

The Prevalence of Dysmenorrhea in Iran: A Systematic Review and Meta-Analysis

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Abstract

Context: Dysmenorrhea is the most common gynecological complaint in Iran but the true prevalence of it is not clear yet. This study is aimed to estimate the overall prevalence of dysmenorrhea in Iran.

Evidence Acquisition: International and national electronic databases including PubMed, ISI, Ovid, Scopus, Science Direct, SID, MagIran and IranMedex were searched up to January 2016. All studies, in which the prevalence of dysmenorrhea in Iran had been reported, were included in this meta-analysis. Eligible studies were reviewed, and data was extracted onto a standard data sheet. A Meta-analysis was done by a random-effects model with a 95% confidence interval (CI).

Results: Twenty-five studies were assessed involving an overall of 9,677 participants, of which 6,748 had primary dysmenorrhea and 280 had secondary dysmenorrhea. The overall prevalence of primary and secondary dysmenorrhea was 0.71 (95% CI: 0.65, 0.77) and 0.18 (95% CI: 0.03, 0.32), respectively.

Conclusions: Primary dysmenorrhea is a common problem in Iran however, there are only a few studies regarding secondary dysmenorrhea prevalence. Moreover, there is a significant variation between the results of the studies on the primary dysmenorrhea prevalence. Therefore, further evidence-based data on national studies is needed to estimate the exact estimation of dysmenorrhea prevalence in Iran.

Keywords: Iran, Meta-Analysis, Painful Menstruation, Prevalence

1. Context

Dysmenorrhea, a menstrual disorder, is one of the most common gynecological complaints in women. Dysmenorrhea is described as cramping of the lower abdominal pain, which may be accompanied with other symptoms such as nausea, vomiting, diarrhea and rarely syncope episodes (1). Dysmenorrhea has two subgroups, primary and secondary. Primary dysmenorrhea is described as painful menses in women with normal pelvic anatomy without any pathology, which is resulting from excess or imbalance secretion of prostaglandin from the endometrium during menstruation cycle. It is more common in younger women after the establishment of their ovulatory cycles. Secondary dysmenorrhea is defined as a menstrual pain following underlying pelvic pathology, such as endometriosis. It mostly occurs in older women (1).

The prevalence of dysmenorrhea differs largely worldwide, ranging from 16% to 91% (2). Latthe et al., in a systematic review study, indicated that the lowest reported prevalence of dysmenorrhea was in Bulgaria (8.8%) and the highest in Finland (94%) (3). In Asian studies, there are different dysmenorrhea prevalence reports from 56.0% for Jordan (West Asia) (4) and 80% for Hong Kong (East Asia) (5).

In Iran, dysmenorrhea is the most common gynecological complaint (6, 7) and there are several dispersed studies on its prevalence. However, the accurate prevalence of dysmenorrhea is not clear yet in Iran. Most of the researchers in Iran have used different scales and have different definitions of dysmenorrhea. In some, the Andersch and Milson scale has been used, which considers dysmenorrhea as a menstrual pain that needs analgesic drugs or causes poor functioning (8-12). Some have used pain rating scales such as the Numeric Pain Rating Scales (NPRS) and Visual Analog Scale (VAS), which define primary dysmenorrhea as pain scores more than zero (13-15). Others have used the researcher-made scales in which mild to moderate menstrual pain have been considered as dysmenorrhea (6, 16-18). These three definitions are very different. Grandi et al. (2012) conducted a study to determine the prevalence of dysmenorrhea based on different definitions. They found that the severity of menstrual pain didn't match with the need for analgesic drugs or poor functioning. According to the definition of dysmenorrhea, just on menstrual pain itself the prevalence of dysmenorrhea was 84.1%, on menstrual pain and need for medication it was 55.2%, on menstrual pain and absenteeism it was 31.9% and on menstrual

pain, need for medication and absenteeism it was 25.3% (19). Therefore, it seems necessary to estimate the true prevalence of dysmenorrhea separately based on different definitions. Worldwide the prevalence of dysmenorrhea hasn't been compared based on different scales.

2. Objectives

This systematic review and meta-analysis was performed to determine the overall prevalence of dysmenorrhea and its prevalence based on different study subgroups.

3. Patients and Methods

3.1. Review Registration

The study has been registered in the international prospective register of systematic reviews (PROSPERO) as number CRD42016033270, available online at http://www.crd.york.ac.uk/PROSPERO/register_new_review.asp?RecordID=33270&UserID=4127

The study was a systematic review and meta-analysis of published studies and so the ethics approval and informed consent was not necessary.

