (n=02). So analysis was done with n=52 participants. A sealed envelope method was used to allocate the participants among the three groups. The guidelines regarding physical activity for intervention were obtained from Rapid Assessment of Physical Activity (RAPA) questionnaire which has constructed validity and reliability.(13) In LPA group, participants were asked to perform Leisure Walk for 35 minutes, Brisk Walk for 30 minutes in MPA group and jogging for 15 minutes in VPA group. The duration of the study was 6 weeks and each group received intervention for 5 days/week. <sup>4</sup>

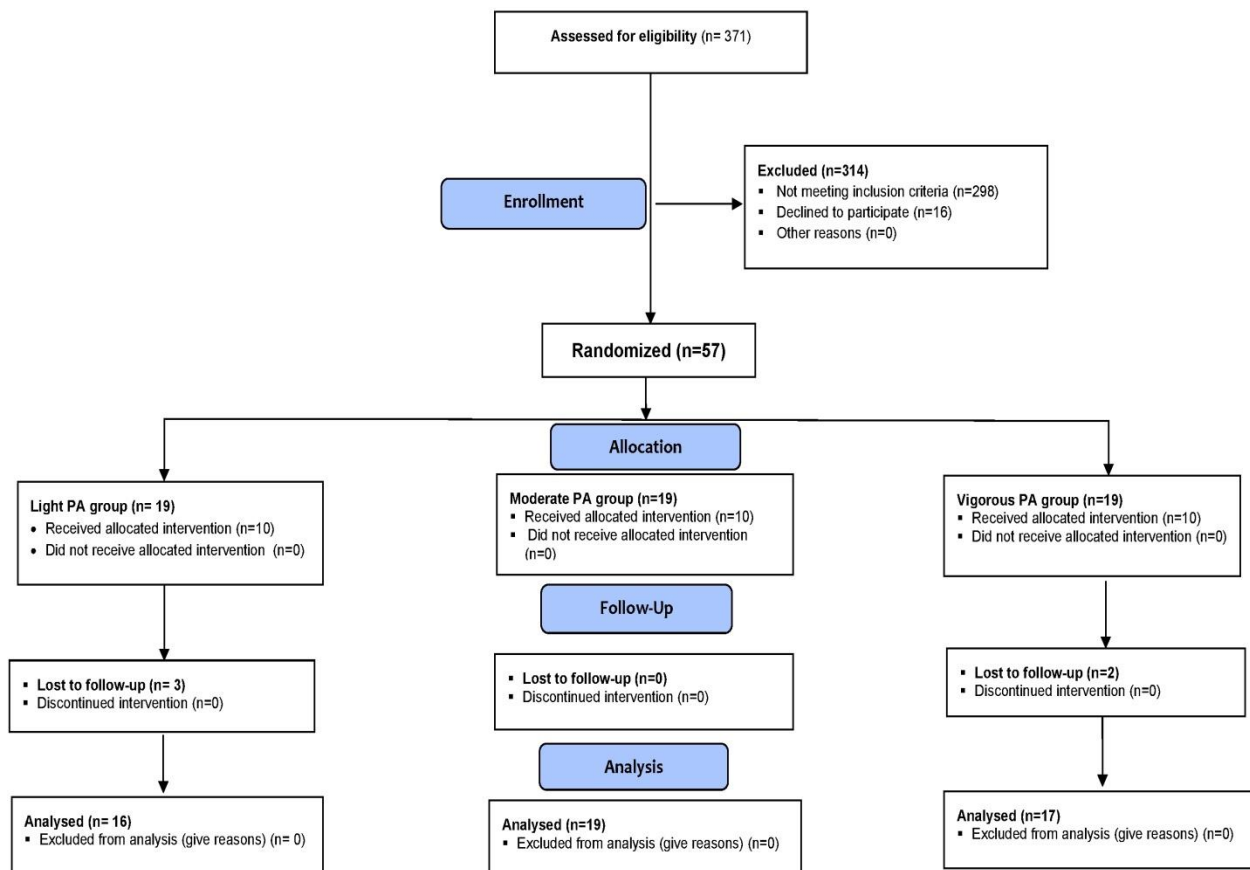


Figure 1: CONSORT diagram

The demographics such as age, BMI and semester were obtained at baseline. The short form (SF-36) was used to observe Quality of Life (QOL), among participant at baseline and after six weeks of intervention, which also has established validity and reliability.<sup>14</sup> The One Way ANOVA with Tukey

