

REVIEW

Epidemiology of menstrual disorders in developing countries: a systematic review

Introduction

In developing countries, priority setting in the health sector traditionally focuses on the principal causes of mortality. More recently, the Global Burden of Disease approach incorporates assessment of morbidity and quality of life in identifying priorities. Yet, although investigations in various developing countries reveal that women are concerned by menstrual disorders, little attention is paid to understanding or ameliorating women's menstrual complaints.¹ Menstrual dysfunction, like other aspects of sexual and reproductive health, is not included in the Global Burden of Disease estimates^{2,3} and, even as reproductive health programs expand their focus to address gynaecologic morbidity, the utility of evaluating and treating menstrual problems is not generally considered. Available data from developing countries on the frequency of menstrual disorders and their impact on women's health status, quality of life and social integration suggest that evaluation and treatment of menstrual complaints should be given a higher priority in primary care programs. This article reviews the literature on the prevalence of menstrual morbidity in developing countries and suggests a strategy for improving the quality of services provided to women with menstrual complaints.

Methods

We identified published and unpublished studies with information on the prevalence of menstrual disorders from 1970 through mid-2002 by systematically searching Medline, Popline and Lilacs and by reviewing the citation list for each published study. We also contacted researchers who have conducted community-based studies of gynaecological morbidity to ascertain whether they had information about menstrual morbidities in their databases. We were unable to obtain detailed information from two studies, but results of those studies are similar to those discussed here.

Some population-based surveys of general health or gynaecological morbidity include questions about menstrual complaints. In the late 1970s, the World Health Organization (WHO) conducted a multicountry cross sectional survey of Family Formation Patterns and Health.^{4,5}

Information on the prevalence of menstrual complaints in the past three months was obtained in seven countries (Table 1). These data permit cross national comparisons in so far as similar questions with a similar time reference were asked. However, no definitions were provided and considerable variation in the interpretation of questions among individuals and across cultures is likely.

Approximately a dozen subsequent surveys, including community-based, clinic-based and one national census, include some information on menstrual morbidities^{6–29} (Table 2). A few health surveys of special populations, such as factory workers in Vietnam¹⁷ and medical students in Venezuela,^{27,28} have also included relevant questions on menstrual disorders. These surveys vary considerably in the definition of and reference period for menstrual dysfunction, limiting their comparability. However, most provide precise definitions and several include a gynaecological evaluation thus permitting evaluation of the validity and reliability of self-reported menstrual complaints.

About 15 studies focus on adolescents and describe age at menarche, timing of reproductive maturation and menstrual characteristics, including normative patterns of menstrual function and frequency of dysmenorrhea^{30–48} (Table 3). Most of these studies sampled student populations, while a few used community-based samples.

A few studies have quantified blood loss during menstruation and estimate the prevalence of menorrhagia based on the standard definition of blood loss exceeding 80 mL,⁴⁹ although only one used a population-based sampling strategy.⁴⁰ These latter studies provide useful information on correlations among blood loss, various measures of body iron and anaemia.

Finally, a few qualitative studies have included queries about women's definitions of menstrual disorders, their experience and perception of menstrual dysfunction and their access to treatment and health services.^{12,23,50–52} Some others focus on providers' perceptions of menstrual dysfunction and knowledge about treatment protocols.⁵³ These qualitative studies identify gaps between the potential demand for and the availability and quality of services in the primary health care setting.

Studies do not use consistent definitions of menstrual disorders. We summarised results in five broad categories of menstrual dysfunction: abnormal uterine

Table 1. Summary of data on prevalence of menstrual complaints in the past three months from Family Formation Patterns and Health survey.^{4,5}

