



International Journal of Medical Research & Health Sciences

www.ijmrhs.com

Volume 4 Issue 3

Coden: IJMRHS

Copyright ©2015

ISSN: 2319-5886

Received: 28th April 2015

Revised: 23rd May 2015

Accepted: 18th June 2015

Research article

A STUDY TO EVALUATE THE ABNORMAL MENSTRUAL PATTERNS AMONG ADOLESCENT GIRLS IN BAREILLY

*Chauhan Sandhya¹, Kariwal Peeyush², Kumari Anita¹, Vyas Shaili³

¹Associate Professor, Department of Pediatrics, SRMSIMS, Bareilly, Uttar Pradesh, India

²Associate Professor, Department of Social and Preventive Medicine, RIMSR, Saifai, Uttar Pradesh, India

³Assistant Professor, Department of Social and Preventive Medicine, HIMS, Dehradun

*Corresponding author email: drsandhyapedia@gmail.com

ABSTRACT

Background: Menstrual cycle abnormalities have been considered a common occurrence during puberty. Numerous earlier studies have analyzed the various patterns seen in the epidemiological data regarding menstrual cycle of adolescent girls. But there is dearth of data from Rohilkhand region of central UP state. **Aims:** To find out the abnormal menstrual patterns among adolescent girls in Bareilly city. **Materials and Methods:** A cross sectional study conducted by presenting a pre-designed and pre-tested self administered questionnaire, containing questions pertaining to menstrual practices and knowledge to 994 adolescent girls of urban schools in Bareilly city. **Results:** Mean age of menarche was 13.11±0.95 years. 6.07% girls in the study reported cycles of abnormal lengths. This subset also had significantly higher prevalence of irregularity. Presence of irregular menses beyond 3 gynaecological years diminished the possibility of their regularization in near future. Among the girls with excessive dysmenorrhea, nearly 1/3rd had associated menstrual disturbances also. **Conclusion:** Incidence of irregular menstrual cycle was 20.75% and it was significantly more in oligomenorrheic cycles. Among normal menstrual cycles also, presence of IMC was significantly more in adolescents having mild oligomenorrhea. 6.07% of girls reported abnormal cycle lengths. 77.70% reported dysmenorrhea. Chances of menstrual cycles getting regularized after 5 years of menarche are minimal. Adequate knowledge regarding abnormal variations in the menstrual cycle pattern during adolescence may permit implementation of strategies for preventing potential reproductive and other health morbidities in adulthood.

Keywords: Mild oligomenorrhea, Polymenorrhea, Menarche, Menstrual cycle, Adolescence.

INTRODUCTION

Menstrual cycle abnormalities have been considered a common occurrence during puberty and constitute a common complaint with which adolescents girls present in pediatric clinics. According to District Level Household and Facility Survey 3 (DLHFS) nearly 25% of the adolescent girls complain of some problem related to menstruation.^[1] Menstrual disturbances in adolescents are often explained by immaturity of the hypothalamic-pituitary-gonadal axis. Certain prospective follow up studies on the

menstrual pattern of adolescent girls have shown that few conditions, which present in the first few years of menarche viz oligomenorrhea and/or irregular menstrual cycles may be related to polycystic ovarian disease(PCOD) later on.^[2,3] Similarly, though diseases like endometriosis often begin in adolescence, they are most often recognized after many years.^[4] Thorough evaluation of menstrual cycle disorders in adolescence provides a window of opportunity for early diagnosis and treatment of

conditions affecting HPO axis. Delay in the evaluation and treatment of disordered menses in some cases may contribute to reduced bone density also.^[5]

Adequate knowledge regarding abnormal variations in the menstrual cycle pattern during adolescence may permit early identification of the potential reproductive and other health morbidities for adulthood. This can help in screening susceptible individuals in early adolescence after the onset of menarche and timely intervention may be sought if required. Extensive search failed to reveal any related data from the study region. This study presents the findings of first epidemiological survey regarding menstrual patterns from Rohilkhand region of central Uttar Pradesh state in India.

Aim and objective:

1. To present the epidemiological data regarding patterns of the menstrual cycle in a representative sample of Indian girls.
2. To analyze the abnormal variations in the menstrual cycle patterns' in this study sample.

MATERIAL AND METHODS

Study type: A cross sectional, questionnaire based study.

Sampling technique: These were selected by convenience sampling.

