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Review Article

Definition and Self-Reported Pain Intensity in Adolescents with Dysmenorrhea: A Debate Report

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Abstract

Background: Dysmenorrhea is one of the most common complaints among adolescents and women. Patho-physiologically, it is categorized into primary and secondary dysmenorrhea. Primary Dysmenorrhea (PD) refers to pain with no obvious pathological pelvic disease; Secondary Dysmenorrhea (SD) is caused by an underlying pelvic condition or pathology. The prevalence of primary dysmenorrhea varies between 67% and 90% in adolescents, with severe pain perceived in 7%-15% of the women studied.

The lowest prevalence of 16% was reported in a random sample of Japanese women aged 17-51 years through daily diary recording for 1 month. The highest prevalence of 91% was reported in a random sample of Iranian women aged 16-56 years, with the majority younger than 30 years of age without children. The prevalence of primary dysmenorrhoea is difficult to determine because many affected women do not seek medical treatment. The majority accept pain as a part of their normal menstrual cycle.

Aim of the study: The authors reviewed the epidemiology data reported in the literature on 4 aspects of Dysmenorrhea: definition, pain severity, prevalence and development of chronic pain.

Results: The authors highlight the necessity for finding a uniform definition of dysmenorrhea. The wide variation in the prevalence rates may be due to using different definitions, employing selected groups of subjects and/or the absence of a universally established method for measuring pain. Variation in the methods that assess the severity of dysmenorrhea (ranging from occasional menstrual cramps to severe pain that interferes with daily activities and/or to require medication) adds to the variation in the prevalence among different studies.

Definition: Dysmenorrhea: Pain severity, prevalence and development of chronic pain.

Conclusions: Studying the epidemiology of menstrual pain is an important issue that deserves further attention because of its high prevalence and negative effect on women's health.

Keywords: Dysmenorrhea; Adolescents; Epidemiology; Health Problems

Background

Dysmenorrhea is one of the most common complaints among adolescents and women of reproductive age. It is categorized into two types: primary and secondary. Primary Dysmenorrhea (PD) refers to pain with no obvious pathological pelvic disease. Secondary Dysmenorrhea (SD) is caused by an underlying pelvic pathology and occurs more in women older than 20 years. SD can be caused by endometriosis, pelvic inflammatory disease, intrauterine devices, ovarian cysts, adenomyosis, uterine myomas or polyps, intrauterine adhesions or cervical stenosis [1-5].

PD is characterized by a crampy suprapubic pain that begins between several hours before and a few hours after the onset of the menstrual bleeding. Symptoms peak with maximum blood flow and usually last less than one day, but the pain may persist up to 2-3 days. Symptoms are more or less reproducible, from one menstrual period to the other [3,4]. The pain is characteristically colicky and located in the midline of the lower abdomen, but may be dull and may extend to both lower quadrants. Pain can radiate to the back of the legs or the lower back. Associated nausea, vomiting, diarrhea, fatigue, mild fever and headache or lightheadedness are fairly common.

Dysmenorrhoea may impair the quality of (personal and social) life. In many women it is associated with mood disorders, sleep disturbance and limitations in performance of daily activities (school and work).

Dysmenorrhea shortly after menarche or in a patient who is clearly anovulatory should alert the physician to the possibility of an obstructing malformation of the genital tract. However, adolescents may experience menstrual pain with their first periods (anovulatory) without any demonstrable underlying cause, when the bleeding is heavy and accompanied in background, by clots [2,4]. Menstrual pain

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Table 1: Some Criteria used in Literature to define Dysmenorrhea.

Authors and References	Criteria used to define Dysmenorrhea
Dawood MY. [33]	Painful menstrual cramps which appear to have no macroscopically identifiable pelvic pathology
Tangchai K. [56]	Any type of pain or discomfort associated with menstrual period
Lefebvre G, et al. [57]	A difficult menstrual flow
Proctor M, et al. [58]	A painful menstrual cramp of uterine origin
Rostami M. [59]	A painful syndrome which occurs at the time of menstrual flow in ovulatory cycles
Begum J, et al. [60]	Any type of pain or discomfort associated with menstrual period
Suresh K, et al. [61]	A pelvic pain associated with onset of menses and lasting for 8-72 hours
Grandi G. [62]	A cramp-like, dull, throbbing pain that usually emanates from the lower abdomen, and that occurs just before and/or during menstruation
Shah M. [63]	Menstrual pain without organic pathology

appearing after several years of painless periods is suggestive of SD [2-5].

Pain intensity in PD can be mild (pain that does not disturb daily activities or require painkillers), moderate (pain that slightly interferes with daily routines, but can be managed with painkillers), and severe (pain that entirely prevents daily life activities) [6,7].