HSD post hoc was applied on mean differences for comparison. The clinical significance measured through eta squared ( $\eta^2$ ), cohen's *d* and 95% confidence Interval (CI) was used. The level of statistical significance was set as  $p < 0.05$ , and SPSS ver. 21 was used to analyze the data.

## RESULTS

The mean age of the study participants was  $20.35 \pm 1.426$  years. The majority of the participants

( $n=34$ ) were in healthy BMI range (the average BMI was  $20.16 \pm 2.61$ ) as shown in Figure 2.

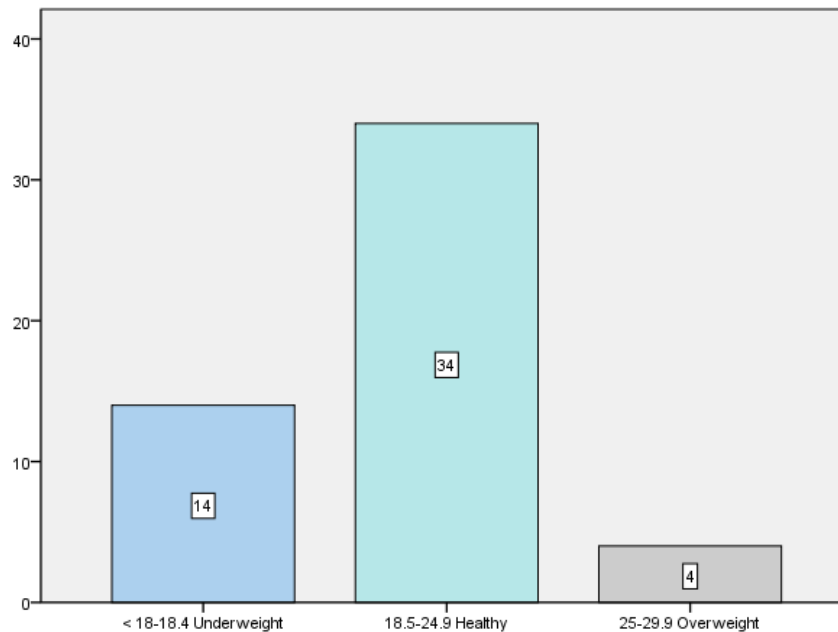


Figure 2: BMI Category

The results showed significant difference among Light, Moderate and Vigorous activity group with small effect size ( $p < 0.05$ ) in role limitation mental  $\{F(df)=2,49(5.786), p=0.006, \eta^2 = 0.191\}$ , social function  $\{F(df)=2,49(5.400), p=0.008, \eta^2 = 0.181\}$  and in pain  $\{F(df)=2,49(10.902), p=0.000, \eta^2 = 0.308\}$ .

The post hoc analysis showed that Role limitation (mental) was significantly improved in vigorous activity group than the light ( $MD=21.20, d=0.85, 95\% CI=0.97$  to  $43.37$ ) and moderate ( $MD=23.94, d=0.96, 95\% CI=4.05$  to  $43.83$ ) activity group. While social function showed significant improvement in

moderate activity group as compared to light ( $MD=15.30, d=1.01, 95\% CI=3.83$  to  $26.76$ ) activity and vigorous ( $MD=9.60, d=0.63, 95\% CI=1.68$  to  $20.88$ ) activity group. The pain also showed significant improvement in moderate activity as compared to light ( $MD=20.32, d=1.09, 95\% CI=5.48$  to  $35.16$ ) and vigorous ( $MD=21.97, d=1.18, 95\% CI=9.67$  to  $34.26$ ) activity group. Remaining domains did not show significant improvement ( $p > 0.05$ ) throughout the treatment as shown in table 1.