3.2. Definitions of Dysmenorrhea

Dysmenorrhea is defined as a cramping pain in the lower site of the abdomen before or during menstruation. In the absence of pelvic pathology, the pain is named primary dysmenorrhea and if pathologic problems such as endometriosis and pelvic inflammatory disease (PID) are present, the pain is named secondary dysmenorrhea (1). Definitions of primary dysmenorrhea were determined based on the Andersch and Milsom scale, the pain rating scales (VAS and NPRS) and the researcher-made scales. Based on the Andersch and Milsom scale, mild dysmenorrhea is described as mild pain not interfering with daily activities and rarely requiring analgesic drugs; moderate dysmenorrhea is described as moderate pain, interfering with daily activities, existing signs such as headache, exhausting, nausea, vomiting and diarrhea and requires analgesic drugs; and severe dysmenorrhea is described as severe pain, interfering with daily activities clearly, existing signs such as headache, exhausting, nausea, vomiting and diarrhea clearly, and requires analgesic drugs, but they have no effect or have mild effects on relieving pain (20). According to the VAS, mild, moderate and severe intensity of primary dysmenorrhea was defined as up to 3, 4 to 7 and 8 to 10 pain scores, respectively and based on the NPRS, the aforementioned intensities were defined as 1 to 3, 4 to 6, and 7 to 10 pain scores, respectively (14, 21). Moreover, based

on most of the researcher-made scales, mild to moderate menstrual pain is considered as dysmenorrhea.

3.3. Systematic Search

International databases were searched using the terms "prevalence", "dysmenorrheas", "pain, menstrual", "menstrual pain", "menstrual pains", "pains, menstrual", "menstruation, painful", "menstruations, painful", "painful menstruation", "painful menstruations" and "Iran". In addition, national databases were searched using the Persian terms of "dysmenorrhea" and "painful menstruation". International databases consisted of PubMed (January 1950 to January 2016), ISI (January 1983 to January 2016), Ovid (January 1946 to January 2016), Scopus (January 1973 to January 2016) and Science Direct (January 1823 to January 2016). The national databases consisted of Scientific Information Database (up to January 2016), MagIran (up to January 2016) and IranMedex (up to January 2016). Furthermore, the references of all the included studies were searched to obtain additional literatures. The authors of the included studies were contacted as needed. Moreover, the following conference databases were searched until January 2016:

- Congress of Gynecology and Reproductive Health; available from: <http://portal.icog.ir>
- International Association for the Study of Pain; available from: <http://www.iasp-pain.org/SearchResults.aspx>
- The American Congress of Obstetricians and Gynecologists; available from: <http://www.acog.org>
- National Congress of Women Health; Available from: http://www.seminars.mui.ac.ir/signup/acpt_abs.php?current

3.4. Study Selection

All descriptive studies, in which the prevalence of dysmenorrhea in Iran had been reported and were retrieved regardless of the publication date, source of the study population and language. Iranian women in the reproductive age were considered as the study population. The first outcome of interest was the prevalence of primary and secondary dysmenorrhea and the second outcome was the prevalence of dysmenorrhea based on different study subgroups such as different definitions and different provinces.

3.5. Data Extraction

The researchers screened the title and abstract of the retrieved studies independently and reviewed the full texts to extract studies that met the inclusion criteria. The names of the studies' authors and journals were not blind to the researchers. Any disagreements were resolved by

consensus or arbitration. The percent agreement of the two researchers was 97.2% and the Kappa statistics was 76.5%. The variables that were extracted for data analysis included the author, year, province, study scales for definition, study design, source of the study population, total number of participants, number of outcomes, intensity of dysmenorrhea, type of dysmenorrhea and age. Provinces of the studies were grouped into five regions based on the Iranian Ministry of Interior's management development and human resource suggestions (22).

3.6. Risk of Bias Across Studies

The chi-square test was used to assess statistical heterogeneity, I-square statistic to assess inconsistency through study results and tau-square statistic to assess between-study variance (23). Additionally, the Begg and Egger statistical tests were used to measure publication bias (24, 25).

3.7. Subgroup Analysis

According to our prior knowledge of effective factors on dysmenorrhea prevalence, the sources of heterogeneity were found using meta-regression. The significance level was set at 0.2.

