

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	DYSMENORRHOEA AND INITIATION RITES AMONG INDIGENOUS WOMEN OF THE COLOMBIAN AMAZON: A CROSS-SECTIONAL STUDY
AUTHORS	Zuluaga, German; Andersson, Neil

VERSION 1 - REVIEW

REVIEWER	Hilda Garcia-Perez Assistant Professor Arizona State University There is not conflicts of interest
REVIEW RETURNED	28-Sep-2012

GENERAL COMMENTS	<p>The study investigates the association between dysmenorrhea and the decline of female initiation rites among Amazonian indigenous people of Vaupes in Colombia. Using a cross-sectional design, the author conducted a survey among 185 women 13 years and over living in seven communities in the Amazonian.</p> <p>Although the study presents valuable data from a cultural setting for which information about dysmenorrhea is missing, the data analysis is imprecise and confuse. In my opinion all the statistical analysis need to be repeated and the results presented in a more standard format. Obviously those changes impact all the sections of the article. Some changes that might help the authors to improve the clarity, consistency, and soundness of the analysis reported in the article are described below:</p> <p>Abstracts. In page 2, row 19 the authors indicate that data collection took place in 2009 yet in page 5, row 31 they also mention that data collection was completed on December 2008. This point needs clarification.</p> <p>Methods. Women's sampling criteria were defined as "all women over the age of 13 years who had experienced at least two menstruations". The authors need to clarify the specific time frame used, for example at least two menstruation during last year. Also, the authors should provide a more clear definition of all the independent variables: contraceptive use (current or 12-months contraceptive use?), acculturation level (live in the community versus live outside of the community most of the time?), education, community (how communities were classified) and parity. Some of the variables mentioned in the abstract were not included in the methods section.</p> <p>Results. The study should include a table presenting descriptive statistics for all variables mentioned in the method section. This table should include absolute and relative</p>
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	<p>numbers, as well as information about missing cases. This table is critical to evaluate the quality of the data for each individual variable. The articles of Pawlowski (2004) or Garcia-Perez (2010) can provide some ideas about how this data should be reported (see references below)</p> <p>Also, the authors should clarify (page 6, row 39 and 40) whether the percent of women in the categories of education were computed in a population of 184 or 185 women. Table 1. It is no clear whether table 1 is describing the "risk" of experiencing dysmenorrhea or its absence. The title of the table should clearly state that the values correspond to odds ratios. In its current state the table does not communicate well how the adjustment by age and education was computed. The study reports an OR of 2.59 for the initiation rite of emesis. Table 1 suggests that there is an increase in the odds of dysmenorrhea for this initiation rite but in the abstract and in the conclusion it is stated that emesis has a protective effect. If this is the case, then values should be presented in a more standard way with an OR below 1 and the information should indicate what the reference group is.</p> <p>Table 2 and the remaining charts don't add much to the analysis. In my opinion it does not make sense to include table 2 because the 95% CI are not only very wide but also because several of these interval overlap each other. It is not clear what the intentions of the authors are, with the inclusion of this material.</p> <p>References: Although the number of references cited is reasonable, the article will benefit from the inclusion of the following articles that report findings from recent studies conducted in Latin-American countries:</p> <p>Pawlowski, B. 2004. "Prevalence of menstrual pain in relation to the reproductive life history of women from the Mayan rural community." <i>Annals of human biology</i> 31:1-8.</p> <p>Harlow, Siobán D. and Oona M. R. Campbell. 2004. "Epidemiology of menstrual disorders in developing countries: a systematic review." <i>BJOG: An International Journal of Obstetrics & Gynaecology</i> 111:6-16.</p> <p>García-Pérez H, Harlow SD, Erdman CA, Denman C (2010) Pelvic Pain and Associated Characteristics among Women in Northern Mexico. <i>International Perspectives on Sexual and Reproductive Health</i>, 36:90-98. A Spanish version of this article is available at http://www.guttmacher.org/pubs/journals/3702211S.pdf</p>
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REVIEWER	Professor Dr Khoo Ee Ming Consultant primary care physician Department of Primary Care Medicine Faculty of Medicine University of Malaya 50603 Kuala Lumpur MALAYSIA.
REVIEW RETURNED	30-Sep-2012