Sample size: Considering the national incidence of menstrual disorders^[1] among adolescents to be 20-30%, the sample size was calculated using the formula $n=4pq/L^2$ with a 10% relative precision and 95% confidence interval to be 933 girls aged <18 years. [p=approximate prevalence rate of menstrual disorders in adolescents; q=1-p ; L= permissible error in the estimation of p i.e. 10% of 30%]

Ethical approval: Written consent was taken from the head of respective school for conducting the study. Verbal consent of the study subjects was also taken after explaining the aims and need of this study. Ethical committee of our institute cleared the study protocol.

Duration of study: This study spanned over a time period of 6 months from October 2013 to April 2014. Data was collected simultaneously from all study schools on same day.

Inclusion criteria: The study subjects were all the unmarried girls studying in standard(s) 9th, 10th, 11th or 12th and who were physically present in the school

on the day of the study. The study was conducted in 3 girls' Government school from urban city located in Uttar Pradesh.

The girls were approached during the school hours after obtaining the permission and written consent of the school authorities.

Exclusion criteria: Respondents were excluded from the study if they did not attain menarche or they failed to complete the given questionnaire.

Methodology: A pre-designed and pre-tested self administered questionnaire was prepared in the local language Hindi. This was used for data collection. Copies of the questionnaire were distributed and filled by the adolescents in classrooms, following an anonymous respondent approach immediately after an explanation of its content by the principal author. The questionnaire included details of menstrual cycle pattern (cycle length, regularity and duration of flow), hygienic practices and self-reported reproductive morbidities.

The following definitions are used in the study^[6]:

Gynecological age: The number of years since menarche.

Oligomenorrhea: Infrequent and irregular bleeding at >45days interval.

Polymenorrhea: frequent regular or irregular bleeding at <21days interval.

Irregular menses: Bleeding at varying intervals, 21 days but <45 days interval.

Dysfunctional uterine bleeding: Prolonged and excessive menstrual bleeding associated with irregular periods.

Statistical analysis: Statistical analysis was done using GraphPad 5 software.

RESULTS

All the girls in the study sample were unmarried and aged 12-17 years (Table 1). All together 994 girls were given the questionnaire. Response rate was 100%. 88(8.8%) girls had not attained menarche. Remaining 906(91.14%) subjects filled the questionnaire completely and only these subjects were included in the further statistical analysis for menstrual patterns.

The mean age of the girls included in the study was 14.89±1.41 years and the mean age of menarche was 13.11±0.95 years. The median age for menarche was 13 years with a range of 10-17 years. 219(24.01%) girls had menstruated by the time they were 12 years

of age. All the girls attained menarche by the maximum age of 17 years in the study population. Among 88/994(8.85%) girls who had not attained menarche, 23/88(26.14%) girls were in the age group of 14-16 years. (Table 1)

Table 1: Characteristics of menstrual cycle in study subjects

Gynaecological age (n=906)	
1 st year	340 (37.28%)
2 nd year	264 (28.95%)
3 rd year	175 (19.18%)
4 th year	51 (5.59%)
5 th year	32 (3.51%)
Don't remember	44 (4.86%)
Cycle length (n=906)	
No of study subjects (%)	
<21 days	34 (3.75%)
21-35days	738 (81.46%)
36-45days	84 (9.27%)
46-90days	9 (0.9%)
>90 days	12 (1.3%)
Don't remember	29 (3.2%)
Duration of menstrual flow (n=906)	
7 days	840 (92.71%)
>7 days	48 (5.29%)
Don't remember	18 (1.98%)
Regularity of menstrual cycle (n=906)	
Regularity	683 (75.38%)
Irregular	188 (20.75%)
Couldn't specify	35 (3.86%)

Table 2 describes menstrual patterns in study subjects as per their gynaecological age. In the study sample, 822/906(90.72%) girls had a normal cycle length of 21-45 days. Abnormal cycle lengths were reported by 55/906(6.07%) girls. Among these, 34/906(3.95%) girls reported polymenorrhea and 21/906(2.41%) girls reported oligomenorrhea.

With increasing gynaecological age statistically significant increase in regularity of menses was seen. Similarly irregular menses also showed a statistically significant decreasing trend with progressive gynaecological age till 3rd gynaecologic year. However presence of irregular menses from 4th

gynaecological year onwards diminishes the possibility of their regularization in near future as per the present study.