Country	<i>n</i>	Irregular bleeding	Excessive bleeding	Bleeding between periods	Pain
Colombia					
Old urban zone	2669	83.3	19.2	9.2	42.0
Newly settled zone	2597	76.2	27.2	17.0	52.5
Pakistan					
Semi-urban	2284	25.9	16.2	13.2	39.2
Urban	2390	20.7	16.4	9.8	38.5
Syria					
Damascus	1977	22.1	8.0	5.0	39.0
Sweida	1708	28.8	11.1	8.3	31.7
Aleppo	1874	20.3	9.6	7.7	30.7
Teheran, Iran					
Muslim	1413	24	20	7	46
	2105 (pain)				
Armenian	1643	23	12	6	25
	2065 (pain)				
Beirut, Lebanon					
Shiite	943	31	12	7	31
	1512 (pain)				
Maronite	1150 (pain)	28	10	5	39
Manila, Philippines					
Rural	1990	14	8	6	45
Urban	1989	8	10	8	58
Ankara, Turkey					
Rural	226	6.5	11.0	7.4	38.2
	780 (pain)				
Semi-urban	196	11.8	11.4	7.3	41.9
	685 (pain)				

bleeding, amenorrhea/oligomenorrhea, irregular cycles, dysmenorrhea and any menstrual complaint. Abnormal uterine bleeding includes definitions consistent with menorrhagia or polymenorrhea including (1) a long duration of menstrual flow, (2) excessive, heavy or profuse bleeding, (3) frequent periods or short cycles and (4) spotting or intermenstrual bleeding. Amenorrhea/oligomenorrhea includes all definitions consistent with amenorrhea (no menses for three or more months), oligomenorrhea (menstrual cycles of 35–90 days) or infrequent menses. The term *irregular menses* is included in a number of surveys, thus we report it here even though it lacks a commonly accepted meaning among women or across cultures. Dysmenorrhea includes pain, backaches, abdominal pain or cramps with menstruation. Finally, a number of studies group diverse complaints, such as irregular cycles, frequent periods, spotting, heavy bleeding and menstrual pain into a single category of ‘any menstrual problems’. Although this category is of little utility for determining aetiology, diagnosis or treatment, it captures the relative importance of menstrual morbidity as a health priority.

Results

Approximately 4–8% of women report having menstrual periods longer than 7–8 days when interviewed^{6,20} (see Table 2). Similarly, the self-reported prevalence of excessive, profuse or heavy bleeding was 4–9% in most studies,^{6,7,12,23} although in the WHO multicountry study,^{4,5} the three month, self-reported prevalence of excessive bleeding was higher, ranging from 8% to 27% (Table 1). The frequency increases when the sample is limited to older women.⁶ Self-reported three month prevalence of bleeding between periods was 5–17% in the WHO multicountry study,^{4,5} while in other studies 1–11% of women report spotting or intermenstrual bleeding.^{19,20,22,23} Short cycles of less than 21 days were self-reported by 1% of women in India^{6,11} while 6% of women in Turkey complained of having frequent periods.^{19,20}

Prevalences of abnormal uterine bleeding were higher when women were interviewed by a physician with 15% of women diagnosed with menorrhagia⁷ and 15% reporting profuse bleeding¹¹ to a physician in India. In the Turkish

study, a total of 25% of women aged 15–44 complained of having either long or frequent periods and/or spotting to the physician, with 16% then clinically diagnosed with abnormal uterine bleeding.^{19,20} Two studies that measured actual blood loss and defined menorrhagia as blood loss exceeding 80 mL found a prevalence of 11% in the Philippines¹⁴ and 20% in China.¹⁸

Only a few of the adolescent studies (Table 3) provided data on menstrual flow. In Nigeria, 1% of girls reported having menses that lasted more than 7 days, 4% reported having heavy flow and 24% reported having cycles shorter than 21 days.³⁹ In another Nigerian study, 12% of teenage girls had menorrhagia based on documented blood loss of >80 mL.⁴⁰ In India,³¹ profuse periods were reported by 8%, and in Turkey, short cycles were reported by 7% of adolescent girls.³⁴ In the Dominican Republic, 18% reported hypermenorrhagia (not defined).⁴⁷