THE STUDY	Article summary needs copyediting: Main focus is not on cross sectional study 2009. Key messages and strength and limitations of the study are not in
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	<p>complete sentences. Difficult to understand.</p> <p>Introduction: why is qualitative research mentioned in the first sentence of the introduction? Is it important?</p> <p>Methods: how was the pilot done? How was the quality of the translation of the 37 item questionnaire ensured for semantic and cultural equivalence?</p>
RESULTS & CONCLUSIONS	<p>Descriptive data were not provided in full for appraisal.</p> <p>Missing number for family planning is big.</p> <p>Table 1, % of each rites were given but not number (N) and the total N to account for missing values. Please provide this for each items.</p> <p>Table 2. There was 180/185 that had a response to rites, which was not described in the text.</p> <p>How is the intensity of dysmenorrhoea categorized? (table 2) what is 4y5?</p> <p>Table 3 (assuming it is the table below table 2 as there is no label) results were singled out to no rites compared with all rites. This would introduce bias to the result</p> <p>P7, 2nd paragraph, "The contrast was more stark between those who did no rituals at all (10/14), and those who completed the ten activities (8/32) (Fisher p 0.01). Those who did some but not all rites were somewhere in-between (89/153) (p-Fisher 0.001)" total N =199, does not tally with 185</p> <p>Table 2 and 3. The number of those with severe intensity was only 1. There will be problem with the significance analysis</p>

VERSION 1 – AUTHOR RESPONSE

INSIGHTS FROM INTER-CULTURAL EPIDEMIOLOGY: A CROSS-SECTIONAL STUDY OF DYSMENORRHOEA AND INITIATION RITES AMONG INDIGENOUS WOMEN OF THE COLOMBIAN AMAZON: A CROSS-SECTIONAL STUDY

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Neil Andersson, [Centro de Investigación de Enfermedades Tropicales \(CIET\), Universidad Autónoma de Guerrero, Calle Pino, El Roble](#), Acapulco México, andersson@ciet.org, 52 744 488 0012 and 52 744 487 7230.

Germán Zuluaga, Escuela de Medicina y Ciencias de la Salud, Universidad del Rosario, Bogotá, Colombia.

Comment [Germán Zu1]: From the managing editor: please remove the first part of the title as this does not really add anything specific that assists the reader.
>>Done

Neil Andersson, Universidad Autónoma de Guerrero, Centro de Investigación de Enfermedades Tropicales, Acapulco, México.

Keywords:

Intercultural

Dysmenorrhoea

Medicine, Traditional

Initiation rites

Word count: 2133

ABSTRACT

Objectives: Investigate the association between dysmenorrhoea and the decline of female initiation rites among Amazonian indigenous peoples of Vaupés in Colombia.

Design: Cross-sectional study of all women in seven indigenous communities. Questionnaire administered in local language documented female initiation rites and experience of dysmenorrhoea. Analysis examined ten initiation components separately, then together, comparing women who underwent all rites, some rites and no rites.

Settings: Seven indigenous communities belonging to the Tukano language group in the Great Eastern Reservation of Vaupés (Colombia) in 200~~8~~⁹.

Participants: All women over the age of 13 years living in the seven communities in Vaupés, who had experienced at least two menstruations.

Primary and secondary outcome measures: The analysis rested on pelvic pain to define dysmenorrhoea as main outcome. Women were also asked about other disorders present during menstruation or the precedent days, and about the interval between menstruation and its duration.