Table 1: Comparison of Mean differences of SF-36

	Light Activity		Moderate Activity		Vigorous Activity		F(df)	Sig	$\eta^2$
	Mean	SD	Mean	SD	Mean	SD			
Physical Function (PF)	-19.89	16.67	-9.21	36.07	-18.32	12.69	2,49(0.97)	.386	.038
Role Limitation-Physical (RLP)	-32.81	26.95	-26.32	19.49	-30.88	25.81	2,49(0.34)	.712	.014
Role Limitation-Emotional (RLE)	-6.25	21.83	-3.51	15.29	-27.45	29.42	2,49(5.78)	.006**	.191
Social Function( SC)	-15.63	11.63	-30.92	15.79	-21.32	13.81	2,49 (5.4)	.008**	.181
Pain(P)	-10.47	16.63	-30.79	19.13	-8.82	9.52	2,49(10.9)	.000***	.308
Mental Health (MH)	-12.25	14.49	-14.53	15.15	-12.47	9.15	2,49(0.16)	.851	.007
Energy/Validity (EV)	-9.06	7.79	-17.37	19.46	-17.65	9.53	2,49(2.1)	.133	.079
General Health (GH)	-14.38	11.23	-17.37	9.33	-13.82	8.39	2,49(0.7)	.499	.028

Significance Level:  $p < 0.05^*$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$

## DISCUSSION

The purpose of the study was to determine the effects of physical activity on quality of life among undergraduate medical students, and determine the effectiveness of different levels of PA i.e. LPA, MPA, and VPA on QOL. According to the results of study, after 6 weeks of training program of PA, the QOL was significantly improved in all the three interventional groups. In a previous systemic review, it has been concluded that PA improves physical outcomes in young adults.<sup>15</sup> A study conducted by Gill DL, PA was found to be effective in improving QOL in college going students. Self-esteem is might be a contributing factor in improving QOL, because PA contributes to self-confidence, self-acceptance and self-discipline which ultimately improves self-esteem, well-being and QOL.<sup>9</sup>

In a group of vigorous PA, the role-limitation mental (RLM), a domain of QOL, was significantly improved after 6-weeks of intervention. A study conducted by Nakagawa T et al. found the vigorous intensity of PA is important for psychological wellbeing. More frequent PA of vigorous intensity was also associated with coping in challenging situations. The results of this study also correlates with neurobiological literature in which PA has more long-lasting and extensive psychological benefits but in a recent study it has been found that not just PA but vigorous intensity of PA has more significant effects in role limitation-emotional.<sup>16</sup> In another study it has been discussed that VPA is directly associated with emotional wellness and it more effective as compared to MPA. Physical activity affects neurotransmitters, stress and hormonal pathways, and overall brain health which ultimately improves cognitive functions.<sup>17</sup> And good emotional health is a key to better QOL.<sup>18</sup>

Furthermore, in a recent study, moderate intensity of PA improved social function and pain after 6-weeks of training program which is in accordance with the previous study, in which MPA is effective for reducing bodily pain and improving social functions.<sup>19</sup> Also, previous studies in patients with fibromyalgia,<sup>19</sup> and arthritis, patients who were involved in MPA had better QOL and significant difference was found in social function and body pain.<sup>20,21</sup>

Moreover, the physical function, role limitation physical, mental health, energy/vitality, and general health didn't show any significant improvement after 6-weeks of intervention. However, a study reported in which significant improvement was observed in all domains of QOL, after 6-12 months of intervention.<sup>21</sup>

## CONCLUSION

PA significantly improved QOL of female undergraduate students. It was also found that VPA improves role limitation (emotional) while MPA improves social function and body pain. It was conducting in a single setting without controlling cofounding variables associated with undergraduate students i.e. BMI, GPA in last semester depression, anxiety and stress etc. A future study must be incorporating these confounders.

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