Abnormal uterine bleeding may be a symptom of other reproductive, gynecologic or systemic morbidities but few studies from developing countries have evaluated menstrual symptoms as a risk marker for other reproductive morbidities. An important study from the Gambia²³ found that women with a history of infertility and pelvic tenderness were more than three times as likely to report having heavy or prolonged bleeding compared to women without these conditions. Additionally, women with cervical tumours were almost six times more likely and women with pelvic tenderness or adhesions were about three times more likely to report spotting than other women. Women with endometrial tuberculosis were twice as likely to report having menorrhagia as control women in one Indian study (16% vs 8%)⁴² and menorrhagia can be a symptom of haemorrhagic dengue fever.^{54–56}

Among women of reproductive age, the prevalence of amenorrhea ranged from approximately 5% to 13%^{7,19,20,26–28} with the highest prevalence reported in a study of medical residents.²⁹ The prevalence of oligomenorrhea or cycles longer than 35 days ranged from 8% to 22%.^{7,8,11,26–28} Reports of irregular bleeding in the past three months in the WHO multicountry study ranged from 8% to 83%.^{4,5} In other studies, the frequency of irregular cycles ranged from 5% to 16%, with higher prevalences generally reported after medical interviews (9–16%) than lay interviews (5–15%).^{6,7,11,12,21,23} However, the highest prevalence of irregularity was reported in a study of a selected population, Vietnamese factory workers (30%).¹⁷ In Lebanon, 15% of women who had ever visited a gynecologist sought care for menstrual irregularity at their last gynaecological visit.²¹ In the adolescent studies, the frequency of amenorrhea was reported to be 4% in Chile while that of oligomenorrhea was reported to be 1.1% in Nigeria,³⁹ 8% in Turkey³⁴ and 42% in Thailand.³³ In the Gambia, women with evidence of cervical tumours were about 2.5 times more likely and women with adnexal tumours were 4.5 times more likely to report irregular menstruation in the past three months than women without

tumours.²³ Oligomenorrhea/amenorrhea may also be a symptom of genital tuberculosis.^{54,58}

Between 25% and 58% of women participating in the WHO multicountry study reported having menstrual pain in the past three months.^{4,5} In other studies, 15–70% of adult women reported dysmenorrhea with higher frequencies reported in physician interviews.^{6,7,11,12,15,16,19,22,24,28} Severe pain or pain that kept a woman from work or her daily activities ranged from 3% to 18%,^{6,16,23} with one report in Niue of 58% of women reporting 'excessive' pain.²² Among adolescents, the prevalence of dysmenorrhea was higher with approximately 18–88% reporting some pain^{30–32,34–39,41–48} and 3–20% reporting severe pain or pain sufficient to cause them to miss school, work or daily activities.^{30,31,34,36,39,41,42,45,46,48} In the Gambia, women with infertility and women with pelvic tenderness were 3.5 and 5 times more likely to report disabling menstrual pain, respectively.²³

As gynaecologic morbidity surveys begin to evaluate the relative frequency of menstrual complaints and related care-seeking behaviour, they permit assessment of the relative importance of menstrual disorders as a health concern. In India, menstrual disturbances were between the first and fourth most commonly reported gynaecological complaints.^{9,10} In the Philippines, menstrual disorders were the third most commonly reported gynaecologic morbidity.¹³ In Turkey, abnormal uterine bleeding was the third most commonly reported gynaecological complaint and the fourth most commonly diagnosed gynaecological morbidity among adult women,^{19,20} while among adolescents who consulted a gynecologist menstrual disorders and dysmenorrhea were the most common complaints.³⁴ In Lebanon, menstrual irregularity and bleeding problems were between the second and fourth most common reasons for seeking gynaecological care.²¹ Perhaps most notably, in Niue, where some of the highest prevalences of menstrual disorders were reported, women, when asked to rank their health care needs, ranked menstrual problems as their third priority for health education and their fourth most important health priority.²²

Surveys of women in medical care settings^{19–21} and studies that offered care in conjunction with survey participation^{7,10,11,23} demonstrate that women do seek treatment for menstrual complaints. Furthermore, qualitative data from the Gambia²³ demonstrate that women purchase paracetamol for dysmenorrhea and are aware that iron tablets are recommended for women with heavy bleeding. However, they were unaware of any Western medicines that could reduce blood flow or treat abnormal uterine bleeding. Qualitative studies in Pakistan⁵⁰ and Brazil (M Luick, unpublished observations) have documented both the difficulty women experience in obtaining care for menstrual problems and the lack of knowledge among primary care providers about protocols for the diagnosis and treatment of menstrual disorders. Training of primary care professionals and access to diagnostic and

Table 2. Summary of data on prevalence of menstrual disorders among women of reproductive age in developing countries.