Pathophysiology of PD

At the end of the luteal phase in non-pregnant women, the corpus luteum regresses, with a consequent decline in the progesterone level. This decline favors the production of prostaglandin precursor, arachidonic acid. Arachidonic acid, then enters the cyclooxygenase pathway that leads to the production of prostaglandins. Consequently, there is increased production and release of prostaglandins causing Prostaglandins stimulates contraction of vascular and uterine smooth muscle, causing an excessive uterine contractions and constriction of endometrial blood vessels. The vasoconstriction causes ischemia of the endometrium and expelling the menstrual effluent from the uterine cavity. Both the ischemia and the myometrial contraction explain the cramping of ovulatory menstrual cycles [8-14]. Increased leukotrienes and vasopressin and diminution of prostacyclin levels are contributing factors. Leukotrienes amplify myometrial contraction and vasoconstriction. Women who fail to respond to prostaglandin inhibitors may have elevated levels of leukotrienes [15]. Leukotrienes can increase the sensitivity of pain fibres [15,19]. Increased vasopressin levels, without an accompanying increase in oxytocin levels, can produce dysrhythmic uterine contractions that are more likely to produce uterine hypoxia and ischemia [17-19]. Stimulation of pain fibres in the uterus causes activation of the afferent pain pathways transmitted up to the central nervous system. It has also been suggested that women with PD have increased expression of pro-inflammatory cytokines and decreased expression of growth factors in the secretory and regenerative phases of MP. These factors may be involved in the regulation of endometrium breakdown and repair and indirectly exacerbate pain [16].

In summary, little is known about the various patho-physiological, vascular, molecular and neural mechanisms that produce and control the pain of dysmenorrhea.

Prevalence and Risk Factors for PD

Dysmenorrhea is a common symptom for a large proportion of young women. Severe pain, limiting daily activities is less common. The reported prevalence of dysmenorrhea varies substantially. A greater prevalence is generally observed in young women (17-24 years), with estimates ranging from 67% to 90% [20,21]. In Australia, the prevalence of PD in senior high school girls is high (93%), while severe pain, sufficient to limit daily activities, is less common (7%-15%) [22,20].

Studies suggest that the importance the interplay of four main categories of factors in the prevalence of dysmenorrhea. These are: menstrual history, lifestyle characteristics, works related factors and personal variation of pain perception [23-25]. The prevalence of primary Dysmenorrhoea is difficult to determine because many affected women do not seek medical treatment. The majority accept pain as a part of their normal menstrual cycle.

Aim of the Study

The authors reviewed the epidemiology data reported in the literature on 4 aspects of dysmenorrhea: definition, pain severity, prevalence and development of chronic pain.

Results

Definition

The definition of dysmenorrhea varied considerably between different studies (Table 1). In 3 large studies in the United States, variable selection of women with dysmenorrhea, based on different definitions, produced big variation in the prevalence. One of the studies considered only those with moderate to extreme uterine cramping pain [27], the second recruited participants with one or more episode of severe pain [28] and the third selected participants with some degree of dysmenorrheal [29]. Other studies defined menstrual pain as dysmenorrheal [30-32]. Some considered dysmenorrhea to be any menstrual pain associated with "the need for medication or inability to function normally" [33]. A more recent study denied any association between intensity of menstrual pain and need for medication or work intolerance [34]. These definitions are clearly quite different and result in great variability in prevalence of dysmenorrhea.

Pain severity

Two instruments are commonly used to measure the subjects' severity of dysmenorrheal are Verbal Multidimensional Scoring System (VMS) and the Visual Analogue Scale (VAS) [35]. The VMS measures pain severity and takes into account the impacts of pain on daily. Activities, systemic symptoms and analgesic requirements.

Table 2: Summary of Studies on Dysmenorrhea in different Countries from 2011 to 2015.

