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Prevalence of Dysmenorrhea and Determinants of Menstrual Distress in Adolescent Girls with Dysmenorrhoea, In Tirupati Town

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ABSTRACT

Background: Dysmenorrhoea is a common problem during menses in adolescent girls which affects their quality of life, academic activities, cannot attend social functions and use over the counter medicines which may lead to dangerous adverse effects and infertility. **Objectives:** 1. To study the prevalence of dysmenorrhea in adolescent girls studying in government municipal high schools of Tirupati. 2.To determine the significant factors related to menstrual distress in adolescent girls.

Methodology: A cross-sectional study conducted among 320 adolescent girls studying in the selected government high schools of Tirupati, India. The study investigated symptoms, related factors and consequences of menstrual distress in adolescent girls with dysmenorrhea. Four instruments were used to collect data: Questionnaires on Demographic Data, Menstrual Distress Questionnaire, A Questionnaire related to Menstrual characters and A Short Form McGill Pin Questionnaire.

Results: Prevalence of dysmenorrhoea among adolescent girls was found 67.7%. Regression analysis indicated that the best subset for predicting menstrual distress in adolescent girls included MPQ-SF, menstrual cycle in days, socioeconomic status and education.

Conclusions: Majority (67.7%) of the adolescent girls were suffering with dysmenorrhoea. Menstrual distress is significantly correlated with impact on daily activities, absence from class, and analgesic usage.

Key words: dysmenorrhoea, adolescent girls, menstrual distress, high school

INTRODUCTION

Adolescence, one of the most crucial stages of life, is a period of transition from childhood to adulthood between ages 10 and 19 years.[1,2] In Adolescence their extreme stress and strain due to the various physiological and psychological changes that occur during this period. One of the main changes is puberty. Puberty is the process of physical changes by which a child's body matures into adulthood and become capable of sexual reproduction. There are many pubertal changes in the girls and one of the majors is the onset of menstruation. Even though menstruation is a physiological process, many females face various types of menstrual problems among which dysmenorrhoea is the commonest one.

Dysmenorrhoea is a group of symptoms which includes either sharp, intermittent pain, or dull aching pain, usually in pelvic region or lower abdomen. Sometime dysmenorrhoea is associated with headache, nausea and vomiting, diarrhea or constipation,

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fainting, premenstrual symptoms such as tender breasts and swollen abdomen, which may continue throughout the period. For most women pain usually starts shortly before or during their menstrual period, peak after 24 hours, and subsides after 2-3 days[3].The factors like nulliparity, obesity, cigarette smoking and positive family history, stress, family history of dysmenorrhea, diet, depression, and abuse are highly associated with the prevalence of primary dysmenorrhea.[3,4] Even though primary dysmenorrhoea does not have serious complications but it affects the quality of life of adolescent girls. About ten percent of women who have this type of dysmenorrhoea cannot work, attend school, or participate in their normal daily activities which can further lead to poor academic result. They feel reluctant to attend social functions and remain isolated during this period.[5] In additional to this, they use over the counter medicines which may lead to dangerous adverse effects and infertility.[6]

Literature reveals that most of the adolescent girls are suffering from dysmenorrhoea and it affects their daily life and academic activities. Hence, it is necessary to find the level of dysmenorrhoea among adolescents and help them to manage it. This study aims to assess the level of dysmenorrhoea and related factors and consequences of menstrual distress in adolescent girls with dysmenorrhea.

OBJECTIVES

The research was undertaken to study the prevalence of dysmenorrhoea in adolescent girls studying in government municipal high schools of Tirupati and also to determine the significant factors related to menstrual distress in adolescent girls.

METHODOLOGY

Type of study: A cross sectional study was conducted among adolescent girls studying in the selected government municipal high schools present in Tirupati town, Andhra Pradesh.

Adolescent girls who had attained menarche, studying in 8th, 9th and 10th class and willing to participate in the study were included in the study. Adolescent girls who not had attained menarche, studying other than 8th, 9th and 10th class and not willing to participate in the study were excluded from the study.