Author, year, country	Design	Population characteristics	Amenorrhoea/oligomenorrhoea/irregular	Abnormal uterine bleeding	Dysmenorrhoea	Menstrual problems
Khatri and Gupta, 1978, India ⁶	community-based survey; interview <i>n</i> = 1000	age 20–40, married, parous, not using IUD, oral contraceptives, sterilized; no recent D&C for menstrual dysfunction	irregular: 5%	bleed >7 days: 4%; excessive bleeding: 9%; excessive bleeding age 36–40: 28%; cycle <21 days: 1%	dysmenorrhoea: 29%; severe dysmenorrhoea: 3%	
Bang <i>et al.</i> , 1989, India ⁷	community-based survey; cross sectional; interview and clinical exam <i>n</i> = 650	age 13+	amenorrhoea: 20% interview, 5% exam; oligomenorrhoea: 22% exam; irregular: 7% interview, 13% exam	profuse periods: 5% interview; menorrhagia: 15% exam	dysmenorrhoea: interview 15%, exam 58%	
Jeyaseelan and Rao, 1995, India ⁸	prospective community survey <i>n</i> = 2566 women followed for three to five cycles	reproductive age	cycles >37 days: 12%			
Kumar <i>et al.</i> , 1994, India ⁹	community-based survey; cross sectional interview <i>n</i> = 600	age 15–44 married				menstrual disturbances in past month: 23%
Bhatia and Cleland, 1995, India ¹⁰	community-based survey; cross sectional interview <i>n</i> = 3600	age <35, with at least one child <5 years				current menstrual disorders (heavy or light bleeding, irregular bleeding, painful menstruation, or spotting between periods): 7% in total sample; 11% in menstruating women
Bhatia <i>et al.</i> , 1997, India ¹¹	follow up of cross sectional survey; interview and clinical exam <i>n</i> = 385	age <35 with a child aged 6–12 months	cycle >5 weeks: 8% response to doctor query; irregular: 9% response to doctor query	profuse discharge: 15% response to doctor query; period >5 days: 16% response to doctor query; cycle <3 weeks: 1% response to doctor query	dysmenorrhoea: 55% response to doctor query	any menstrual problems (heavy or light bleeding, irregular bleeding, painful menstruation, or spotting between periods): 62% response to doctor query; 15% in interview in the last month
Intermediate Technology Bangladesh, 1992, Bangladesh ¹²	focus groups, <i>n</i> = 8 groups, 80 women	urban, rural and periurban groups	irregular: 3%	heavy bleeding: 8%	backaches, abdominal pain, cramps and lethargy: 44%	
Philippine National Safe Motherhood Survey, 1993, Philippines ¹³	nationally representative sample; interview <i>n</i> = 8481	age 15–49, ever pregnant				menstrual problems during last menstrual period (severe pain that kept you from your normal activities, changes in the duration of your period or in the amount