3.8. Data Synthesis

Data analysis was performed using Review manager 5 (26) and Statistical software Stata 11 (Stata Corp, College Station, TX, USA). Meta-analysis was done to obtain summary measures of dysmenorrhea prevalence in the Iranian women population. The results were reported by a random-effects model and had a 95% confidence interval (CI), using inverse variance weight (27). Furthermore, the Geographic Information System (GIS) was used to draw prevalence based on the country regions.

3.9. Risk of Bias in the Included Studies

The quality of the included studies was assessed by eight selected items from the recommended checklist of STROBE (28), the items included present key elements of study design, study date, study setting, the outcome, eligibility criteria, sample size, statistical methods and study sample. The studies were classified as high quality if they fulfilled all of the criterias (16 scores), as intermediate quality if they did not fulfill two of the criterias (14-15 scores) and low quality if they did not fulfill more than two criterias (less than 14 scores). Sensitivity analysis was conducted to assess the sensitivity of each study on the pooled prevalence by sequential omission of each study.

4. Results

4.1. Study Selection

The total of 967 studies were retrieved up to January 2016, including 389 references through international databases, 577 references through national databases and one reference through reference lists. Of the 967 retrieved references, 323 references were excluded because of duplication, 606 did not relate to the objective of this review and 13 did not meet the eligibility criteria. No new study was found through contacting the authors and searching conference databases (Figure 1).

4.2. Study Characteristics

Finally, 25 studies were included in the meta-analysis (6-18, 29-40), which involved 9,677 participants with a mean age of 21.87 years, of which 6,748 had primary dysmenorrhea. Furthermore, 11 (8-12, 14, 15, 29, 34, 35, 37) studies reported the prevalence of mild dysmenorrhea that involved 4,177 participants, of which 1,044 had mild dysmenorrhea and 10 studies (8-12, 14, 15, 29, 34, 37) reported the prevalence of moderate and severe dysmenorrhea, which involved 3,273 participants of which 1,134 had moderate and 512 had severe dysmenorrhea (Table 1). All of the studies were cross-sectional. Just two studies (6, 7) reported the prevalence of secondary dysmenorrhea that involved 1,272 participants of which 280 people had it (data has not been shown).

4.3. Estimated Prevalence of Dysmenorrhea

The total prevalence of primary dysmenorrhea amongst Iranian girls and women was 0.71 (95% CI: 0.65, 0.77) and the prevalence of secondary dysmenorrhea was 0.18 (95% CI: 0.03, 0.32). Furthermore, in the studies that used the Andresh and Milsom scale 0.79 (95% CI: 0.73, 0.86) was much more than studies with pain rating and researcher-made scales 0.69 (95% CI: 0.46, 0.92) and 0.68 (95% CI: 0.60, 0.76), respectively (Figure 2). The overall prevalence of primary dysmenorrhea in the cities of Tehran and Esfahan [0.78 (95% CI: 0.70, 0.86) and 0.78 (95% CI: 0.68, 0.88)] was more than other cities including Tabriz, Kermanshah and Mashhad [0.68 (95% CI: 0.53, 0.82) 0.54 (95% CI: 0.51, 0.57) and 0.62 (95% CI: 0.45, 0.80)] (Figure 3).

The prevalence of primary dysmenorrhea in guidance and high school students [0.67 (95% CI: 0.56, 0.79)] was less than university students [0.69 (95% CI: 0.61, 0.78)] and any others [0.86 (95% CI: 0.79, 0.93)]. The prevalence of mild, moderate and severe intensity of primary dysmenorrhea was 0.27 (95% CI: 0.20, 0.34), 0.31 (95% CI: 0.26, 0.35) and 0.16 (95% CI: 0.12, 0.19), respectively (Table 2).