Sample size: Based on prevalence of dysmenorrhea in previous studies conducted in India.[7] The sample size was calculated using the formula sample size n = $4pq/d^2$ where p is prevalence of dysmenorrhoea in adolescent girls (72%)[7], q is (1-p) and, d is allowable error (7% of prevalence = 5.04). The calculated sample size was 317.48 which was rounded to 320.

Sampling methods: Out of 7 govt high schools, 4 were selected randomly according to their geographic location which covers entire Tirupati. 80 adolescent girl students from each school were selected for the study to get required sample size of 320.

Study tool: After obtaining the Institutional Ethics Committee approval, permission from the principals and informed written consent from the participants, A pre tested structured questionnaire will be given to the participants and asked them to write their responses and return the same. Each participant will be given 45 minutes to complete the questionnaire.

The questionnaire consisted of 4 sections: 1) Demographic proforma, 2) Questions related to menstruation, 3) Menstrual distress Questionnaire (MDQ)[8] and 4) Short Form McGill pain Questionnaire (MPQ-SF).[9]

Content validity for this tool was established by experts in the field of women's health.

Characteristics of adolescent girls were investigated using the demographic Data Questionnaire. These included age, onset of menarche, duration of menstruation, frequency of menstruation, socioeconomic status, mother's occupation, impact on daily activity, absence from class.

A total of around 320 adolescent girls were the subjects. The head masters are interviewed and were looked into to secure information regarding the number of adolescent girls participating to full the questionnaire of my study. Prior permission has been taken

Data analysis: Data will be entered into the MS Excel sheet and analyzed by using SPSS software version 21.

Descriptive statistics like frequencies, percentages for discrete data and means ± standard deviation for continuous data will be calculated.

Chi-square test and student's test or ANOVA test will be used to know the significance between discrete and continuous data. A 'p' value of 0.05 will be taken as significance levels.

RESULTS

The age of the participants ranged between 11 and 17 years with a mean age of 14.23±0.924 and majority of them are studying 9th class (45.9%), 90% of adolescent girls are Hindus. According to BMI, majority of adolescent girls are underweight (57.5%) with the mean of 18.32±3.27. 80% of participants are lived in urban area. Majority of participants have single sibling (51.6%), living in Nuclear Families (84.7%). Among the participants, their mother's education is primary (40.9%), Secondary (29.4%) and majority of them are unemployed (54%). The socioeconomic status of (36.8%) of participants are lower middle class and (32.8%) of them are middle class in accordance with previous studies (Table 1).

Total study participants were 564 adolescent girls out of which 380 were suffering with dysmenorrhoea. Prevalence of dysmenorrhoea was found 67.7% in the present study. Duration of menses is 5-6 days in in majority (42.2%) of adolescent girls.43.8% of adolescent girl's menstrual cycle is 28-30 days. Majority of the participants (50.9%) getting menstrual pain in first day. 33.8.% of participants were suffering with menstruation with severe pain

Table 1: Distribution of Socio-demographic characteristics of the study participants