Cheong <i>et al.</i> , 1991, Philippines ¹⁴	convenience, age-stratified sample, recovery of menstrual pads <i>n</i> = 80	age 15–44, not using oral contraceptives or IUD, not supplementing iron		menstrual blood loss >80 mL: 11%		of blood lost or was your period irregular): 5–6%
Thongkrajai <i>et al.</i> , 1999, Thailand ¹⁵	cross sectional survey <i>n</i> = 634	age 20–49			dysmenorrhea: 45%	
Ng <i>et al.</i> , 1992, Singapore ¹⁶	random sample of households; cross sectional; questionnaire <i>n</i> = 415	age 15–54			1+ episodes menstrual cramps or pain in past year: 51%, work leave in past year: 10%	
Matsuda <i>et al.</i> , 1997, Vietnam ¹⁷	cross sectional survey of factory employees from 10 factories <i>n</i> = 150 women	age <40 years	irregular: 30%			
Gao <i>et al.</i> , 1997, China ¹⁸	convenience sample <i>n</i> = 421	age 18–44, non-contracepting		blood loss >80 mL: 20%		
Filippi <i>et al.</i> , 1997 ¹⁹ and Bulut <i>et al.</i> , 1997, Turkey ²⁰	systematic sample of health center patients; interview (symptom checklist of problems in last 3 months) and clinical exam <i>n</i> = 696	age 15–44, currently married, parous and non-pregnant; ever contracepted	infrequent periods: 9% interview, 13% response to doctor query	long bleeding (>8 days): 8% interview, 18% response to doctor query; frequent periods: 6% interview, 9% response to doctor query; spotting: 3% interview, 5% response to doctor query; abnormal uterine bleeding: 25% response to doctor query, 16% diagnosed by doctor	menstrual pain: 21% interview, 56% response to doctor query	
Deeb <i>et al.</i> , 2003, Lebanon ²¹	community-based, cross sectional survey <i>n</i> = 779	age 15–49, ever married, ever visited gynecologist	irregular: 15% complaint at last gynecology visit	bleeding: 10% complaint at last gynecology visit		
Taylor <i>et al.</i> , 1985, Niue ²²	community-based census; interview and clinical exam: (1) <i>n</i> = 452; (2) <i>n</i> = 327	(1) aged 15+; (2) aged 15–49 pre-menopausal, without hysterectomy, not on Depo-Provera		heavy menstrual bleeding: 6% all women, 36% women aged 15–49; intermenstrual bleeding: 11% women aged 15–49	excessive menstrual pain: 58% women aged 15–49	menstrual problems: 25% all women
Walraven <i>et al.</i> , 2002, Gambia ²³	community-based survey; interview and clinical exam <i>n</i> = 607	menstruating, not using hormonal contraception	irregular: 16% to doctor; 8% to fieldworker	heavy/prolonged bleeding: 4% to doctor and fieldworker; spotting: 8% to doctor, 1% to fieldworker	pain that kept you from normal activities: 14% to doctor, 10% to fieldworker	any menstrual problem: 35% to doctor, 21% to fieldworker
Céspedes Maturana and Cornejo Araya, 1997, Chile ²⁴	factory-based survey, interview <i>n</i> = 53	age 19–45			dysmenorrhea: 68%	

Table 2. Continued.

Author, year, country	Design	Population characteristics	Amenorrhea/oligomenorrhea/irregular	Abnormal uterine bleeding	Dysmenorrhea	Menstrual problems
del Riego and Gonzalez, 1990, Dominican Republic ²⁵	convenience sample of workers, interview <i>n</i> = 200	age 15–50	no period for 4–12 months: 5%			menstrual problems: 31%
Hernandez <i>et al.</i> , 1999, Mexico ²⁶	clinic-based survey <i>n</i> = 1099	age 18–40	no period for 3 months: 9%	bled >7 days: 8%; unusually heavy bleeding: 7%; spotting: 9%	any pain: 66%; a lot of pain: 18%	spontaneous report of any menstrual problem: 10%
Harlow (unpublished observations), Mexico	cross sectional survey; interview past 18 months <i>n</i> = 466	age 16–41	no menses for >3 months: 8%; no menses for 45 days to 3 months: 22%			
Núñez Troconis <i>et al.</i> , 1990, 1991, Venezuela ^{27,28}	random sample of medical students; cross sectional interview survey <i>n</i> = 765	age 26–45	amenorrhea: 13%; oligomenorrhea: 14%; irregular: 11%		dysmenorrhea: 70%	
Núñez Troconis <i>et al.</i> , 1999; Venezuela ²⁹	cross sectional survey of medical interns and residents; interview <i>n</i> = 207					

treatment protocols is also recognised to be a major barrier in India.