704/906(77.70%) girls reported dysmenorrhea with 102/906 (11.26%) girls reporting excessive pain which resulted in restriction of day to day activities and absenteeism at school. Mild to moderate dysmenorrhea showed a significantly decreasing trend with increasing gynecological age. But the trend of excessive dysmenorrhea definitely showed an increase with increasing gynecological age. Among the menstrual disturbances associated with excessive dysmenorrhea, 35/102 (34.31%) girls had irregular menstrual cycles, 16/102 (15.68%) had cycles of abnormal lengths, 74/102 (72.55%) reported vaginal discharge, 33/102(32.36%) had burning micturition and 29/102 (28.43%) reported both. 8/906 (8.8%) girls reported excessive dysmenorrhoea along with a cycle duration of >7days.

The proportion of both short and long cycles showed no significant increasing or decreasing trend with the increasing gynecological age. Noteworthy the menstrual length of menstrual cycle normalized in all the study subjects by 5th gynaecological age.

Out of 48 girls with a cycle duration of >7 days, 14(29.16%) had abnormal cycle lengths, 14(29.16%) had irregular menstrual cycle(IMC) and 8(16.66%) had excessive dysmenorrhea. Such girls can be considered to be suffering with dysfunctional uterine bleeding(DUB).

For further comparison of the menstrual cycle length and regularity of menstrual cycles (**Table 3**), the 822 girls with a cycle length of 21-45 days were further divided into 2 subgroups on the basis of cycle length; 21-35 days cycle length and 36-45 days cycle length. Significantly more girls in the latter subgroup reported IMC (p=0.0001).

As per **table 4**, prevalence of IMC was significantly more in cycles of abnormal lengths. The incidence of IMC was 38.23% in the polymenorrhic group (p=0.0205) compared to 51.43% in oligomenorrhic group (p=0.0001).

Table 2: Relationship of gynaecological age with various patterns of menstrual cycle and dysmenorrhea:

Menstrual characteristics	Gynaecological age					P value
	1 st (n=340)	2 nd (n=264)	3 rd (n=175)	4 th (n=51)	5 (n=32)	
Regular menstrual cycle(n=683)	257 (75.58%)	197(74.62%)	143(81.71%)	41(80.93%)	23(71.87%)	0.0016
Irregular menstrual cycle(n=188)	71 (20.88%)	60 (22.72%)	29 (16.57%)	9 (21.95%)	8 (25%)	0.0136
Duration of menstrual flow >7 days (n=48)	15 (4.41%)	21 (7.95%)	5 (2.85%)	5 (9.8%)	1 (3.12%)	0.2424
Mild dysmenorrhea (n=357)	174 (51.17%)	105(39.77%)	69 (39.43%)	7 (13.72%)	2 (6.25%)	0.0136
Moderate dysmenorrhea (n=245)	101 (29.70%)	88 (33.33%)	42 (24%)	10 (19.6%)	4 (12.5%)	0.0143
Severe dysmenorrhea (n=102)	28 (8.23%)	30 (11.36%)	18 (10.28%)	26(50.98%)	0	0.6169
Menstrual cycle length of 21-45 days (n=822)	308 (90.58%)	252(95.45%)	165(94.28%)	50 (98%)	32 (100%)	0.0012
Polymenorrhea (n=34)	14 (4.12%)	10 (3.78%)	10 (5.70%)	0	0	0.0587
Oligomenorrhea (n= 21)	18 (5.29%)	2 (0.75%)	0	1 (1.96%)	0	0.4026
Menstrual cycle length of 46-90 days (n=9)	8 (2.35%)	1 (0.04%)	0	0	0	0.2243
Menstrual cycle length of >90 days (n=12)	10 (2.94%)	1 (0.04%)	0	1(2%)	0	0.2463

Table 3: Comparison of various abnormal menstrual cycle patterns in girls having cycle length of 21-35 days with girls having cycle length of 36-45 days as per their gynaecological age:

Gynaecological age	21-35 DAYS CYCLE			36-45DAYS CYCLE		
	No of study subjects (n)	Irregular menstrual cycle (%)	Duration of menstrual flow of >7days (%)	No of study subjects (n)	Irregular menstrual cycle (%)	Duration of menstrual flow of >7days (%)
1	268	34 (12.68)	7 (2.61)	40	22 (55)	3 (7.50)
2	226	41 (18.14)	17 (6.34)	26	12 (46.15)	2 (7.69)
3	154	24 (15.58)	3 (1.94)	11	5 (45.45)	0
4	44	17 (38.63)	5 (11.36)	6	3 (50)	0
5	31	10(32.25)	1(3.22)	1	1 (100)	0
Total	723	126(17.4)	33 (4.62)	84	43 (51.19)	5 (5.95)

Table 4: Correlation of regularity of Menstrual cycle with length of menstrual cycle.