Results: Only 17.3% (32/185) completed all initiation rites and 52.4% (97/185) reported dysmenorrhoea. Women not completing the rites were more likely to report dysmenorrhoea than those who did so ($p=0.01$ Fisher exact), taking into account age, education, community, parity, and use of family planning. Women who completed less than the full complement of rites had higher risk than those who completed all rites. Those who did not complete all rites reported increased severity of dysmenorrhoea ($p=0.00014$).

Conclusions: Our results are compatible with a protective effect of initiation rites. We could exclude indirect associations with age, education, parity and use of family planning as explanations for the association. The study indicates feasibility, possible utility and limits of inter-cultural epidemiology in small groups.

Comment [Germán Zu2]: HGP: Abstracts. In page 2, row 19 the authors indicate that data collection took place in 2009 yet in page 5, row 31 they also mention that data collection was completed on December 2008. This point needs clarification. CORRECTED

Article summary

Article focus

~~Cross-sectional study 2009.~~

- Female initiation rites and dysmenorrhoea.
- Epidemiology and cultural safety.

Key messages

- ~~There is an a~~ association between abandoning initiation rites and dysmenorrhoea.
- ~~The study s~~uggests ~~an-effectiveness of ity of a~~ traditional practice.
- ~~The study proposes the~~uggests feasibility and usefulness of ~~an~~ intercultural epidemiology.

Strengths and limitations of this study

- ~~There are n~~No epidemiological studies of indigenous initiation and dysmenorrhoea.
- ~~The small numbers problem is recognized. e~~Even with all eligible women participating ~~the small numbers problem is recognized.~~

INTRODUCTION

Qualitative research methods, like unstructured conversations, are relatively easily adapted to cultural contexts. This cultural adaptation is less common in epidemiology, which is often perceived as unreceptive to alternative epistemologies.[1] Yet inter-cultural epidemiology can be useful to identify potential health benefits of traditional health practices, many of which are being lost as globalization erodes indigenous cultures.

This loss of culture is a concern for Amazon indigenous communities, where every year people have less to do with traditional medical practices.[2] The Tatuyo, Bará, Carapana, Tuyuca y Tukano ethnicities in Tukano language group live between the Papurí and Yapú rivers in the Great Eastern Reservation of Vaupés.[3, 4] In collective reservations, the seven communities with very similar customs in a subsistence economy.[5] In the context of a decade long partnership with the traditional health systems group at Universidad del Rosario in Colombia, the indigenous authorities of these communities requested scientific support to study their loss of cultural practices and the effect of this on women's reproductive health, particularly dysmenorrhoea.

Problems related to women's reproductive cycle are increasing worldwide.[6-8] Western medicine has few satisfactory solutions to offer women with dysmenorrhoea, offering an interesting case in point as the World Health Organization calls to explore possible contributions of traditional medicine.[9-11] A sparse epidemiological literature addresses the links with dysmenorrhoea and cultural influences,[12, 13] ethnicity and religiosity.[14, 15] Better documented risk factors are diet, exercise, psychological or emotional episodes, and use of alcohol and tobacco.[16-20] We found no epidemiological studies of indigenous initiation rites and dysmenorrhoea.

METHODS

Study population: All women over the age of 13 years living in the seven communities in Vaupés, who had experienced at least two menstruations in their lifetime.

Outcome: Interviewers asked if, during menstruation, women suffered pelvic pain, dizziness, headache, bodily pains, and problems in the days prior to menstruation. They also asked about the interval between menstruation and duration of menstruation. The analysis rested on pelvic pain to define dysmenorrhoea.[21-23] Because pain perception is subjective, we used a well-established graphic approach showing faces with different grades of discomfort (Figure 1).[24] Respondents simply pointed to the face that reflected their experience during menstruation.

