

Original article

Effect of power posing on Basic cardiovascular parameters: A short term pilot study

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Abstract :

Introduction: The emotional status of the individual can change the body language. By observing the body language and posture one can judge about the emotional condition.

Material and methods: Institutional ethics committee approval was taken for the study and it was done under ICMR STS 2015 studentship project. Healthy volunteers of either sex, with age average of 22.79 years were included as per inclusion and exclusion criteria. The participants were free from any systemic illness and were not on any medication currently

Conclusion: This is preliminary study done on 43 volunteers showed statistical and clinical significant drop on cardiovascular parameters like blood pressure, pulse and cardiac workload index. The future implications of positive power posing on various psychosomatic diseases needs to be explored.

Introduction:

The emotional status of the individual can change the body language. By observing the body language and posture one can judge about the emotional condition. This is a known fact in the world of psychology, but the other way round is also true. Early in the 20th century, a pioneering psychologist, William James, stated "it was the actions that create the feelings, not vice versa".¹ Off late research has evidenced this fact that body posture can influence hormones like testosterone and cortisol on immediate basis i.e. within minutes.² In this project, subjects were given a set of body posture called as positive and negative power poses. The positive power poses being more open wider and confident kind of body postures. The study volunteers were assigned to negative power

posing and positive power posing randomly (n=42) and saliva test was done before and after. They found increase in testosterone and decrease in cortisol in positive power posers and opposite in negative power posers.

It was shown that positive power posing reduces stress and improves the confidence of performance in humans. It has objectively been shown to reduce the stress by reducing levels of cortisol and increased levels of testosterone.² It is hypothesized that positive power poses reduce cortisol levels & hence reduced formation of adrenaline thus reducing blood pressure and pulse rate and ultimately the cardiac workload.

Review of Literature:

In above mentioned study, Cuddy AJC have demonstrated a significant rise in testosterone levels

an fall in the cortisol levels after the power posing session indicating a drop in the stress level. The same authors demonstrated the positive impact of power posing on presentation skills.²The power posing and its beneficial effects on various behavioral aspects are studied by many authors to improve presentation performance during exams, high stake social interactions³ and combat stage fright.

In the study, "Physiological Response to Cognitive Stress and the Effect of Power Poses, Stephanie Lakritz et.al"⁴ They examined the effects of strong and weak power poses on blood pressure, respiratory rate, and heart rate after a cognitive stressor. Acute academic stressors cause an increase in systolic blood pressure.⁵ They assessed the effects of the poses by imposing various stressors on subjects and comparing results across different power poses. The first group sat for 2 minutes (control group).The second group was asked to sit in a high power pose for two minutes (power posing group).The third group was asked to sit in a low power pose for two minutes (weak posing group). Results demonstrated no significant change in measurements after exposure to a cognitive stressor and no difference was documented in between power pose, weak pose, and control groups. There are very few studies on medical benefits of power posing in various health conditions particularly pertaining to beneficial effects on cardiac parameter. Hence, the current study was undertaken to study the impact of power posing for 4 minutes on blood pressure and pulse as a primary objective. The secondary objective was to find out the effect on mean arterial pressure and cardiac work load index (mean arterial pressure x pulse/100).

Material and methods:

Institutional ethics committee approval was taken for the study and it was done under ICMR STS 2015 studentship project. Healthy volunteers of either sex, with age average of 22.79 years were included as per inclusion and exclusion criteria. The participants were