TOTAL(n=906)	RMC(n=683)	IMC(n=188)
CYCLE LENGTH		
<21days (n=34)	21 (61.67%)	13 (38.23%)
21-35days (n=738)	616 (83.47%)	122 (16.53%)
36-45days (n=84)	38 (45.24%)	43 (51.19%)
>45days (n=21)	10 (47.62%)	11 (52.38%)

DISCUSSION

Age of menarche in current study was similar to recent Indian studies.^[7-10] The mean age of menarche is typically between 12-13 years.^[11] Age of menarche is determined by general health, genetic, socio-economic and nutritional factors. Chronic disease, malnutrition and high level of physical activity can delay menarche.^[12]

Prevalence of different patterns of Menstrual Cycle:

In the present study, 2.31% girls reported oligomenorrhea. Other population based studies on adolescent girls have reported a prevalence ranging from 2.5%-22%.^[7,8,13,14] The proportion of adolescents with oligomenorrhea declined after the second gynaecologic year in the present study. This is in accordance with other studies which suggest that in most of the adolescents, oligomenorrhea present

with the onset of menarche changes to a normal pattern, especially with in the first 2 years after menarche.^[3,15-17]

The incidence of polymenorrhea in the present study was 3.75% which is similar to past studies from HongKong, Italy and India, which reported a varied range from 3.0 to 8.0%.^[7,14-16,18]

The incidence of irregular menstrual cycles in the present study is 20.75% . Past studies from India have reported irregularity in upto 30% of study subjects.^[7,14]

Across the gynaecological ages, the incidence of IMC showed little fluctuation. This was different from findings of Chan et al which showed a decreasing trend in the prevalence of IMC with increasing gynaecological ages.^[15] The present study shows that the incidence of IMC was much higher in cycles of abnormal length, more so in oligomenorrheic cycles. Past studies suggest that the risk of cycles remaining oligomenorrheic can be predicted by IMC.^[3,19]

Also the risk of cycles becoming oligomenorrheic can be predicted by IMC , particularly the cycles with an average length of 35-45 days.^[3] The POMP study had specified the group with 36-45 days cycle length and irregular menses as mild oligomenorrhea.^[3] Further this study showed that about 34% girls with Mild oligomenorrhea went on to develop oligomenorrhea as compared to only 4% girls having regular menstrual cycles.^[3] According to the available prospective studies, in such girls the first symptoms of PCOS (polycystic ovarian syndrome) may appear in the perimenarchal period. Similarly a Swedish prospective study of menstrual disturbances in adolescents demonstrated that after 6 years of follow-up, irregular menstruation was still present in 62%.^[2] Further, 59% of those with persisting irregular menstruation fulfilled the criteria for diagnosis of PCOS.^[2] Since PCOS is the most important cause of anovulatory infertility, observations of the present study are extremely relevant with respect to the fertility concerns for these young women in the future. On the basis of the above mentioned available evidence, we can conclude that adolescents presenting with IMC since the beginning of menarche and mild oligomenorrhea (i.e. cycle length of 36-45 days) should be counseled accordingly and as far as possible kept under close follow up for years.