Exposure: Traditional healers described initiation rites at the onset of menarche, lasting three to five days, during which time the young women completed a number of discrete activities: each initiate had a god-mother (*madrina*); each had a mentor during the initiation; the initiate spent 3-5 days away from others; she received a diet limited to specific foods; she received a blessing or prayer from the traditional healer; she applied powdered *carayurú*, a vegetable stain (*Arrhabidea chica*); her hair was cut; her body was painted with *we*, another vegetable stain (*Bignoniaceae sp.*); she inhaled aji, a hot spice mix (*Capsicum spp.*); and water or a plant precipitated emesis. The questionnaire documented exposure to each component rite (yes/no) separately. Without understanding the exact workings of the initiation rites, we followed the WHO guideline to handle the component activities as a "black box"[25]: we do not always have to understand exactly how a traditional therapy works to measure its effect.

Instrument: A month of consultation with local healers (payés) clarified the main research question and a list of culturally appropriate questions. After approval of the questionnaire for semantic and cultural equivalence with the payés, the researchers piloted it with 14 women of the same ethnic group living in Mitu (not part of the study). The authorities in each community invited all women – by

Comment [Germán Zu3]: KEM: Article summary needs copy editing: Main focus is not on cross sectional study 2009.
>copy editing done

Key messages and strength and limitations of the study are not in complete sentences. Difficult to understand.
>CORRECTED

Comment [Germán Zu4]: KEM: Introduction: why is qualitative research mentioned in the first sentence of the introduction? Is it important?

>Qualitative studies have been able to adapt more easily to intercultural perspectives. The first sentence simply sets up the second

Comment [Germán Zu5]: KEM: Descriptive data were not provided in full for appraisal.
> the references provide this detailed information

Comment [Germán Zu6]: HGP: Women's sampling criteria were defined as "all women over the age of 13 years who had experienced at least two menstruations". The authors need to clarify the specific time frame used, for example at least two menstruation during last year.
>>clarified

Comment [Germán Zu7]: KEM: How was the quality of the translation of the 37 item questionnaire ensured for semantic and cultural equivalence?
>>Clarified in the text

cultural definition, the first menstruation identifies the woman as an adult -- to the communal hall (*maloka*) where the researchers explained the instrument, issues of confidentiality and the right to decline to participate or to leave out any question. No eligible woman declined to participate. Interviewers administered a 37-question instrument through a translator during December 2008.

Analysis: Epi-data 3.1 served for manual data capture analysis relied on CIETmap 2.0 beta 8 ([Community Information and Epidemiological Technologies, New York](#) [Centro de Investigación de Enfermedades Tropicales, Mexico](#)), public domain software that provides a Windows-like interface with R. Bivariate analysis with each of the 10 component activities examined the relationship of each component rite on its own with dysmenorrhoea. We also analysed complete and incomplete initiation using sequential stratification by age of the woman, community of origin (some had more access to Western ways), education, parity, family planning and menopause. We analysed trend using the Mantel extension of the Mantel-Haenszel test.[26] We report results as adjusted odds ratios (aOR) with 95% confidence intervals. The two-tailed Fisher exact test served for estimation of confidence with the resulting sparse numbers comparisons.

Without any prior basis for weighting importance of different activities in the initiation, we calculated the average effect across the ten components as though each was a separate exposure; this relied on Meta, an R program. A Forest plot summarises this (Figure 2). Compared with occurrence among women who completed all ten rites of initiation, a sensitivity analysis dropped each initiation rite in turn to test relevance of each in initiation.

Control of biases: Involvement of healers and elders in the design guaranteed cultural fit. The questionnaire [documented inquired for type of current family planning, and if so, which is the method used](#) (~~none~~, plants, pill, injection, condom, pessary, surgery, partner-managed contraception), and duration of use of each method, as this could affect dysmenorrhoea; hormonal pills can diminish pain and IUDs can increase pain. Use of Western contraceptive methods also coincides with Western acculturation. We stratified by contraceptive use to separate between the effect of the contraceptive and the initiation rites. To avoid an acculturation bias from interviewing only women who did not go to nearby towns for work, we conducted the study in December when most return to their homes. We took age, menopause and education into account by stratification to limit the differential influence of these on responses.