References	Study Characteristics and Number of Subjects	Prevalence and Severity (%) of Dysmenorrhea
Khamdan HY, et al.[64]	Cross sectional study. 226 students. Mean Age: 21 years.	90.7%
Haque SE, et al. [65]	Intervention study. 416 Students Aged: 11–16 yrs.	Severe: 59.8%
Pitangui AC, et al.[66]	Public school 218 Adolescents Aged:12-17 yrs.	73%
Nooh AM. [67]	283 questionnaires. Mean Age: 17.8±0.7 yrs.	65.4%; 27.9%: Mild, 23.3%: Moderate and 14.1%: Severe.
Zegegne TK, et al.[68]	A mixed-method research combining quantitative and qualitative methods 562 students. Age range: 9-12 years, mean age of 14.96 yrs.	Severe: 20.9%
Gagua T, et al. [69]	Cross-sectional study including 2,561 women. Mean age 16±1.3 yrs.	52%
Gumanga SK, et al. [70]	Cross-sectional descriptive study. 456 girls Age Range: From 14-19 yrs; Mean age 16±0.93 yrs.74.4% Mild:18.1%; Moderate: 37.5%.	Severe: 18.8%.
Chia CF, et al. [71]	Cross-sectional questionnaire. 240 students. (128 medical and 112 non medical). Mean Age: 20.1±1.4 yrs.	80%
Rani A, et al. [72]	Cross-sectional study. 300 girls Age Range: 11-18 yrs	61.3%
Al Asadi JN, et al. [73]	Cross sectional study 384 students, mean age 17.1 yrs.	89.4% Moderate: 54.3%; Severe: 43.9%
Baghianimoghadam MH. [74]	Cross-sectional study. 300 students of university. Age Range of Participants: 18-35 years (Mean: 21±4.3 yrs).	38.1%
De Sanctis V, et al. [75]	Cross-sectional multicenter study. 4,992 girls (Mean Age: 17.1 yrs).	56% In 56% subject it was severe
Nohara M, et al. [76]	Anonymous self-administered questionnaire 2,166 women. 10.4% <25 yr.	77.6% 2.8% of female workers responded that they have “Very Serious Pain”, 25.8% “Serious Pain”, and 49.7% responded that “The Pain Could be Tolerated”.
Bata MS. [77]	Self-administered questionnaire. 596 secondary-school students. Mean age:15.7±1.5 yrs.	Mid-cycle pain was reported by 30.9% and dysmenorrhea by 37.6% of the students
Al-Jefout M, et al. [78]	Cross-sectional study. 272 female medical students (Aged 19-25 years).	In 55.8% from moderate to severe
Lee JC, et al. [79]	Anonymous questionnaire 538 teenage girls, aged 14 to 18 yrs (Mean Age: 16.1 yrs).	82% Severe in 0.9% of subjects
Wong LP. [80]	Cross-sectional study. 1,295 adolescent girls (Aged 13-19 yrs) of a rural school	76.0%
Al-Kindi R, Al-Bulushi A. [81]	Cross-sectional survey. 404 girls from two public high schools. Age range:15-23 yrs.	94% Mild : 27% ; Moderate: 41% ; Severe: 32%
Gulzar, et al. [82]	Cross-sectional descriptive study. 337 school and college going female students aged between 12-19 years.	78%.
Rodrigues AC, et al. [83]	Observational transversal study. 274 adolescents and young adults (Age ≤26)	62.8%
Bano R, et al. [84]	Cross-sectional descriptive study using self-administered questionnaire. 100 participants. Age Range:18-24 yrs.	Mild: 20%; Moderate: 43% and severe in 37%.
Wijesiri HS, et al. [85]	A descriptive study. 200 adolescent students.	84%
Narring F, et al. [86]	Cross sectional survey. 3,340 females, aged 16 to 20 yrs who attended post-mandatory education	86.6% In 12.4%: Severe and in 74.2% moderate dysmenorrhea.
Pembe AB, Ndolele NT. [87]	Cross sectional study. 880 girls of eight secondary schools.	74.1%
Sahin S, et al. [88]	The study group included 520 students. Mean age of the students was 20.2±1.5 years (Range 17-25yrs).	69% Frequency of dysmenorrhea was higher in smokers, those with menstrual irregularity, those who used drugs for menstrual regulation and having a family history.
Jang IA, et al. [89]	Questionnaires. 3,017 Vietnamese women aged 17 to 42yrs (Mean: 25.5 yrs).	58.8% Mild to moderate: 7.8% Moderate: 65.9% Moderate to severe: 23.3% Severe: 2%

Based on this system, pain levels are defined based according to the criteria listed below:

Mild Dysmenorrhea: Painful menses that do not limit or hinder normal daily activities, and results in little or no systemic symptoms and/or analgesic need.

Moderate Dysmenorrhea: Painful menses that slightly limit or hinders normal daily activities, and result in moderate systemic symptoms and/or analgesic need.

Severe Dysmenorrhea: Painful menses that severely limit or hinder normal daily activities result in noticeable symptoms (such as fainting, vomiting) and respond poorly to analgesics.

The VAS method entails using a 100mm horizontal line scale that begins with no pain on the far left to the worst possible pain on the far right. Participants will be asked to indicate a perception of pain intensity scored from one to 100 by drawing a mark on this scale representing their subjective pain.

