

Incidence of Menstrual Disorders is Not Influenced by Nulliparity

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Abstract

Background: Nulliparity is a condition that has been associated with some oncological gynecological diseases. Since religious community is a realistic example of nulliparous women, the present study aims to evidence if nulliparity is a risk factor for developing menstrual disorders and benign gynecological diseases.

Materials and Methods: The present observational retrospective study enrolled 442 women divided in Group A (n=216; Catholic nuns) and Group B (n=226; parous women). All eligible women filled in standardized questionnaires, to obtain data on physiological and pathological aspects of menstrual cycle and related gynecological data. Statistical analysis was performed using univariate statistical analyses, Mann-Whitney *U* test or Fisher exact test. $P < 0.05$ was considered statistically significant.

Results: The results showed that nulliparity is not correlated with a different incidence of menstrual cycle disorders (in term of length or bleeding), or gynecological disorders (ovarian or uterine). Dysmenorrhea is more common in pluriparous women, with a higher use of painkillers in nulliparous women.

Conclusion: Therefore, the present study suggests that nulliparity does not represent a risk factor for the development of menstrual irregularity and painful symptomatology, compared with pluriparous women.

Keywords: Woman's health; Nulliparity; Menstrual disorders

Abbreviations: BMI: Body Mass Index; SD: Standard deviation; OCs: Oral Contraceptives; RR: Relative Risk

Introduction

A life course view of women's health offers a more unified and woman-centred approach to health promotion, disease prevention and management, with implications for long-term, cross-generational health gain. This perspective highlights the potential for early intervention to reduce disease risk or severity, ensuring that primary care clinicians are alert to the reproductive histories of their patients [1].

Nulliparity is a condition that has been associated with the development of some oncological gynecological diseases. Cancer mortality rates in Catholic nuns (breast, ovarian and uterine) is higher than in general population [2-4], and nulliparous women appear more susceptible to these three cancers, as compared to parous women, thus suggesting that pregnancy represents a 'protected' time [5,6]. It is suggested that in nulliparous women, the increased number of cycles between menarche and menopause expose to an increased risk of hormone-dependent cancers. The association between nulliparity and other benign gynecological disorders, like an increased risk of endometriosis [7], and uterine fibroids [8], is still under discussion.

Considering religious community a good model of an urban nulliparous women group living in a low stress environment, the present study aimed whether nulliparous women are more predisposed to the development of menstrual disorders and related gynecological diseases.

Materials and Methods

For the present study, a group of women, (8n=442; range 35-81 years old) were enrolled from August 2010 to April 2011. An observational retrospective study was as follow:

- Group A (n=216): Catholic nuns (enrolled in religious institutes at Siena and Rome-Italy);

- Group B (n=226): Parous women (recruited among university or hospital staff members at Siena-Italy).

Exclusion criteria were only the current state of pregnancy.

When enrolled, at all women eligible for the study, a standardized questionnaire was administered by a trained interviewer. The following patients' characteristics were reported: age, nationality, height, weight, BMI, age at menarche, parity, menstrual cycle length (during adolescence, between 25 and 40 years of age, and after 40 years of age), menstrual bleeding, dysmenorrhea, administration of analgesic during the period, past surgery for ovarian cysts or myomas, previous ultrasound assessments, age at menopause and type of menopause (spontaneous or iatrogenic) (Table 1). The diagnosis of gynecological diseases was supported by reported diagnostic procedure.

Statistical analysis was performed using Graph Pad Prism 5 (San Diego California USA, and www.graphpad.com). Subject characteristics were compared in univariate statistical analyses to describe the study population. Frequencies and proportions of categorical variables were compared using Mann-Whitney *U* test or Fisher exact test, where appropriate. The results are reported as mean SD, or as percentages where appropriate $P < 0.05$ was considered statistically significant.

Results

All participants completely answered the questionnaire and no

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Parameters	Groups		p value
	A) Nulliparous N=216	B) Parous N=226	
Age	52.01 ± 13.87 years	52.51 ± 10.54 years	ns
Post-menopausal state	49.5%	57.5%	ns
Height	162.03 ± 7.36 cm	163.26 ± 5.79 cm	ns
Weight	61.89 ± 9.76 kg	65.29 ± 10.15 kg	p<0.0006
BMI	23.63 ± 3.76	24.35 ± 4.68	p< 0.0248
Menarche age	12.34 ± 1.42 years	12.70 ± 1.55 years	p< 0.0105
Irregular menstrual cycle during adolescence	32.1%	37.6%	ns
Irregular menstrual cycle between 25 and 40 years	35.2%	29.6%	ns
Irregular menstrual cycle after 40 years	48.7%	46.3%	ns
Regularity of menstrual bleeding (4-6 days)	72.3%	76.9%	ns
Heavy menstrual bleeding (>7days)	34.4%	35.4%	ns
Dysmenorrhea	38%	57.5%	p<0.0001
Painkillers administration	49.5%	41.3%	p<0.0861
Ultrasound assessments	58.3%	71.1%	p<0.0053
Surgery for ovarian cysts	14.3%	7.6%	p<0.0301
Surgery for fibromatosis	10.1%	12.4%	Ns
Type of menopause (surgical)	21%	14%	Ns

Table 1: Statistical significance of evaluated parameters between Group A vs Group B (mean ± SD).

woman was excluded from the analysis. No significant difference was observed in the mean age ± SD among the groups (Group A 52.01 ± 13.87 years vs Group B 52.51 ± 10.54 years), that were homogeneous for proportion between reproductive or post-menopausal age (Table 1).