Ethical aspects: The CIET ethical review committee at the Universidad Autónoma de Guerrero and Research Fund at the Universidad del Rosario in Colombia both approved the proposal. The leadership of each community signed formal agreements for data management and sharing with all participants present, after the researchers had explained to all the nature of the study, how data would be used, confidentiality, and rights to decline participation.[27]

RESULTS

A total of 185 women participated, representing 70.6% of the 262 women over the age of 12 years identified in the 2006 census. The 77 women excluded had either migrated from the area or they had not completed two menstruations. Of 158 women who knew their age in years, the average was 32.5 years (mode 19 years, sd 15.6). Respondents reported low levels of education, 28.3% (52/184) with no schooling and only 17.43% (32/184 [women interviewed](#)) with secondary education. Few used family planning (11.1% based on 15/135 [women of reproductive age](#)) with an average of 4.9 children each (SD 2.7).

The average age of menarche was 13.8 years (SD 1.16). Some 52% (97/185) reported dysmenorrhoea and 88.6% (164/185) reported undergoing at least some rite of initiation during menarche. Table 1 shows the proportion involved in each of ten activities identified by traditional

Comment [Germán Zu8]: HGP: Also, the authors should provide a more clear definition of all the independent variables: contraceptive use (current or 12- months contraceptive use?)
>>Done

Comment [Germán Zu9]: HGP: Also, the authors should clarify (page 6, row 39 and 40) whether the percent of women in the categories of education were computed in a population of 184 or 185 women.
>>Done

Comment [Germán Zu10]: KEM: Missing number for family planning is big.
>>This question was only asked of 135 women in their reproductive years, no clarified in the text.

healers as the initiation rites. Considering each rite separately, only emesis retained a significant association on its own with dysmenorrhoea, after taking into account age of the woman, community of origin (some had more access to Western ways), parity, family planning by sequential stratification and adjusting for menopause and education. The Forest plot (Figure 2) shows dysmenorrhoea associated with each component rite compared with women who did no rites. The average effect size was OR 1.66 (95%CI 1.35-2.04).

Table 1: Exposure to different aspects of initiation rite and risk of dysmenorrhoea (odds ratio)

Initiation rite	% of all women receiving this rite**	Risk of dysmenorrhoea in each subgroup			
		SiReceiving rite	Not receivin g rite	aOR*	95% CI
Emesis	38.4%	27/71	70/114	2.59 0.39*	1.42 0.21 4.75 0.70
Cared for during the ceremony	76.8%	69/142	28/43	1.97 0.51	0.98 0.25 3.99 1.02
Applied <i>carayurú</i> powder	84.3%	78/156	19/29	1.9 0.53	0.84 0.23 4.32 1.19
Spent time in isolation	71.9%	64/133	33/52	1.87 0.53	0.97 0.28 3.64 1.03
Followed prescribed diet	71.9%	64/133	33/52	1.87 0.53	0.97 0.28 3.64 1.03
Body painted with we	50.8%	44/94	53/91	1.68 0.63	0.89 0.35 2.83 1.12
Had a godmother	50.8%	45/94	50/88	1.43 0.70	0.8 0.39 2.67 1.25
Cut hair	68.6%	64/127	33/58	1.3 0.77	0.69 0.41 2.43 1.45
Inhaled <i>ají</i>	49.2%	45/91	52/94	1.27 0.79	0.74 0.44 2.26 1.41
Blessed by traditional healer	88.6%	85/164	12/21	0.49 0.81	0.32 0.32 3.4 2.04

* Adjusted for age and level of education ~~after~~ in a stratified analysis.

** Total 185 women; no missing data.

To understand the role of each rite in relation to dysmenorrhoea, a sensitivity analysis compared dysmenorrhoea rates among women who did all ten rites (n=32) with women who participated in less than the ten, dropping each rite in turn. Figure 3 shows the unadjusted odds of dysmenorrhoea for all rites compared with failing to do specific rites, and those who did no rites. Those who completed the 10 rites (8/32) contrasted sharply with those who completed some or no rites (89/153) (p-Fisher 0.001).

