

# Comparative study on the effects of blood pressure changes during menstrual cycle

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## ABSTRACT

Blood pressure (BP) is not constant throughout the day, on different days in a month and on different times of a cyclical event like menstrual cycle. Variation in BP during different phases of menstrual cycle can also be attributed to the effect of female sex hormones on cardiovascular function. The purpose of this study was to evaluate the variation in BP during different phases of menstrual cycle and whether these changes warrant an increase or decrease in the dose of antihypertensive drugs in hypertensive women of reproductive age group. To conclude, cardiovascular homeostatic mechanisms are strong enough to correct the subtle BP changes brought about by the action of ovarian hormones on the cardiovascular system.

**KEY WORDS:** Blood pressure, Antihypertensive drugs, Reproductive age, Cardiovascular function

## INTRODUCTION

Menstrual cycle is a complex, synchronized sequence of events which involves anterior pituitary, ovary, hypothalamus, and endometrium. The menstrual cycle with all its complexities can be influenced easily by environmental factors such as exercise, stress, work tension, eating disorders, mental problems, and obesity. Genetic influences such as fragile X mutations (Chapter X), X chromosome abnormalities and galactose-1-phosphate uridylyltransferase point mutations (galactosemia) contribute to perturbations of the menstrual cycle.<sup>[1]</sup> Menstruation coupled periodic bleeding from the blood vessels, at the time of shedding of the uterine mucosa. During menstruation, the flow of the blood level to the uterus and ovaries varies.<sup>[2]</sup> Menstrual abnormalities are common in women with CHD, and therefore, this group of patients should be aware of the menstrual function and its abnormalities.<sup>[3]</sup> During heartbeat, the blood is supplied all over the body to provide the energy and oxygen which the cells of the body require. During the movement of the blood, the blood pushes against the walls of the blood vessels. This pressure is called the blood pressure (BP). For over 100 years, we have

measured BP from the upper arm, termed peripheral BP, which doctors subsequently use to diagnose high BP or hypertension.<sup>[4]</sup> BP reading consists of two levels or numbers. The first number refers the systolic BP. It is the highest level of the body blood which reaches the heart. The second number or level refers to the diastolic BP. The second number or level refers to the diastolic BP. It is the lowest level of the BP which reaches as the heart relaxes between each beat. The reproductive system of women, unlike that of men, shows regular cyclic changes that teleologically may be regarded as periodic preparations for fertilization and pregnancy. The duration of cycle averages 28 days. It may be as short as 20 days or as long as 45 days in some women. This study is to find the comparison between the BPs during the menstrual cycle and to estimate the awareness level of current generation women about the effects of maintenance of BP during menstrual cycle.

## MATERIALS AND METHODS

A survey was conducted on 80 non-obese regularly cycling females in the age group of 18–60 years living in both rural and urban area randomly. Females who were pregnant and consuming oral contraceptive pills were excluded since they have irregular menstrual cycle. Oral contraceptive pills are regarded as the most popular form of hormonal contraception in the

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United States.<sup>[5-7]</sup> Thus, it may cause some changes in the menstrual cycle. The questions were made in such a way to estimate the awareness among the female individuals on their own hygiene, health, and sanitation during their bleeding period.

## RESULTS

The BP remains normal around the range of 120/80 mmHg.

Parameter	90/60 mmHg	120/80 mmHg	Above 120/80 mmHg
Blood pressure	4	24	1

The interval of each menstrual cycle varies from 24 to >28 days. Sometimes, they feel stressed during the menstrual cycle due to changes in the BP, but the changes are not prominent. This result is obtained for the female individuals chosen under the above-mentioned condition.