Socio-demographic characteristics	Participants (%)
Age	
11 years	1 (0.3)
12 years	5 (1.6)
13 years	60 (18.8)
14 years	131 (40.9)
15 years	104 (32.5)
16 years	15 (4.7)
17 years	4 (1.3)
BMI	
Under weight (BMI < 18.5Kg/m2)	184 (57.5)
Normal (BMI 18.5-24.9 Kg/m2)	125 (39.1)
Over weight (BMI 25-29.9 Kg/m2)	8 (2.5)
Obese (BMI ≥ 30Kg/m2)	3 (0.9)
Residential address	
Rural	64 (20)
Urban	256 (80)
Educational status	
8th class	45 (14.1)
9th class	147 (45.9)
10th class	128 (40)
Religion	
Hindu	291 (90.9)
Muslim	22 (6.9)
Christian	7 (2.2)
Family Size	
Nuclear	271 (84.7)
Joint	49 (15.3)
Three generation	0 (0)
No of Siblings	
None	9 (2.8)
One	165 (51.6)
Two	99 (30.9)
Three	40 (12.5)
Four	5 (1.6)
Five	2 (0.6)
Mother Education	
Illiterate	73 (22.8)
Primary	131 (40.9)
Secondary	94 (29.4)
Intermediate	14 (4.4)
Graduate	7 (2.2)
Post Graduate	1 (0.3)
Mother's Occupation	
Late	12 (3.8)
Employed	135 (42.2)
Un employed	173 (54)
Socio economic Status	
Upper Class	10 (3.1)
Upper middle class	31 (9.7)
Middle class	105 (32.8)
Lower middle class	118 (36.9)
Lower class	56 (17.5)

Table 2: Distribution of Menstrual characteristics among the Adolescent Girls

Menstrual Characteristics	Participants (%)
Duration of Menses in a day	
1-2 days	28 (8.8)
3-4 days	116 (36.3)
5-6 days	135 (42.2)
>6 days	41 (12.7)
Menstrual Cycle	
<28 days	107 (33.4)
28-30 days	140 (43.8)
31-35 days	44 (13.8)
>35 days	29 (9)
Occurrence of menstrual pain	
Before menstruation	33 (10.3)
1st day	163 (50.9)
2nd day	58 (18.1)
3rd day	47 (14.7)
4th day	19 (6)
Impact of Menstrual Cycle on daily activities	
Menstruation with pain but rare limitations of daily activities.	148 (46.2)
Menstruation with severe pain with limitations in daily activities.	108 (33.8)
Menstruation with severe pain with studies get affected	64 (20)
Absent from class	
No	179 (55.9)
Sometimes	113 (35.4)
Usually	10 (3.1)
Always	18 (5.6)
Physical consultation for Dysmenorrhea	
Yes	71 (22.2)
No	249 (77.8)
Analgesic Usage	
Nil	250 (78.2)
1-2 times/cycle	58 (18.1)
3-4 times/cycle	10 (3.1)
5-6times/cycle	2 (0.6)

Table 4: Description of Menstrual pain according to short form MC GILL Pain questionnaire RONALD MELZACK

Pain	Rank	Yes (%)	No (%)
Sickening	1	235(73.4)	85(26.6)
Aching	2	233(72.8)	87(27.2)
Tiring exhausting	3	228(71.3)	92(28.7)
Sharp	4	187(58.4)	133(41.6)
Splitting	5	182(56.9)	138(43.1)
Throbbing	6	178(55.6)	142(44.4)
Hot burning	7	158(49.4)	162(50.6)
Heavy	8	156(48.7)	164(51.3)
Cramping	9	152(47.5)	168(52.5)
Fearful	10	151(47.2)	169(52.8)
Punishing cruel	11	150(46.9)	170(53.1)
Tender	12	141(44.1)	179(55.9)
Shooting	13	117(36.6)	203(63.4)
Gnawing	14	75(23.4)	245(76.6)
Stabbing	15	72(22.5)	248(77.5)

Table 5: Correlations between demographic - menstrual variables and Menstrual Distress Questionnaire (MDQ Score)

	MDQ SCORE	
Item	**r value**	**P value**
Education	0.145	0.009
Socioeconomic status	-0.198	0.000
MDQ score	1	320
Duration of menses in a day range	-0.116	0.038
Menstrual cycle in days	-0.143	0.010
Range of menstrual cycle	-0.114	0.042
Physical consultation of doctor	0.196	0.000
Analgesic usage	-0.146	0.009
MPQSF	-0.582	0.000
Menstrual cycle in days	-0.152	0.006

Table 6: Results of the stepwise multiple regression for Menstrual Distress Questionnaire scores