While no difference was found in demographics data, the evaluation of anthropometric data showed nulliparous women with higher body weight (Group A 61.89 kg ± 9.76 vs Group B 65.29 kg ± 10.15; p<0.0006) and BMI (Group A 23.63 ± 3.76 vs Group B 24.35 ± 4.68; p<0.0248), than parous women. When considering the menstrual characteristics, the age of menarche occurred significantly earlier in Group A (12.34 ± 1.42 years) than in Group B (12.7 ± 1.55 years) (p<0.0105), while no difference was found for the menstrual cycle length, independently from the reproductive age (Table 1). The menstrual cycle disorders differed with age in both groups, resulting highest in women >40 years old (Table 1).

Dysmenorrhea resulted higher in pluriparous women (57.5%), than in nulliparous (38%) (p<0.0001), while consumption of painkillers among the nulliparous women (49.5%) was higher than in pluriparous (41.3%) (p<0.0861). Pluriparous referred to undergo to more ultrasound controls than nulliparous (p<0.0053), while surgery for ovarian cysts was mainly performed by nulliparous women (p<0.0053) (Table 1). No significant difference was observed between the groups, in the prevalence of surgical or spontaneous menopause.

Discussion

Women frequently experience a variety of menstrual-related complaints, including dysmenorrhea, and irregular menses. These problems deserve a careful evaluation, as they may reflect the physiologic menstrual pattern, or be suggestive of significant pathology that could have a major impact on the reproductive and general woman's health. In the common belief, the menstrual cycle is considered a vital signal, whose normality suggests an overall good health, and whose abnormality requires appraisal. Menstrual disorders are not still recognized as significant health morbidity factors [9]. In particular, few and restricted studies [10-12], refer on epidemiology and evaluation of menstrual characteristics in limited population of women, without comparison between nulliparous and pluriparous women.

The present study showed that nulliparity is not associated with an increased or decreased risk of menstrual disorders. The two populations did not differ in the regularity of menstrual cycle, and in menstrual bleeding characteristics, even through menarche occurring earlier in nulliparous women. Both early and delayed menarche have been associated with different gynecological diseases, as endometriosis [13,14], uterine or ovarian cancer [15], but also with several general women' health disease, such as an increased risk of cardiovascular pathology or metabolic syndrome [16,17]. Therefore, the earlier age of menarche in nulliparous women may represent a single epidemiological data. The results on menstrual pattern in reproductive age are in line with previous study on a Japanese population, reporting that 70% of all women have a normal and regular menstrual cycle [18]. The percentage of menstrual disorders was different with ages, resulting highest in women >40 years old, which are typically characterized by irregular menstrual cycle [19,20].

Dysmenorrhea resulted more frequent in pluriparous women than nulliparous, in contrast with the common opinions supporting that childbirth ameliorate the severity of menstrual pain. Few studies have examined the natural history of primary dysmenorrhea, but it seems reliable that parity has a strong influence on evolution of dysmenorrhea, with a possible "protective effect", resulting the prevalence and severity of dysmenorrhea reduced after pregnancy, but were unchanged in women who were still nulliparous, or in women who had a miscarriage [21]; the higher is parity, less severe is primary dysmenorrhea [22]. Nulliparous women with primary dysmenorrhea experienced improvement in menstrual pain after age 40 and after pregnancy [23], and term delivery had a higher likelihood of improvement in dysmenorrhea than preterm delivery, and spontaneous delivery had more benefits than cesarean delivery [24].

All these studies focused the attention mainly on primary dysmenorrhea, and its natural history after pregnancy; the study did not distinguish in term of appearance of dysmenorrhea during the reproductive life. The correlation between dysmenorrhea and pluriparous state may be related to the presence of uterine adenomyosis: women with adenomyosis were more likely to be pluriparous [25,26], and have an increased rate of dysmenorrhea and pelvic pain [27-29]. The development of adenomyosis after childbearing may be elucidated by the concept of "tissue injury and repair" and, in this context,

may represent the extreme of an estrogen-related mechanism [30]. Mechanical transport of endometrial cells may explain the presence of adenomyosis included in the myometrium during cesarean section, as well as the aggressive action of the trophoblast on myometrial fibres during pregnancy [30]. The increased incidence of dysmenorrhea in pluriparous women contrasts with the higher consumption of painkillers among the nulliparous women than pluriparous, and may be explained by the larger use of hormonal treatment, i.e Oral Contraceptives (OCs), among pluriparous women.

The impact of OC pills may also explain the higher number of surgical interventions for ovarian cysts in nulliparous women. Even though the data have considered only benign ovarian pathology, we may indirectly suppose that the use of oral contraceptives among pluriparous population caused a protective anovulation and reduced the risk of ovarian cysts. An increased number of estimated ovulatory cycles directly correlate with risk for both endometrial and ovarian cancer, suggesting that reproductive tissue turnover represents a possible mechanism. An association between parity and risk of functional ovarian cysts or endometrioid cysts, with no clear correlation of with seromucinous cysts or benign ovarian teratomas: in comparison with nulliparous women, the estimated RRs were 1.1 and 0.7, respectively in women reporting one or two or more births [31-33].

In conclusion, the present study showed no significant difference in terms of menstrual disorders between nulliparous and pluriparous women, thus suggesting that nulliparity does not represent a risk factor for an increased development of menstrual and benign gynecological disorders.

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