Discussion and conclusion

This review of the literature on the prevalence of menstrual disorders in developing countries suggests that the prevalence of menstrual morbidity is broadly comparable to that observed in developed countries. Furthermore, it suggests that menstrual morbidities constitute an important area of unmet need for reproductive health services for women in developing countries. The literature upon which this review is based is quite limited and the definition of menstrual dysfunction is often imprecise. Nonetheless, the data do support the conclusion that menstrual dysfunction represents a problem for women in developing countries as is true elsewhere.

In developing countries, abnormal uterine bleeding appears to affect about 5–15% of women of reproductive age and probably a higher percent of women in older age groups. Data on prevalence of abnormal uterine bleeding in Europe and North America is also limited, but it is a major cause of gynaecological morbidity, affecting up to one in five women at some point during their reproductive life span.⁵⁹ Nine to fourteen percent of reproductive-aged women have blood loss that exceeds 80 mL⁴⁹ and abnormal uterine bleeding is a leading indication for hysterectomy, the most common non-obstetric operation in women in both the United States and the United Kingdom.⁶⁰ Abnormal uterine bleeding is also reported to be the primary indication for hysterectomy in Trinidad.⁶¹

Abnormal uterine bleeding is of concern both because it may have serious medical consequences and because excessive or prolonged bleeding may cause undue disruption of women's daily activities, particularly if sanitary protection is not easily available. Prolonged and excessive bleeding may provoke or exacerbate anaemia and, in a certain percentage of cases, may eventually be life threatening if left untreated. The critical level of blood loss has traditionally been defined as 80 mL.⁴⁹ Although Janssen *et al.* argue that anaemia is not observed among women in the United Kingdom until a threshold loss of 120 mL is reached,⁶² most studies in developing countries concur with the 80 mL cutpoint to define the upper limit of normal blood loss,^{14,18,40} while Andrade *et al.*⁶³ argue that iron depletion may be detectable with blood loss as low as 60 mL among undernourished women in Brazil. Although, iron supplementation is typically recommended, Fazio-Tirrozzo *et al.*⁶⁴ have recently argued that supplementation will not improve iron status if significant blood loss occurs during menstruation.

The lack of awareness about the potential importance of reducing menstrual flow when women are anemic and lack of knowledge among women and providers about treatment alternatives is of some concern. Treatment

recommendations should focus on reducing the quantity of blood loss in addition to supplementing iron. The Gambian study, demonstrating the association between menstrual symptoms and other reproductive morbidities, underscores the importance of ruling out infection and cancer when women present with abnormal uterine bleeding. More research is needed on the prevalence of abnormal uterine bleeding, particularly among older women and in regions where fibroids are common. The need for hysterectomy services and the utility of training in endometrial ablation technique should be evaluated in regions where abnormal uterine bleeding is prevalent.

The frequency of amenorrhea ranged from about 5% to 9% in the developing country studies, which is similar to the prevalence reported in population-based surveys in Europe.⁶⁵ Although infrequent cycling is not generally associated with adverse health outcomes, irregular cycles or amenorrhea may be associated with infertility, which is a major concern of women in many developing countries.⁶⁶ Amenorrhea may also be problematic when it is a symptom of other health problems that require treatment, such as hypothyroidism,²⁶ endometrial tuberculosis⁵⁷ or AIDS wasting.⁶⁷ Irregular bleeding may also be a sign of cancer, particularly in postmenopausal women, and the Gambian study did find an association between cervical and uterine tumours and irregular bleeding.²³

As might be expected, about 25–50% of adult women and roughly three-quarters of adolescents experience some pain with menstruation, with about 5–20% of women reporting severe dysmenorrhea or pain that prevents them from participating in their usual activities. These frequencies are comparable to those found in studies of American, European and Australian women.⁶⁸ Again, although not life threatening, painful menstruation can be particularly disruptive to a woman's daily life and productivity. In the absence of appropriate pain relief, women with severe dysmenorrhea may need to refrain from their normal activities. Several effective and relatively inexpensive interventions that may be appropriate for use in developing countries are currently available. First, the most effective treatment for dysmenorrhea and the first line of treatment for menorrhagia not attributable to infection are the non-steroidal anti-inflammatory drugs (NSAIDs). Introduction of appropriate products, such as mefenamic acid, as opposed to aspirin, which might provoke bleeding problems, or acetaminophen, which is ineffective for either complaint should be promoted. Research on the efficacy of indigenous therapies should also be encouraged. Furthermore, dysmenorrhea may also be associated with other reproductive morbidities, such as infection, thus clinical evaluation of chronic or severe menstrual pain may be warranted.