Most respondents with dysmenorrhoea (92/97) reported severity using the Wong-Baker Faces Pain Rating Scale. Table 2 shows a statistically significant increase across five levels of severity for those who completed all rites compared with those who did any or no rites (p=0.0014). It also contrasts those who did no rites with those who completed all rites (p= 0.0039).

Table 2 Completion of initiation rites and reported intensity of dysmenorrhoea

	No dysmenorrhoea	Intensity of dysmenorrhoea

Comment [Germán Zu11]: HGP: Table 1. It is no clear whether table 1 is describing the "risk" of experiencing dysmenorrhoea or its absence. The title of the table should clearly state that the values correspond to odds ratios.
>>title changed to clarify this

Formatted Table

Comment [Germán Zu12]: HGP: The study reports an OR of 2.59 for the initiation rite of emesis. Table 1 suggests that there is an increase in the odds of dysmenorrhoea for this initiation rite but in the abstract and in the conclusion it is stated that emesis has a protective effect. If this is the case, then values should be presented in a more standard way with an OR below 1 and the information should indicate what the reference group is.
>>Corrected

Comment [Germán Zu13]: HGP: In its current state the table does not communicate well how the adjustment by age and education was computed.
>Done

Comment [Germán Zu14]: KEM: Table 1, % of each rites were given but not number (N) and the total N to account for missing values. Please provide this for each items.
>>Clarified with a footnote to table

	0	1	2	3	4 y 5
Incomplete or no rites	64	18	20	19	27
All rites completed	24	2	4	1	1
Total	88	20	24	20	28
OR		3.94	3.49	6.76	6.92
95%CI		1.72 - 9.00	1.41 - 8.64	1.84 - 24.93	1.17 - 40.88
		Mantel-Haenszel chi square for linear trend = 10.16 p-value = 0.0014			
No rites at all	4	1	3	3	2
All rites completed	24	2	4	1	1
Total	28	3	7	4	3
OR		6.75	6.93	9.38	5.64
IC 95%		1.72 - 26.42	1.77 - 27.17	1.82 - 48.41	0.57 - 55.87
P-Fisher		0.01	0.01	0.02	0.2
		Mantel-Haenszel chi square for linear trend = 8.33; p-value = 0.0039			

DISCUSSION

Our results support the idea that abandoning traditional initiation rites, or adopting practices that go along with abandoning these rites, is a risk factor for dysmenorrhoea. Emesis was the single strongest protective rite on its own, but sensitivity analysis showed a consistent effect of the other rites for those who did not abandon the initiation practices. The apparent lack of specific effects of each component rite supports the idea that synergy between all components completes the protective effect.

This study faced several common challenges in inter-cultural epidemiology. Even with all eligible women participating, the small numbers problem is well recognised[28-31] and has no easy solution. As anticipated, we found it difficult to untangle issues like use of contraceptives and reporting of age, given the effect of acculturation on these. Despite this interdependence of exposures, we believe we were able to show an independent effect of initiation rites.

Inter-cultural approaches have received little attention in the epidemiological literature, and these need further investment. In this study, the indigenous leaders of the seven communities requested the study and set the research question; they specified the cultural exposures of interest; they participated in the design and testing of instruments; they led the interpretation of results; and they are the primary research users, sharing the results with their communities in support of traditional health practices.

Comment [Germán Zu15]: KEM: Table 3 (assuming it is the table below table 2 as there is no label) results were singled out to no rites compared with all rites. This would introduce bias to the result Table 2 and 3. The number of those with severe intensity was only 1. There will be problem with the significance analysis >> Tables have been consolidated. The sparse data do affect the analysis, but the trend is still significant however we set the contrast.