Variable	B	SE	R^2	F
MPQSF	-0.294	0.023		
Menstrual cycle in days	-1.188	0.411		
Socio Economic Status	-0.509	0.175		
Education	0.534	0.250		
(Constant)	39.224	2.479	0.376	15.823

with limitations in daily activities, and only 20.0% are suffering menstruation with severe pain with studies get affected. Majority of adolescent girls (77.8%) did not consult the physical practitioner for dysmenorrhoea. (Table 2)

The top five symptoms of menstrual distress were Abdominal pain, irritability, Fatigue, Backache and Lack of concentration (Table 3). According to Short form MC GILL Pain questionnaire top 5 rank pains are Sickening 235(73.4 %), Aching 233(72.8 %), Tiring exhausting 228(71.3 %), Sharp 187(58.4%) and Splitting pain 182(56.9 %) and the least type of pain was stabbing pain 72(22.5%). (Table 4)

Correlation analysis between Demographic Data – Menstrual Distress Questionnaire (MDQ) was positive for education level of the adolescent girls and physical consultation of doctor. Father's occupation and MDQ were negatively correlated with socioeconomic status, duration of menses in days, menstrual cycle in days, analgesic usage and MPQ-SF pain score (Table 5). Results of step wise regression indicated that the best subset for predicting menstrual distress in adolescent girls included MPQ-SF, menstrual cycle in days, socioeconomic status and education. Of the total variance in MDQ score, 37.6% could be explained by these four variables (Table 6).

DISCUSSION

The Mean age of menarche in the present study was found as 12.82±0.95 years. Similar results found in a study conducted by Dass Ruhi, Kulkarni Meenal in Nagpur found 12.98 ± 1.44 years[10], Singh A et al found 12.5 ± 1.52 years[11], Khanna[12], A dasgupta[13], Dharmapal 13.67±0.8 years[14], Higher age of menarche found in study conducted in ethiopia[15].

Total study participants were 564 adolescent girls out of which 380 were suffering with dysmenorrhoea. Prevalence of dysmenorrhoea was 67.7% in the present study which indicates the need to take care of adolescent girls to reduce the disabilities during this period and improve productivity. Similar results came from study conducted by Sharma P et al 67.2%[16], Nabia Tariq et al 67%[17], SC Chan et al 68.7[18]. This study found that dysmenorrhoea occurred most commonly on the first day of the menstrual period. Similar results found in studies conducted by Fankenauser[19] Banikarim[20.]

Several studies done among adolescents with dysmenorrhoea report that it effects their academic performance as well as a social and sporting activities, a distressing finding given the availability of effective medication.[19-21] The impact of Menstrual cycle on daily activities, in our study is 53.8% which includes –Menstruation with severe pain with limitations in daily activities 108 (33.8%) and Menstruation with severe pain with studies get affected 64 (20%). Study conducted by Banikarim et al among Hispanic adolescents on impact on daily activity rate was found 50%.[20.] Higher impact on daily activity was found in a study conducted by Huei-Mein and Chung-Hey Chen in Taiwan.[22] The school absenteeism rate in our study is 44.1%. School absentees in studies conducted by Das Rushi 45.45%[10] Agarwal A and venkat A 24%[7]. A research study conducted in Ethiopia shows 51.2%. students were absent from school[15]. School absentees of 25.3% were found in a Study conducted by Huei-Mein Chen and Chung-Hey Chen in Taiwan[22] which is lower than the present study. So, to improve quality of life, positive academic output and to reduce absenteeism in schools, we need to educate the adolescent girls, their parents, educational institutions and education ministries to act accordingly and even make necessary changes in the curriculum if required.