free from any systemic illness and were not on any medication currently. A written informed consent form was signed by every participant. Procedure was conducted in Pharmacology seminar hall equipped with air conditioning. The participants were rested in air conditioned conditions for 10 minutes to adapt to the location. After the rest participants were explained the background of the study and power posing postures. The participants were also instructed to keep their mobiles off and away from them. They were also instructed not to talk till the procedure was completed. A comfortable distance was kept between the participants. Maximum 8 participants were taken in one setting. Initially the baseline reading was taken twice successively and if there was a difference of more than 10 mm of Hg between two systolic blood pressure readings, the participant was excluded from the study. The procedure of positive power posing consisted of eight poses (shown in photograph). Each pose was to be carried out for 30 seconds, so for a total of 4 minutes procedure was performed. The power poses were based on similar principles described by Amy Cuddy in their article.² After the procedure was over, participants were asked to sit down comfortably and post procedure reading was taken within a period of 2 to 5 minutes. The Mean arterial blood pressure and the cardiac work index (CWI) were the parameters considered for the study. Cardiac work index calculating the involvement of systolic blood pressure diastolic blood pressure and pulse is not described in the previous literature. It is hypothesized that this indicator would be a better and indirect measure of autonomic activity. The blood pressure and pulse measurement was taken by automatic blood pressure instrument by Omron.

(Figure 1: Different Positive Power Poses)

The derived parameter of mean arterial pressure was calculated as $MAP = SBP + (2 \times DBP) / 3$.

The cardiac workload index which depends on blood pressure and pulse was calculated as **cardiac work**

$$\text{Index} = \text{MAP} \times \text{pulse}/100$$



The data was analyzed by graph pad prism version 5, The parameters were analyzed by using paired “t” test.

Observation and results:

Figure 1: Different types of positive power poses

Figure 2: Table showing the effect of power posing on blood pressure.

	Blood pressure (systolic)		Blood pressure (Diastolic)		Pulse rate		Mean arterial pressure		Cardiac workload (Cardiac work = MAP x pulse)	
	Before pp	After pp	Before pp	After pp	Before pp	After pp	Before pp	After pp	Before pp	After pp
Mean readings(SD)	119.9	113.5	73.88	70.49	83.91	78.67	89.23	84.84	74.78	66.84
	-12.76	-11.69	-10.47	-10.2	-12.84	-11.01	-10.37	-9.884	-13.72	-12.94
Difference of after and before(95%confidence interval)	6.395 (4.776 - 8.015)***		3.395 (1.812-4.978)***		5.233 (2.943-7.523)***		4.396 (3.068-5.723)***		7.946 (5.71-10.18)***	
pp=power posing : *= p<0.05 , **= p<0.01 and ***=p<0.001										

Figure 3: Effect of positive power poses on Blood Pressure

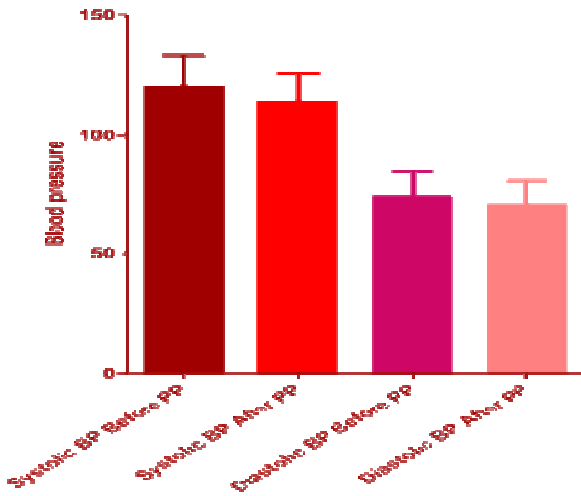


Figure 4: Effect of positive power poses on Pulse

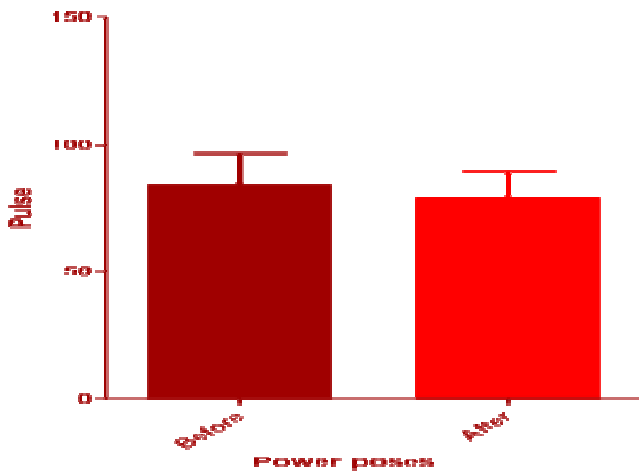


Figure 5: Effect of positive power poses on Mean Arterial Pressure.