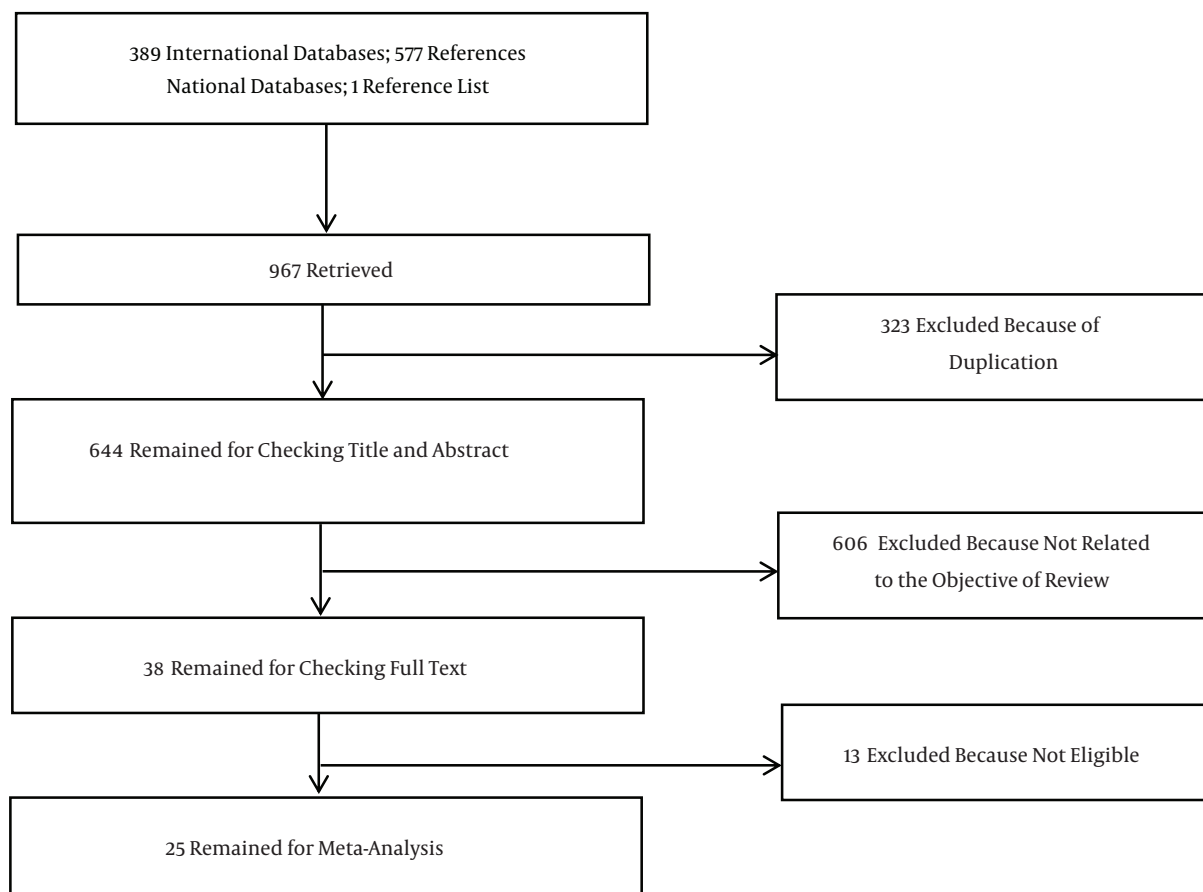


Figure 1. A Flow Diagram Showing the Phases of Development Through the Meta-Analysis

4.4. Risk of Bias Across Studies

There was considerable heterogeneity amongst the included studies, which allowed the result of the chi-square test for heterogeneity to be highly significant ($P < 0.001$). In addition, the I-square statistic was 98% (Figure 2). Despite the significant heterogeneity the tau-square statistic was very small ($\tau^2 = 0.02$). In order to increase the homogeneity, the studies were divided into subgroups by province and year. In spite of all that, heterogeneity was not reduced.

The results of statistical tests for publication bias, including Begg and Egger tests, were not statistically significant, which proved the absence of publication bias.

4.5. Risk of Bias in the Included Studies

The studies were divided into three categories based on the quality of reporting using the STROBE checklist: 4 studies (16%) had high quality, 7 studies (28%) had moderate quality and 14 studies (56%) had low quality. The prevalence of primary dysmenorrhea was estimated based on

the different qualities of the studies. The prevalence of primary dysmenorrhea in high quality studies was 0.77 (95% CI: 0.66, 0.89), in moderate quality was 0.73 (95% CI: 0.62, 0.84) and in low quality was 0.69 (95% CI: 0.60, 0.77) (Table 2). Omission of most of the studies didn't change the pooled prevalence, but the omission of some changed it from 0.70 (95% CI: 0.64, 0.77) to 0.73 (95% CI: 0.67, 0.78), which suggested no significant influence on the results.