Traditional cultures of silence often surround menstruation and may inhibit women from obtaining information about menstruation or from seeking care for menstrual morbidities. Cultures of silence can also be one reason for the differential reporting of menstrual complaints in

field surveys as compared with clinical exams. In the Gambia,²³ women customarily speak to no one except their mothers about their menstrual periods, thus in many instances only the study gynecologist was able to elicit information on menstrual complaints. In the United Kingdom, general practitioners have suggested that South Asian women may underreport menorrhagia, and ethnographic research suggests this lack of care-seeking is because these women value heavy periods, which are believed to cleanse the body.^{52,53} An alternative explanation often offered for the differential reporting to medical providers is women's expectation that she will receive treatment in the clinical setting.

Although the extant studies are sufficient to suggest that menstrual morbidities are prevalent and may present a similar level of burden to women in developing countries as is found in the United States and Europe, the data are scant. More country-specific information on the prevalence of individual menstrual morbidities is needed as is information on the cost-effectiveness and feasibility of simple medical interventions. Future reproductive health surveys should include more precise and reliable questions to elicit information on the frequency and health impact of menstrual disorders.⁶⁹

Primary care and reproductive health programs should also evaluate their capacity for addressing menstrual complaints. Packages of reproductive health care provided in middle income developing countries, including large parts of Latin America and the Middle East and some parts of Asia, could certainly include modules for education, diagnosis and treatment of most menstrual morbidities. In addition to the appropriate use of NSAIDs and antifibrinolytic agents, choice of contraceptives should also be carefully evaluated regarding the possibility that they may ameliorate or exacerbate menstrual disorders. Hormonal contraceptives can reduce the amount and duration of bleeding as well as severity of menstrual pain. Most IUDs tend to augment blood loss and thus may be a particularly poor choice for women who already perceive their blood loss to be excessive. However, progestin-releasing IUDs effectively reduce blood loss and may be an appropriate choice for some women. Finally, to the extent that increases in amount, frequency or duration of menstrual bleeding are a complaint only because of lack of adequate sanitary protection options, a simple intervention would be to define the specific sanitary needs of a community and provide culturally appropriate products.^{1,12}

In summary, menstrual morbidities constitute an important unmet area of reproductive health services for women in developing countries and more attention should be given to inclusion of diagnosis and treatment of menstrual complaints within reproductive health care programs. Relatively simple and inexpensive therapies are currently available to address a range of menstrual complaints and monitoring of menstrual symptoms may be important in efforts to reduce pelvic infections and anaemia. More attention

Table 3. Summary of data on prevalence of menstrual disorders among adolescents in developing countries.