In our study 21.8% of them uses analgesics to relieve pain. Study done by Campbell and McGrath found that about 66% of adolescent girls were taken medication for dysmenorrhoea. In the present study, abdominal pain was the most prevalent and severe symptom (95.6%), followed by irritability, fatigue, backache, lack of concentration, general aches and pains etc. Study conducted by Shabnam also shows Abdominal pain was the most common symptom experienced by the adolescent girls.[23] Results from articles of lu[24] and Holroyd et al[25] finds that cramps were the most severe symptom found in their article. However, Banikarim et al found that fatigue was the most prevalent and severe symptom of menstruation.[20] They also found that headaches were the second most common symptoms, revealing a cultural discrepancy that could result in symptomatic differences during the menstrual period. To avoid abuse of over counter medicines like NSAIDS, Harmonal contraceptives which leads to further side effects like ac-

id peptic disease, renal problems and even fertility problems in future, we need to develop and distribute optimized protocol for the medication use in this area from the concerned authorities.

Pearson correlations between demographic-menstrual variables and Menstrual Distress questionnaire (MDQ) were positive for Education level of the adolescent girls and Physical consultation of doctor, Occupation of father ($p < 0.05$). MDQ was negatively correlated with Socioeconomic status, duration of menses in days, Menstrual cycle in days, Analgesic usage and MPQ-SF pain score ($p < 0.05$).

Study conducted by Huei-Mein Chen and Chung-Hey Chen[22] found that MDQ scores were significantly correlated with the mother's occupation, un employed had more severe menstrual distress than employed women's daughters. Similar findings were observed in a study conducted by Faridesh.[26]

36.9% of adolescent girls in our study are lower class people followed by 32.9% are lower middle class which is reflecting through negative correlation between Socioeconomic status and MDQ Scores. A study conducted in karnataka by Shanbhag D etal[27] shows that Socioeconomic status (SES) of the adolescent and their age influenced choice of napkin/pads and other practices such as storage place of napkins; change during night and during school or college hours and personal hygiene. A variety of factors are known to affect menstrual behaviours most influential being age and SES. Some of the socioeconomic variables have been found to be significantly associated with seeking medical consultation for menstrual and gynaecological disorders. Social welfare, education and women welfare departments can utilize this data to quantify dysmenorrhoea related problems and can plan strategies to help adolescent girls of lower socio-economic status to reduce disabilities and improve productivity in academics as well as in quality of life.

The regression analysis shows the best subset for predicting menstrual distress in adolescent girls included MPQ-SF pain score, Menstrual cycle in days, Socio-economic status and Education status of Adolescent girls. Of the total variance in MDQ score, 37.6% could be explained by these four variables. Study conducted by Huei-Mein Chen and Chung-Hey Chen[22] shows best sub set for predicting menstrual distress in adolescent girls were Age, mother's occupation, MPQ-SF pain score and Adolescent Menstrual attitude questionnaire (AMAQ). Of the total variance in MDQ score, 59% could be explained by these four variables.

CONCLUSION

Prevalence of dysmenorrhoea among adolescent girls studying in government municipal high schools of Tirupati, was found 67.7%. Education status of Adolescent girls, Socio-economic status, Menstrual cycle in days, MPQ-SF pain score can predict adolescent girl's menstrual distress. Additionally, there is evidence that menstrual distress is significantly correlated with impact on daily activities, absence from class, and analgesic usage. It is suggested that education institutes, Ministries of social welfare, Education and Women welfare can use these data to strengthen menstrual health education of adolescent girls to positively influence their academic output and quality of life during menstruation.

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REFERENCES:

1. IFPS Technical Assistance Project (ITAP). Promoting Adolescent Reproductive Health in Uttarakhand and Uttar Pradesh, India. Gurgaon, Haryana: Futures Group, ITAP. 2012. Available from http://pdf.usaid.gov/pdf_docs/pnadz546.pdf
2. WHO. The sexual and reproductive health of younger adolescents: Research issues in developing countries. Geneva, Switzerland: World Health Organization Press. 2011. Available from https://apps.who.int/iris/handle/10665/44590
3. Tamrakar A. Textbook of Gynecology for nurses. 1st edition. New Delhi: Jaypee Brother MedicalPublisher(P)LTD;2014;13.Available from https://mjcu.journals.ekb.eg/article_53326_f02b6f39cd3ad9022bf591bbe4109a2f.pdf
4. Ju H, Jones M, Mishra G. The prevalence and risk factors of dysmenorrhea. Epidemiol Rev. 2014; 36(1):104-13. doi: 10.1093/epirev/mxt009. Available from https://pubmed.ncbi.nlm.nih.gov/24284871/
5. Jacob A. A Comprehensive textbook of mid wifery and Gynecological Nursing.1st edition. New Delhi: Jaypee publication; 2008. Available from https://www.jaypeebrothers.com/pgDetails.aspx?book_id=9789352706785
6. Wong LP. Premenstrual syndrome and dysmenorrhea: urban-rural and multiethnic differences in perception, impacts, and treatment seeking. J Pediatr Adolesc Gynecol. 2011; 24(5):272-7. doi: 10.1016/j.jpag.2011.03.009. Epub 2011 May 19. Available from https://pubmed.ncbi.nlm.nih.gov/21600811/
7. Agarwal A, Agarwal;A.A study of dysmenorrhea during menstruation in adolescent girls. Indian J Community Med 2010; 35(1):159-64. doi: 10.4103/0970-0218.62586.Available from https://pubmed.ncbi.nlm.nih.gov/20606943/
8. Moos RH. Menstrual Distress Questionnaire. Los Angeles: Western Psychological Services, 1991.Available at https://scholar.google.co.in/scholar?q=Moos+RH.+Menstrual+Distress+Questionnaire.+Los+Angeles:+Western+Psychological+Services,+++++1991.&hl=en&as_sdt=0&as_vis=1&oi=scholart

9. Melzack R. The McGill Pain Questionnaire: major propertiesand scoring methods. Pain 1975; 1(3):277–99. doi: 10.1016/0304-3959(75)90044-5. Available from https://pubmed.ncbi.nlm.nih.gov/1235985/

10. Das ruhi, kulakarni munal. Prevalence of dysmenorrhea among girls students in a medical college. Panacea J Med Sci 2014; 4(1): 49-51. Available from https://www.ijcm.org.in/article.asp?issn=09700218;year=2010;volume=35;issue=1;spage=159;epage=164;aulast=Agarwal

11. Singh MM, Devi R, Gupta SS.Awareness and health seeking behavior of rural adolescent school girls on menstrual and reproductive health problems.Indian J. Med. Sci.1999; 53(10):439-43.Available from https://pubmed.ncbi.nlm.nih.gov/10776500/

12. Khanna A, Goyal RS, Bhawsar R. Menstrual practices and reproductive problems : a study of adolescent girls in rajasthan.J.health manage 2005;7: 91-107. https://doi.org/10.1177%2F097206340400700103. Available from https://journals.sagepub.com/doi/10.1177/097206340400700103

13. A dasgupta, M.Sarkar.Menstrual hygiene:How hygienic is the adolescent girls? Indian J Community Med 2008;33(2):77-80. doi: 10.4103/0970-0218.40872. Available from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2784630/

14. Dharampal AG, Dambhare J.Y.D. Age at Menarche and Menstrual cycle pattern among school Adolscent Girls in central India. Glob. J. Health Sci. 2012;4(1):105-11. doi: 10.5539/gjhs.v4n1p105. Available from https://pubmed.ncbi.nlm.nih.gov/22980118/

15. Desalegn TZ, Berihun M, Abay M. Age at menarche and the menstrual pattern of secondary school adolscents in Nortwest Ethiopia. BMC Womens health 2009;35(1):159-164. doi: 10.1186/1472-6874-9-29. Available from https://pubmed.ncbi.nlm.nih.gov/19804623/

16. Sharma P,Malhotra C,Taneja DK, Saha R. Problems related to menstruation among adolescent girls.Indian J Paediatr 2008;75(2):125-9. doi: 10.1007/s12098-008-0018-5. Available from https://pubmed.ncbi.nlm.nih.gov/18334791/