5. Discussion

This study indicated that the overall prevalence of primary dysmenorrhea was 71% and the secondary was 18% in Iran. The overall prevalence of primary dysmenorrhea in large cities was more than other cities. Different scales in the studies caused different results, so the studies that used the Andresh and Milsom scale (79%) yielded a more prevalence rate than studies with pain rating (69%) and researcher-made scales (68%). This prevalence in guidance

Table 1. Characteristics of the Included Studies in Meta-Analysis

Author	Province	Mean age	STROBE score	Study scale for definition	Source of the study population	Sample size	Prevalence of dysmenorrhea, No. (%)	Prevalence of the intensity of dysmenorrhea No. (%)		
								Mild	Moderate	Severe
Akhavanakbari (2011)	Tabriz	21	14	Andresh and Milsom	University students	270	163 (60.37)	36 (13.33)	109 (40.37)	18 (6.67)
Amir ali akbari (2011)	Tehran	37	11	Researcher-made	Addiction center	200	183 (91.5)	NR	NR	NR
Baghianimoghdam (2012)	Mashhad	21	12	Researcher-made	University dormitory	300	114 (38)	NR	NR	NR
Basirat (2006)	Tehran	16	10	Researcher-made	High school students	408	212 (51.90)	NR	NR	NR
Habibi (2015)	Esfahan	20.69	9	NPRS	University students	311	277 (89.06)	84 (27.01)	101 (32.48)	92 (29.58)
Jalili (2005)	Mashhad	18	13	Researcher-made	High school students	390	311 (79.74)	NR	NR	NR
Kamjoo (2002)	Esfahan	21	11	Andresh and Milsom	University dormitory	400	309 (77.25)	124 (31)	138 (34.5)	50 (12.5)
Kiani-Asibar (2009)	Tehran	31	14	Researcher-made	Factory workers	476	359 (75.42)	89 (18.70)	182 (38.24)	88 (18.49)
Kiani-Asibar (2011)	Tehran	21	13	Researcher-made	University students	904	702 (77.65)	166 (18.36)	NR	NR
Kordi (2013)	Mashhad	NR	12	VAS	High school students	407	227 (55.77)	28 (6.88)	137 (33.66)	62 (15.23)
Mirblouk (2009)	Tabriz	32.51	10	Researcher-made	Nurses	301	259 (86.04)	NR	NR	NR
Mirzaei (2001)	Mashhad	15.8	16	Andresh and Milsom	High school students	380	324 (85.26)	121 (31.84)	162 (42.63)	41 (10.79)
Molazem (2011)	Esfahan	15.3	14	VAS	High school students	200	182 (91)	NR	NR	NR
Naseh (2008)	Mashhad	NR	12	Researcher-made	Guidance and High school students	325	128 (39.38)	NR	NR	NR
Nazarpour (2010)	Tehran	NR	12	Andresh and Milsom	University students	400	325 (81.25)	163 (40.75)	112 (28.0)	50 (12.5)
Nazarpour (2011)	Tehran	20.57	14	Andresh and Milsom	University students	254	213 (83.47)	90 (35.43)	83 (32.68)	40 (15.75)
Norozi (2004)	Esfahan	20.77	16	Researcher-made	University students	272	178 (65.44)	NR	NR	NR
Panahandeh (2008)	Tabriz	21	14	Researcher-made	University students	380	278 (73.15)	NR	NR	NR
Poureslami (2002)	Tehran	NR	6	Researcher-made	High school students	250	178 (71.2)	NR	NR	NR
Ramezani (2013)	Esfahan	20	16	Researcher-made	University students	601	410 (68.21)	NR	NR	NR
Sehati Shafaei (2013)	Tabriz	21.03	12	VAS	University students	360	150 (41.66)	NR	NR	NR
Shahgheibi (2009)	Tabriz	NR	12	Researcher-made	High school students	511	399 (78.08)	NR	NR	NR
Sharifan (2012)	Mashhad	20	14	Andresh and Milsom	University students	99	75 (75.75)	30 (30.30)	34 (34.34)	11 (11.11)
Soltani (2011)	Kermanshah	NR	15	Researcher-made	High school students	1000	543 (54.3)	NR	NR	NR
Tavallaee (2011)	Tehran	NR	16	Andresh and Milsom	Population based	276	249 (90.2)	113 (40.9)	76 (27.5)	60 (21.7)

Abbreviations: NPRS, Numeric Pain Rating Scale; VAS, Visual Analogue scale; NR, not reported.

and high school students was less than university students. Moreover, the prevalence of reported mild dysmenorrhea was 27% in 11 studies and the prevalence of reported moderate and severe dysmenorrhea was 37% and 16%, respectively, in 10 studies.