Author, year, country	Design	Population characteristics	Amenorrhea/oligomenorrhea/irregular	Abnormal uterine bleeding	Dysmenorrhea
Aggarwal <i>et al.</i> , 1997, India ³⁰	household survey, interviews <i>n</i> = 97	age 11–18, rural, menstruating			dysmenorrhea: 71%; requiring analgesics: 11%; affect daily activity: 6%
Vaidya <i>et al.</i> , 1998, India ³¹	cross sectional survey in three schools <i>n</i> = 574	menstruating schoolgirls age 10–17	irregular: 17%	profuse periods: 8%	dysmenorrhea: 55%; requiring medication: 16%; miss school: 5%
Singh <i>et al.</i> , 1999, India ³²	student survey <i>n</i> = 130	age 13–17	irregular: 2%	menorrhagia: 1%	dysmenorrhea 41%
Piya-Anant <i>et al.</i> , 1997, Thailand ³³	cross sectional questionnaire survey in schools <i>n</i> = 3721	menstruating school girls, age 10–17	menses every other month: 42%; menses every 2–3 months: 10%		
Vicdan <i>et al.</i> , 1996, Turkey ³⁴	cross sectional interview in 32 schools <i>n</i> = 13,665	age 13–18	cycles >35 days: 8%	cycles <20 days: 7%	pain during menstruation: 78%; frequently miss school: 26%
Demir <i>et al.</i> , 2000, Turkey ³⁵	cross sectional questionnaire survey in schools	age 14–18	irregular: 27%		dysmenorrhea: 39%
Montero <i>et al.</i> , 1999, Morocco ³⁶	convenience sample in schools <i>n</i> = 391*	menstruating girls*, age 12–18	irregular: 29%		abdominal pain during cycle: 88%; use medications: 21%; miss school: 7%
Thomas <i>et al.</i> , 1990, Nigeria ³⁷	cross sectional questionnaire and interview survey of university students <i>n</i> = 768	age 15–34	cycles ≥35 days: 4%		dysmenorrhea: 72%
Odujinrin and Ekunwe, 1991, Nigeria ³⁸	cross sectional survey of school girls <i>n</i> = 950	age 10–18			dysmenorrhea: 72%
Fakeye and Adegoke, 1994, Nigeria ³⁹	cross sectional interview survey in seven public schools <i>n</i> = 361	menstruating schoolgirls age 11–19	irregular: 13% cycle ≥37 days: 1.1%	duration >7 days: 1%; heavy flow: 4%; cycle length <21 days: 24%	pain before/during period: 85%; severe pain: 17%

Barr <i>et al.</i> , 1998, Nigeria ⁴⁰	community-based survey; interview and recovery of menstrual pads <i>n</i> = 307	age <20, non-pregnant, nulliparous, menstruating		blood loss of >80 mL: 12%	
Schmidt and Diefenthaler Herter, 2002, Brazil ⁴¹	cross sectional survey in one school <i>n</i> = 92	age 12–19, menstruating	irregular (early or late by more than 7 days): 28%		pain during menstruation: 70%; severe pain: 16%; affect daily activities: 8%
Barros <i>et al.</i> , 1987, Brazil ⁴²	cross sectional interview survey; university students <i>n</i> = 1006	university students			dysmenorrhea: 76%; severe: 8%; often missed activities: 10%
González Bahamonde and Ibarra Farias, 1999, Chile ⁴³	cross sectional interview survey; university students <i>n</i> = 242	university students			dysmenorrhea: 85.2%
Parra <i>et al.</i> , 1995, Chile ⁴⁴	cross sectional interview survey; secondary school students <i>n</i> = 2269	age 11–20	amenorrhea: 4.4%; irregular: 20.0%	menorrhagia: 0.7%	
Rojas Martínez <i>et al.</i> , 1997, Colombia ⁴⁵	cross sectional interview survey at one school <i>n</i> = 600	age 12–23			dysmenorrhea: 27%; primary dysmenorrhea: 24%; severe dysmenorrhea: 4%
Onatra and Posso, 1994, Colombia ⁴⁶	cross sectional survey of students, stratified by socioeconomic status; interview <i>n</i> = 796	age 9–20			pain with menstruation: 37–62%; severe pain: 3–7%
Barranco Ventura <i>et al.</i> , 1993, Dominican Republic ⁴⁷	cross sectional survey of university students <i>n</i> = 430	university students	hypomenorrhea: 11%	hypermenorrhea: 18%	dysmenorrhea: 18%
Pedro-Nuevo <i>et al.</i> , 1998, Mexico ⁴⁸	cross sectional student survey, interview, visual analog pain scale <i>n</i> = 1066	age 12–24, single			dysmenorrhea: 52–64%; absenteeism: 4–20%

* Only 391 of the 495 girls in the study were menstruating. Frequencies of dysfunction are recalculated based on the denominator of 391 menstruating girls.

should specifically be given to improving the training of primary care and reproductive health professionals about the diagnosis and treatment of menstrual morbidities. As part of this effort, diagnosis and treatment guidelines should be developed that are appropriate for use in developing countries. Increased research into the prevalence of and risk factors for menstrual morbidity is also warranted.

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