17. Nabia T,Jawad Hashim M,Jaffery T,Sumairalijaz S, Sana B, Zainab A. Impact and healthcare-seeking behaviour of premenstrual symptoms and dysmenorrhea.Br. J. Med. Pract.2009;2(4):40-43. Available from https://bjmp.kotwal.info/content/impact-and-healthcare-seeking-behaviour-premenstrual-symptoms-and-dysmenorrhoea

18. SS Chan,KW yiu,PM yuen, DS Sahota,TK chung.Menstrual problems and health care seeking behaviour in Hong Kong Chinese girls.Hong Kong Med J 2009;15(1):18-23. Available from https://pubmed.ncbi.nlm.nih.gov/19197092/

19. Fankenauser M.Treatment of dysmenorrhea and premenstrual syndrome.J AM Pharm Assoc 1996;36:503-13. Available from http://www.sciencedirect.com/science/article/pii/S1607551X09702888/pdf?md5=8d03cfa5804ed6101f3cfbb3f804f159&pid=1-s2.0-S1607551X09702888-main.pdf

20. Banikarim C,Chako MR,Kelder SH.Prevalence and impact of dysmenorrhea on Hispanic female adolescents.Arch Pediatr Adolesc Med 2000;154(12)1226-9. doi: 10.1001/archpedi.154.12.1226. Available from https://pubmed.ncbi.nlm.nih.gov/11115307/

21. Chang AM,Holroyd E,Chau JPC.Premenstrual syndrome in employed Chinese women in Hong kong.Health Care Women Int 1995;16:551-61. doi: 10.1080/07399339509516209. Available from https://pubmed.ncbi.nlm.nih.gov/8707689/

22. Chen H.M, Chen C.H.Related factors and consequences of menstrusal distress in adolescent girls with dysmenorrhea. The Kaohsiung J Med Sci. 2005;21(3): 121-7. doi: 10.1016/S1607-551X(09)70288-8. Available from https://pubmed.ncbi.nlm.nih.gov/15875437/

23. Shabnam Omidvar, Fatemeh Nasiri Amiri and Khyrunnisa Begam.A study on menstruation of Indian adolescent girls in an urban area of South India. J Family Med Prim Care 2018;7(4):698-702. doi: 10.4103/jfmpc.jfmpc_258_17. Available from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6132001/

24. Lu ZJ. The relationship between menstrual attitudes and menstrual symptoms among Taiwanese women. J Adv Nurs 2001;33(5):621–8. doi: 10.1046/j.1365-2648.2001.01705.x. Available from https://pubmed.ncbi.nlm.nih.gov/11298198/

25. Holroyd E, Chang AM, Chau JPC. Assessing premenstrual syndrome in Chinese society. Int J Res Pract 1998;4:143–53. Available from http://www.sciencedirect.com/science/article/pii/S1607551X09702888/pdf?md5=8d03cfa5804ed6101f3cfbb3f804f159&pid=1-s2.0-S1607551X09702888-main.pdf

26. Faridesh EK.Adolscent dysmenorrhea .Pediatr Health Care 1988;2:29-37. Available from https://www.researchgate.net/publication/7865973_Related_Factors_and_Consequences_of_Menstrual_Distress_in_Adolescent_Girls_with_Dysmenorrhea

27. Shanbhag D, Shilpa R, D'Souza N, Josephine P , Singh J, Goud BR. Perceptions regarding menstruation and practices during menstrual cycles among high school going adolescent girls in source limited settings around Banglore city, Karnataka, India.Int. j. collab. res.2012;4(7):1353-62. Available from https://www.iomcworld.org/articles/perceptions-regarding-menstruation-and-practices-duringmenstrual-cycles-among-high-school-going-adolescent-girls-in-resource-limited-settings-around-bangalore-city-karnataka-india.pdf