Dysmenorrhea is the most common gynecologic complaint among adolescent and young adult females.^[20] Due to the relative immaturity of the hypothalamic pituitary-ovary axis in the first 2 years following menarche, more than half of the menstrual cycles are anovulatory. Initial anovulatory cycles tend to be pain free, although heavy menstrual loss can result in an element of dysmenorrhoea. When regular ovulatory cycles commence, the periods often become more painful due to the increased levels of circulating prostaglandins.^[17] The majority of dysmenorrhea in adolescents and young adults is primary (or functional), is associated with no pelvic pathology, and has a clear physiologic etiology.^[20] According to DLHS 3 about 79.5% of adolescent Indian girls complain of dysmenorrhea.^[1] In the present study, 77.70% of girls reported to be suffering with variable degree of dysmenorrhea with 11.26% girls having excessive dysmenorrhea leading to restriction of daily activities and school absenteeism. Among the girls with excessive dysmenorrhea, nearly 1/3rd had associated menstrual disturbances also. Parker et al reported that 93% of girls suffered menstrual pain and approximately 25% of the sample had marked menstrual disturbance.^[21] Another study from Turkey also showed a highly significant correlation of pain with menstrual disturbances in approximately 25% of teenagers.^[22] This suggests that association of dysmenorrhea with other menstrual disturbances should prompt the treating physician for earlier investigation and search of an underlying pathological disorder such as endometriosis. It is likely that many cases of endometriosis in young women may have been misdiagnosed as 'spasmodic' dysmenorrheal. Endometriosis has always been assumed to present many years after menarche but studies have shown it to occur prior to menarche and between 1–6 months after the onset of menarche.^[4] According to The Endometriosis Association, 66% of adult women with endometriosis report the onset of pelvic symptoms prior to age 20. Most importantly, patients who report symptoms as teens visit an average of 4 or more physicians before receiving a correct diagnosis.^[4] Abnormal uterine bleeding may occur in women of all ages, and it is a particularly common issue for adolescents.^[22] In the present study 5.29% girls presented with prolonged vaginal bleeding and nearly 1/3rd of them had associated features in the form of

abnormal cycle lengths, 1/3rd had irregular cycles and nearly 20% had excessive dysmenorrhea. Although the majority of adolescents presenting with abnormal vaginal bleeding do, in fact, have anovulatory bleeding caused by an immature HPO axis, one must consider other severe causes in abnormally prolonged bleeding depending upon the associated features present viz. endometritis or endometriosis if associated with significant dysmenorrhoea and PCOS in adolescents who continue to have abnormal vaginal bleeding 3 to 4 years after menarche. Other causes may include abnormalities of the uterus or vagina, endocrine or other systemic disorders and coagulopathies.^[23]

CONCLUSION

Abnormal cycle lengths were reported by 6.07% of girls. Among these, 3.95% girls reported polymenorrhea and 2.41% girls reported oligomenorrhea. The incidence of irregular menstrual cycles in the present study is 20.75%. In the present study 5.29% girls presented with prolonged vaginal bleeding and nearly 1/3rd of them had associated features in the form of abnormal cycle lengths, 1/3rd had irregular cycles and nearly 20% had excessive dysmenorrhea. 77.70% girls reported dysmenorrhea with 11.26% girls reporting excessive pain which resulted in restriction of day to day activities and absenteeism at school. While mild to moderate dysmenorrhea showed a significantly decreasing trend with increasing gynecological age the trend of excessive dysmenorrhea showed an increase with increasing gynecological age. The incidence of IMC increases with oligomenorrhoea. Noteworthy in the normal cycles also, incidence of IMC was significantly more in mild oligomenorrhoeic group. Adolescents having mild oligomenorrhoea (i.e. cycles of 36-45 days duration) along with IMC require regular and intense observation for first 5 years after menarche.

Suggestions: Considering the complex psychology and high risk behavior of adolescents, an appropriate anticipatory guidance should be given to the adolescents regarding what is normal or abnormal for their reproductive health at every contact point. Also thorough evaluation and prompt identification of mild oligomenorrhoea throughout adolescence may help the health care providers in early identification of

potential health concerns for adulthood especially infertility.

Acknowledgements: Authors will like to thank the management of SRMSIMS, Bareilly for help in collecting data. We also thank Dr (Prof) Pratik Gahalaut for critical editing of this manuscript.

Conflict of interest: All the authors declare that they don't have conflict of interest.