## DISCUSSION

Menstruation is the normal physiological activity which indicates the beginning of reproductive life period of the female individual but sometimes becomes an filthy phenomenon in Indian society.<sup>[8]</sup> Scrutiny is needed during the period of menarche because menstruation in adolescent female is most often related with poor practices.<sup>[9]</sup> The knowledge regarding the menstruation from adolescent period should be increased, which helps to decrease the suffering of millions of women [Figures 1 and 2].<sup>[10]</sup> There are a lot of differences in

the lifestyle, food habit, sanitation procedure, and self-hygiene management among rural and urban female menarche. Thus, the survey is conducted parallel between rural and urban female individuals for better results. The study reveals that they are some female who regularly check their basic body measures such as BP, heart rate, and temperature [Figures 3-5].

BP is a common physiological measurement taken by health professionals, which is an easy, quick, and non-invasive indication of the pressure that the blood is exerting on the heart and circulatory system. For over 100 years, we have measured BP from the upper arm, termed peripheral BP, which doctors subsequently use to diagnose high BP or hypertension. When the arteries age, they get rigid and more constrained. This forces our hearts to compensate for the lack of elasticity and so they have to pump our blood harder to move it around our bodies. Heart rate is generally

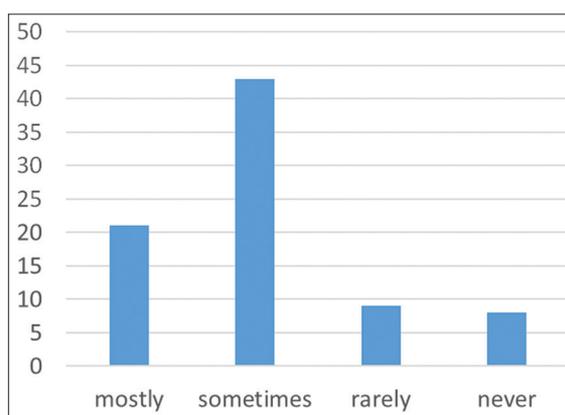


Figure 3: Do you feel stress during your menstrual cycle?

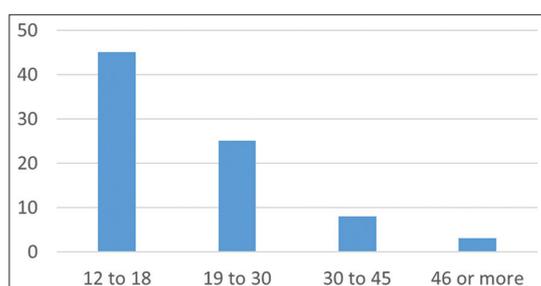


Figure 1: Age

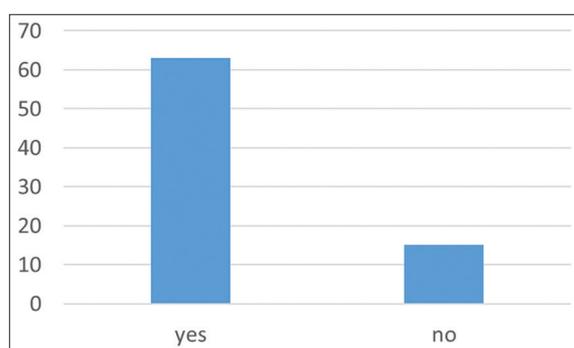


Figure 2: Is your menstrual cycle normal?

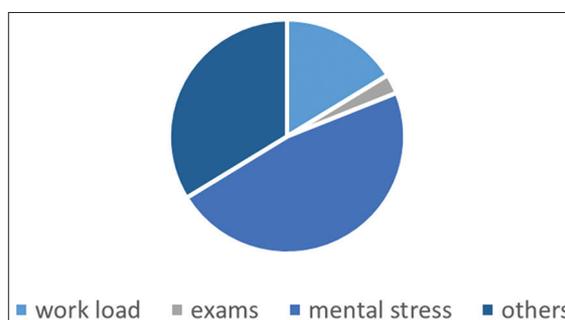


Figure 4: If you feel stress, what could be the reason?