Pain is an extremely subjective symptom very difficult to quantify [36]. Unfortunately, several prevalence studies did not use any standardized scale for evaluation of menstrual pain severity. They used unreliable (not validated) tools for assessing severity of dysmenorrheal [36]. In addition, many symptoms related to menstruation are not well-defined, and thus may increase the misclassification for symptoms as 'menstrual' when they are not [37]. Moreover, the great personal difference in pain perception and reaction to this pain by different women can markedly affect the judgement of pain. Adolescents may not recall the time and severity of pain because they are still learning about their menstrual cycle.

Sixteen studies examined the associations between the perceptions of experimentally induced pain across menstrual cycle phases of healthy females. In healthy Hong Kong Chinese women the pain level was higher compared to Westerns women. Sex hormones may contribute to inter- and intra-individual differences in perception and reaction to pain. Pain inhibition is more effective in the ovulatory phase of the menstrual cycle than in the early follicular phase [38-40]. Therefore, research in this area has flaws in methodology.

In summary, menstrual pain should be regarded as a multidimensional phenomenon and should be measured by a multidimensional scoring system. Future research needs to specify a comprehensive list of dysmenorrhea-specific symptoms based on the pathogenesis of PD, explore relevant symptom dimensions (severity, frequency, duration, and timing) and test validity of the adapted methodology [41].

Prevalence of PD

The prevalence of PD is difficult to determine, because few women seek medical treatment. Many women accept menstrual pain as "normal" part of the menstrual cycle [42]. Thus, many cases remain undocumented [43-46].

Previous studies were retrospective, using different definitions of dysmenorrhea and different periods of recall of symptoms (weeks, months, and year) [43,47]. In addition, there was a lack of standard (validated) method for assessing its severity. Therefore, prevalence estimates vary widely (67% to 90%) [20,21,46]. The lowest prevalence (16%) was reported by daily diary recording in Japanese women (17-51years). The highest prevalence (91%) was reported in Iranian women (16-56years) with the majority younger women than 30years, with no children [25]. Other studies focused on selected groups of subjects instead of taking a representative sample from the population of women in the community [48,49].

The reported downward trend in the age of menarche in the developed countries over the past century may change the experience of menstruation and related symptoms and prevalence reported in older studies. A summary of studies on dysmenorrhea in different countries from 2011 to 2015 is reported in (Table 2).

Development of chronic pain

There is a scarcity of longitudinal studies on the natural history of dysmenorrhea and the effects of a range of possible modifiable risk factors over time. In addition, the duration of follow-up in these studies was relatively short. Several aspects, therefore, are still open.

A longitudinal study of young women between the ages of 19 and 24 conducted by Sundell et al. showed that the severity of dysmenorrhea only decreased in women who gave birth to children during those 5 years, but was unchanged in those who remained nulliparous, had a miscarriage or an abortion [50]. Another study of Weissman et al. found a significant effect of age on the severity of dysmenorrhea. After adjusting for parity, older women were more likely to experience a decrease in the severity of dysmenorrhea, independent of childbearing [51]. Vincent et al. made an important observation, that the longer is the duration of reported dysmenorrheic symptoms (from 2-28 years), the greater is the suppression of the woman's hypothalamic-pituitary-adrenal axis, as manifested by a reduction in cortisol levels [52].

Conclusion

Dysmenorrhea represents a substantial public health burden. It has a high prevalence worldwide and is one of the leading causes of absenteeism from school and work, loss of earnings and diminished quality of life. Therefore, studying the epidemiology of menstrual pain deserves further attention [1-5].

Various prevalence rates are attributed to the use of selected groups of subjects, absence of a universally accepted method for defining dysmenorrhea or its severity, and reluctance of many women to report pain and/or seek medical treatment. In addition, the majority of studies did not distinguish between the types of dysmenorrhea (primary versus secondary). Teenagers, unlike adults, may not be experienced enough to report menstrual pain because they are still learning about the character of their cycles. Therefore, studies that included a good number of girls who just started their menarche have limited value as these symptoms often begin after regular ovulation (2 to 3 years post menarche) [37]. Adolescent receive information regarding menstruation mainly from their mothers [53,54]. Only 2% receive information about menstruation from health care providers [34]. Therefore, it is recommended that health care providers should be knowledgeable and well trained to educate and provide proper care for adolescents with dysmenorrheal [53-55].

In conclusion, this report highlights 4 main issues that deserve further consideration and research. High quality large population-

based longitudinal studies are still needed to delineate the natural history of dysmenorrhea and its potential effect on the reproductive life. A more uniform definition of dysmenorrhea and accurate grading system for severity, agreed upon by experts, are required. Age-specific incidence and prevalence studies of dysmenorrhea in different populations are still needed. There is also a high demand for studying the effect/s of possible risk factors on menstrual pain using appropriate statistical methods.

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