The total prevalence of primary dysmenorrhea in Iranian women was estimated to be 71%. In some countries

such as Turkey (72.7%) (41), India (75%) (42) and Malaysia (74.5%) (43), the prevalence has been reported similar, but in other countries they are different; such as 80% in Australia (44) and Hong Kong (5), approximately 64% in Togo (45), 61% in Saudi Arabia (46) and 56% in Jordan (4). Possible explanations may have different definitions, different perceptions of pain, different study populations, different

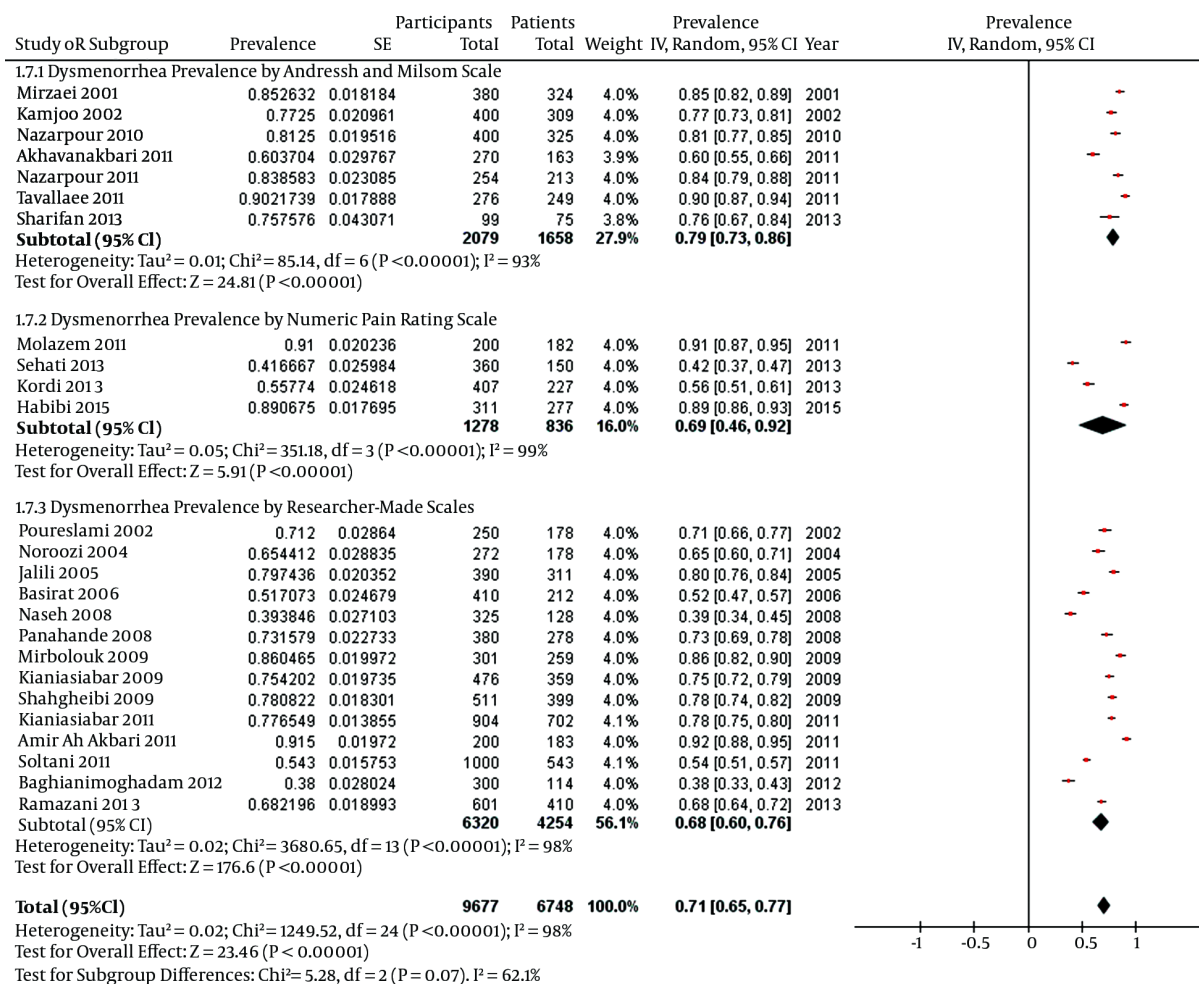


Figure 2. Forest Plot of Dysmenorrhea Prevalence by Study Definition

lifestyle or cultural factors or other factors (5, 46).

The definition of dysmenorrhea and scales used to determine it, changed the prevalence rate. Without considering the severity of pain, interfering with daily activities, requiring analgesic drugs or absenteeism of school or work, the definition of dysmenorrhea is the presence of pain during menstruation. So the researchers expect that, if the scales are well designed, the prevalence results should be similar.