Comment [Germán Zu16]: HGP: Table 2 and the remaining charts don't add much to the analysis. In my opinion it does not make sense to include table 2 because the 95% CI are not only very wide but also because several of these interval overlap each other. It is not clear what the intentions of the authors are, with the inclusion of this material. KEM: Table 2. There was 180/185 that had a response to rites, which was not described in the text. How is the intensity of dysmenorrhoea categorized? (table 2) what is 4y5? >> 180 women responded to the scale of severity; this i show intensity was categorised. We feel the table adds a useful confirmatory dimensión, suggesting that severity is also associated with rites.

In these important dynamics, the research was culturally safe. Even so, cultural issues probably reduced the effectiveness of the study and reduced the numbers further. The 14.6% (27/185) of women who could not give their age in calendar years is testimony to their distance from Western culture. Analysing only those who mention an age included a cultural filter, limiting our conclusions to those with some measure of Western acculturation.

The average age of menarche of our sample was higher than typically reported in the literature,[32-37] possibly indicating a relatively low level of secular change.[38, 39] That one half of the women reported dysmenorrhoea (97/185) is lower than reported in international studies.[40-44] Although the local definition (facial expressions) was useful for internal comparisons, it is of limited value in international comparisons.

We tried to take account of other acculturation issues, beyond initiation rites, by stratifying for education, age, parity, community of residence (some had greater access to modern towns) and use of family planning. The lower risk associated with initiation rites might still be due to unmeasured lifestyle issues associated with maintaining initiation rites. Resolving this requires a randomised controlled trial that supports initiation rites in some communities and not in others, measuring decrease in dysmenorrhoea as the outcome.

Since the 1950s, public health programmes have contemplated primary, secondary and tertiary prevention.[45] More recently, *primordial prevention* identified social, economic and cultural patterns that affect risks.[46, 47] Albeit with limitations, our study suggests that primary or primordial prevention of dysmenorrhoea might be possible for indigenous women who are increasingly in contact with Western ways.

CONCLUSIONS

Without adding insight into exact mechanisms, this cross-sectional study shows an association between abandoning initiation rites and dysmenorrhoea. No one of the rites on its own explains this association. The study suggests feasibility and usefulness of inter-cultural epidemiology: a longer term dialogue led to the research question and design; the indigenous leaders defined the exposure of interest; the ethical review process fitted with indigenous ethical concepts; it generated evidence suggesting an effective traditional practice, without understanding how this works.

ACKNOWLEDGMENTS

Field work was financed by The Research Fund of Universidad del Rosario. Benedicto Mejía and Efraín Mejía, along with other *payés* (wise men, healers) from the seven communities participated in formulation of research questions, design, application of the instrument and interpretation of results. Alicia Jaramillo and Guillermina Ferrer translated the questions during the application of the instrument. Carolina Amaya and Natalia Reinoso carried out the pilot study and the research instrument application in the seven communities. Iván Sarmiento helped with data analysis, tables and figures elaboration and revision of citations and bibliographic references. Andrés Cañón and Sebastián Luna collaborated with the systematic review of cultural risk factors for dysmenorrhea.

COMPETING INTERESTS

We, the authors, declare that there are no conflicts of interest in this study regarding the Indigenous communities that took part, the recognised rights of the Indigenous Peoples, or the financing institutions.

FUNDING

Fieldwork was financed by The Research Fund of Universidad del Rosario. Germán Zuluaga, MD, MSc carried out the research project as part fulfilment of the requirements of MSc (Epidemiology) at the Universidad Autónoma de Guerrero.

FIGURE LEGENDS

Figure 1: Wong-Baker Faces Pain Rating Scale

Figure 2: Forest plot of individual initiation rites and risk of dysmenorrhoea

Figure 3: Sensitivity analysis compared dysmenorrhoea risk among women who did all ten rites (n=32) compared with women who did not do at least one rite, and those who did no rite (listing shows excluded rites)

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