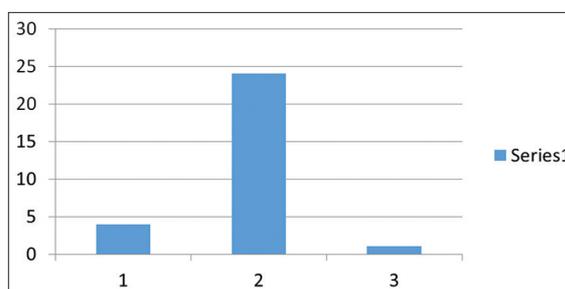


Figure 5: Relation between central BP and heart rate

not a major consideration in choosing antihypertensive medications.<sup>[8]</sup> In part, this is due to a lack of evidence supporting heart rate lowering as a therapeutic strategy in hypertension. In addition, while there is a positive correlation between heart rate and peripheral BP, there is an inverse relationship between heart rate and central BP.<sup>[11]</sup> Thus, since the BP during menstrual cycle, the heart rate remains normal. Sometimes, the person undergoing menstrual cycle becomes stressful and this is mainly because most of the women are working nowadays. There is an enormous change in the sleeping time, eating habit, diet, and living style which causes changes in the body during menstruation. There is no relationship between ovulation and change in BP. There are two BPs, peripheral and central BP. Central BP has been shown to more strongly relate to vascular disease and outcome than traditional upper arm BP.<sup>[12-14]</sup>

## REFERENCES

1. Buckner RL, Andrews-Hanna JR, Schacter DL. The brain's default network: Anatomy, function, and relevance to disease. *Ann N Y Acad Sci* 2008;1135:10-8.
2. Dogan O, Yildiz A, Temizkan O, Pulatoglu C. Comparison of uterine, endometrial and ovarian blood flow by transvaginal color doppler ultrasound in ovulatory and anovulatory cycles. *Ginekol Pol* 2016;87:581-4.
3. Khajali Z, Ziaei S, Maleki M. Menstrual disturbances in women with congenital heart diseases. *Res Cardiovasc Med* 2016;5:e32512.
4. Barlow P. Exercise Physiologist at Mornington. Tasmania: Paul Barlow; 2015.
5. Mosher WD, Martinez GM, Chandra A, Abma JC, Willson SJ. Use of contraception and use of family planning services in the United States: 1982-2002. *Adv Data* 2004;350:1-36.
6. Abma JC, Martinez GM, Mosher WD, Dawson BS. Teenagers in the United States: Sexual activity, contraceptive use, and childbearing, 2002. *Vital Health Stat* 23 2004;24:1-48.
7. Hatcher RA, Trussell J, Stewart F, Cates W, Stewart GK, Kowal D, *et al.* *Contraceptive Technology* 1994-1996. 18<sup>th</sup> ed. New York: Irving Publishers; 1994.
8. Thakre SB, Thakre SS, Reddy M, Rathi N, Pathak K, Ughade S. Menstrual hygiene: Knowledge and practice among adolescent school girls of Saoner, Nagpur district. *J Clin Diagn Res* 2011;5:1027-33.
9. Sharma P, Malhotra C, Taneja DK, Saha R. Problems related to menstruation amongst adolescent girls. *Ind J Pediatr* 2008;75:125-9.
10. Dasgupta A, Sarkar M. Menstrual hygiene: How hygienic is the adolescent girl? *Ind J Community Med* 2008;33:77-80.
11. Drawz PE. *Division of Renal Diseases and Hypertension*. Minneapolis: 717 Delaware Street, S.E., Suite 353, Mail Delivery Code 1932, 626-3840.
12. Roman MJ, Devereux RB, Kizer JR, Lee ET, Galloway JM, Ali T, *et al.* Central pressure more strongly relates to vascular disease and outcome than does brachial pressure: The strong heart study. *Hypertension* 2007;50:197-203.
13. Roman MJ, Devereux RB, Kizer JR, Okin PM, Lee ET, Wang W, *et al.* High central pulse pressure is independently associated with adverse cardiovascular outcome the strong heart study. *J Am Coll Cardiol* 2009;54:1730-4.
14. Avolio A. Central aortic blood pressure and cardiovascular risk: A paradigm shift? *Hypertension* 2008;51:1470-1.

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