Dysmenorrhea is more prevalent in stressful situations than in non-stressful ones (47). Furthermore, pain is more common in urban areas than in rural areas (48). This study also showed that the prevalence of primary dysmenorrhea in large cities, where life is more stressful and industrial, was more than other cities.

As the mean age of participants in some studies was not accessible, the authors compared the dysmenorrhea prevalence based on the studies population instead. The prevalence in guidance and high school students was less than university students, which was comparable to the studies reported by Kazama et al. (2015) and Agarwal and Venkat (2009). In these studies, the prevalence of dysmenorrhea increased with age (49, 50). However, some studies show that with the increase of age the prevalence of dysmenorrhea decreases, except meta-analysis of Iranian studies. Some researchers suggest that the gynecological age (years since menarche) is more effective on the prevalence of dysmenorrhea than chronological age (49).

The most common intensity of dysmenorrhea was moderate, which was consistent with other studies (41,

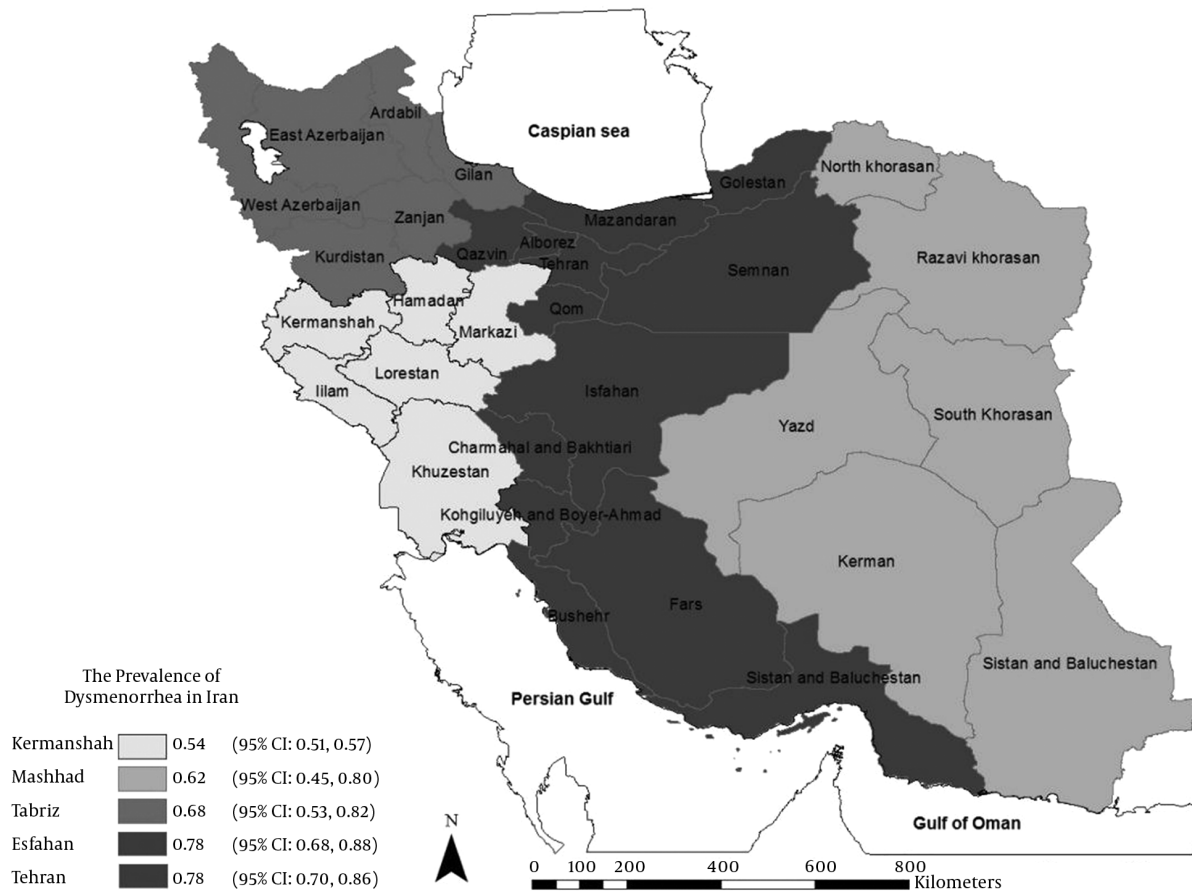


Figure 3. Dysmenorrhea Prevalence by Region

51, 52). Moreover, the prevalence of severe dysmenorrhea was 16%, which was comparable to the 12% - 14% that was reported in the community-based studies in the World Health Organization review (3) and 5%-20% that was reported in another review in developing countries (48). Dysmenorrhea has a negative effect on the quality of life (53), the psychological and physical behaviors as well as social dimensions of life, and has a significant influence on public health (2, 54). Therefore, the authors suggest that policy makers and health planners consider a severe form of dysmenorrhea as women's health priority. Policy makers and health planners need to pay more attention to these groups of women so they will be able to provide adequate services for them. Moreover, there were few studies on the prevalence of secondary dysmenorrhea in Iran, which showed that more studies are needed for the estimation of the true prevalence of secondary dysmenorrhea.

There was a large amount of heterogeneity between

the results of included studies. The large number of the studies (25 studies) and the large sample sizes (9,677 participants) in the meta-analysis could explain part of the observed heterogeneity. However, when the sample size is high, the test has a high power for detecting a small measure of heterogeneity that may be clinically unimportant (23). Presence of the significant differences among the results of studies could be another reason. However, the tau-square statistic was very small, which may have showed the low between-studies variance and the high within-studies variance (55). The prevalence of dysmenorrhea in low and moderate quality studies was underestimated as well. Therefore, it is difficult to give an exact estimation of the primary and secondary dysmenorrhea prevalence in Iran. It seems that, further evidence-based data on national high quality studies with similar definitions and scale, could provide a more accurate estimation of the primary and secondary dysmenorrhea prevalence in