Funding: None

REFERENCES

1. Ram F, Ladusingh L, Paswan B, Unisa S, Prasad R, Shekhar TV. International Institute for Population Sciences (IIPS). District Level Household and Facility Survey (DLHS-3): India. Mumbai[Internet].2007-8.pp 139-40.(cited 2014 October 25). Available from: <http://www.rchiips.org/pdf/INDIA-REPORT-DLHS3.pdf>.
2. Wiksten AM, Hirschberg AL, Hagenfeldt K. Prospective follow-up of menstrual disorders in adolescence and prognostic factors. *Acta Obstet Gynecol Scand* 2008;87:1162-8.
3. Van Hooff MH, Voorhorst FJ, Kaptein MB, Hirasig RA, Koppelaar C, Schoemaker J. Predictive value of menstrual cycle pattern, body mass index, hormone levels and polycystic ovaries at age 15 years for oligo-amenorrhoea at age 18 years. *Hum Reprod* 2004;19:383-92.
4. Dessole M, Melis GB, Angioni S. Endometriosis in adolescence. *Obstet Gynecol Int* 2012;869191.
5. Popat VB, Prodanov T, Calis KA, Nelson LM. The menstrual cycle: a biological marker of general health in adolescents. *Ann N Y Acad Sci* 2008;1135:43-51.
6. Jenkins RR. Menstrual problems. In Kleigman RM, Behrman RE, Jenson HB, Stanton BF. (eds) *Nelsons Textbook of Pediatrics*. 18th ed. Elsevier, New Delhi, 2008:836-44.
7. Dambhare DG, Wagh SV, Dudhe JY. Age at menarche and menstrual cycle pattern among school adolescent girls in Central India. *Glob J Health Sci* 2012;4:105-11.
8. Patil MS, Angadi MM. Menstrual pattern among adolescent girls in rural area of Bijapur. *Al Ameen J Med Sci* 2013;6:17-20.
9. Khanna A, Goyal SR, Bhawsar R. Menstrual practices and reproductive problems: A study of adolescent girls in Rajasthan. *J Health Management* 2005;7:91-107.

10. Deo DS, Ghattargi CH. Perceptions and practices regarding menstruation: A comparative study in urban and rural adolescent girls. *Indian J Comm Med* 2005;30:33-4.
11. World Health Organization Task Force on Adolescent Reproductive Health. A multicentre cross-sectional study of menarche. *J Adolesc Health Care* 1986;7:229-35.
12. Hickey M, Balen A. Menstrual disorders in adolescence: investigation and management. *Human Reprod Update* 2003;9:493-504.
13. Van Hooff MH, Voorhorst FJ, Kaptein MB, Hirasing RA, Koppenaal C, Schoemaker J. Relationship of the menstrual cycle pattern in 14-17 year old adolescents with gynaecological age, body mass index and historical parameters. *Hum Reprod* 1998;13:2252-60.
14. Nair MKC, Chacko DS, Darwin MR, Padma K, George B, Russell PS. Menstrual disorders and menstrual hygiene practices in higher secondary school girls. *Indian J Pediatr* 2012;79:74-8. Doi:10.1007/s12098-011-0431-z.
15. Chan SS, Yiu KW, Yuen PM, Sahota DS, Chung TK. Menstrual problems and health-seeking behaviour in Hong Kong Chinese girls. *Hong Kong Med J* 2009;15:18-23.
16. Rigon F, De Sanctis V, Bernasconi S, Bianchin L, Bona G, Bozzola M et al. Menstrual pattern and menstrual disorders among adolescents: an update of the Italian data. *Ital J Pediatr* 2012;38:38.
17. Williams CE, Creighton SM. Menstrual disorders in adolescents: review of current practice. *Horm Res Paediatr* 2012;78:135-43.
18. Godbole G, Phadake A, Joshi AR. Pattern of menstrual cycle in young adults. *Indian J Basic App Med Res* 2013;8:1017-21.
19. Omidvar S, Begum K. Menstrual pattern among unmarried women from south India. *J Nat Sci Biol Med* 2011;2:174-9.
20. Harel Z. Dysmenorrhea in adolescents and young adults: etiology and management. *J Pediatr Adolesc Gynecol* 2006;19:363-71.
21. Parker MA, Sneddon AE, Arbon P. The menstrual disorder of teenagers (MDOT) study: determining typical menstrual patterns and menstrual disturbance in a large population-based study of Australian teenagers. *British J Obstet Gynecol* 2010;117:185-92.
22. Baaran HO, Akgül S, Kanbur NO, Gümrük F, Cetin M, Derman O. Dysfunctional uterine bleeding in adolescent girls and evaluation of their response to treatment. *Turk J Pediatr* 2013;55:186-9.
23. Bravender T, Emans J. Menstrual Disorders: Dysfunctional Uterine Bleeding. *Ped Clin N Am* 1999;46:545-53.