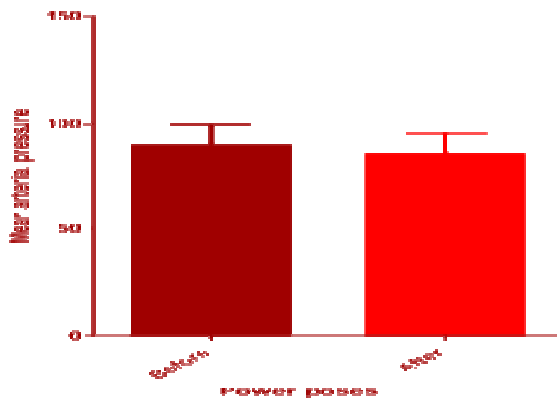


Figure 6: Effect of positive power poses on Cardiac Work Load

In our study power posing was done 4 min in one session. Overall 43 participants with average age of 25.33 ± 7.35 and male female ration of 24:19 were included. There was a statistical significant drop in systolic, diastolic and mean arterial blood pressure just after the power posing session. The drop in the systolic blood pressure, diastolic blood pressure and mean arterial pressure was of the magnitude of 5.5.mmHg, 3.4 mmHg and 4.4 mmHg which was clinically relevant as well.⁶The drop in the pulse rate was 5.2 /min which was also statistically significant. The secondary parameters like mean arterial pressure and cardiac work load index also showed statistically significant drop ($p < 0.001$) from 89.2 to 84.8 and 74.78 to 66.84 respectively.

Discussion:

In present study the drop in blood pressure, pulse rate and also on cardiac workload index may be because of decreased levels of cortisol after positive power posing session. This decreased level might have caused a lesser conversion of noradrenalin to adrenaline. It is also a well known fact that conversion of noradrenalin to adrenaline which occurs in adrenals requires the presence of cortisol.⁷ Obviously with higher cortisol; higher levels of adrenaline will be formed which is a hormone that influences primarily hemodynamic changes in the body as against noradrenalin which is more of a neurotransmitter hormone.^{4,8} Future implications of the study on stress and depression: During stress the body cortisol levels are raised^{9,10} in the adrenal cortex which then flows to the adrenal medulla through the peculiar venous drainage to medulla.⁹ This increased cortisol levels then catalyses synthesis of adrenaline from noradrenalin^{7,9} under the influence of enzyme ethanolamine methyl-o-

transferase which is present only in adrenal medulla.¹¹

In one of the studies on depression it has been shown that there are sustained elevated levels of endogenous cortisol in depression.¹² 61 % of depressed subjects do not show suppression of cortisol in dexamethasone suppression test. So it would mean , higher cortisol level is available for conversion of Nor adrenaline to adrenaline and lesser is the level of nor adrenaline which is required for combating depression, where as higher levels of adrenaline would mean various symptoms of depression like palpitation, tachycardia etc. The impact of stress and depression on the cortical cortisol levels leads to exploring the possibility of using power posing as non pharmacological management of these conditions. On the whole any activity of power posing like body language manipulation and yoga (which is having 80 % of the positive power poses) and long term effects on various cardiovascular parameters needs to be explored particularly in patients of depression, hypertension or any other disease which is having psychosomatic element.

Conclusion:

This is preliminary study done on 43 volunteers showed statistical and clinical significant drop on cardiovascular parameters like blood pressure, pulse and cardiac workload index. The future implications of positive power posing on various psychosomatic diseases needs to be explored.

Acknowledgements

We are grateful to Dr VM Motghare and Dr GN Dakhale, Professor of Department of Pharmacology Government Medical College, Nagpur for allowing the smooth conduct the experimentation and overall cooperation.

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