Table 2. Subgroup Analysis of the Prevalence of Dysmenorrhea Using Chi-Square Test for Heterogeneity

	Primary Dysmenorrhea		P Value
	Prevalence	95% CI	
Quality of the studies			
High	0.77	0.66, 0.89	< 0.001
Moderate	0.73	0.62, 0.84	< 0.001
Low	0.69	0.60, 0.77	< 0.001
Type of dysmenorrhea			
Primary	0.71	0.65, 0.77	< 0.001
Secondary	0.18	0.03, 0.32	< 0.001
Intensity of primary dysmenorrhea			
Mild	0.27	0.20, 0.34	< 0.001
Moderate	0.31	0.26, 0.35	< 0.001
Severe	0.16	0.12, 0.19	< 0.001
Year of the studies			
2010 or before	0.72	0.65, 0.79	< 0.001
After 2010	0.71	0.61, 0.80	< 0.001
Province of the studies			
Tehran	0.78	0.70, 0.86	< 0.001
Esfahan	0.78	0.68, 0.88	< 0.001
Tabriz	0.68	0.53, 0.82	< 0.001
Kermanshah	0.54	0.51, 0.57	< 0.001
Mashhad	0.62	0.45, 0.80	< 0.001
Source of the studies population			
Guidance and high school students	0.67	0.56, 0.79	< 0.001
University students	0.69	0.61, 0.78	< 0.001
Others ^a	0.86	0.79, 0.93	< 0.001
Study scale for definition			
Andresh and Milsom Scale	0.79	0.73, 0.76	< 0.001
Numeric Pain Rating Scale	0.69	0.46, 0.92	< 0.001
Researcher-made Scales	0.68	0.60, 0.76	< 0.001

^aIncluding nurses, factory workers, women in an addiction center and women in a population based study.

Iran.

5.1. Limitations

There are some limitations that should be considered. First, only 16% of the included studies had high quality. Low and moderate quality studies underestimated the prevalence of dysmenorrhea in Iran. Second, the studies used different scales and definitions of dysmenorrhea. These different scales and definitions could change the prevalence. Therefore, we can't exclude the probability of the information bias. Third, blinding was not used for the study

selection, so we couldn't exclude the probability of selection bias.

5.2. Conclusion

The results of this meta-analysis indicated that dysmenorrhea is a common problem amongst the Iranian population. In addition, because of the considerable heterogeneity among the studies' results, further evidence-based on a national survey is needed to estimate the exact prevalence of primary and secondary dysmenorrhea

prevalence in Iran. Moreover, the studies have used different scales to define dysmenorrhea, which may lead to various results. It seems that making or adapting a standard scale can provide valuable information on the dysmenorrhea prevalence in the country.

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Footnotes

Authors' Contribution: The two authors reviewed the literature and drafted the review; Maryam Damghanian performed the literature searches, wrote some parts of the manuscript and revised it; Roghieh Kharaghani performed the literature searches, analyzed the data, wrote some parts of the manuscript and supervised the conduct of the systematic review.

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