

## Comparing the effect of pure and impure honey on severity of pain, amount of bleeding, and duration and interval of menstrual cycles in female students with primary dysmenorrhea

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**Abstract:** Dysmenorrhea is a common problem especially in young women that can have adverse effects on quality of life. **Aim:** to investigate the effect of pure and impure honey on severity of pain, amount of bleeding, and duration and interval of menstrual cycles in female students with primary dysmenorrhea. **Method:** The current study was a single-blind crossover design which was carried out on 60 female students with primary dysmenorrhea. After menstrual initiation, one group took pure honey until next menstrual period and after a 10 day wash-out period started to take impure honey till the initiation of the subsequent menstrual cycle. Then dysmenorrhea was assessed using Visual Analogic Scale (VAS). The similar process was performed by impure honey in the second group. The effects of pure and impure honey were measured on severity of pain, amount of bleeding, duration and interval of menstrual periods in two groups. Data were analyzed using SPSS software (v. 14) by AONAVA test. **Results:** A significant difference was observed in the severity of pain following taking pure honey in group one ( $p=0.002$ ). However, this difference was not significant in this group following taking impure honey ( $p=0.4$ ). In the second group, similarly, significant difference was found in severity of pain after taking pure honey ( $p=0.004$ ). **Conclusion:** Pure honey consumption in women, who suffer from primary dysmenorrhea, reduces significantly the severity of pain and amount of bleeding. It can be considered as an alternative treatment approach in affected women.

[Neda Mirbagher, Mohammad Aghajani. **Comparing the effect of pure and impure honey on severity of pain, amount of bleeding, and duration and interval of menstrual cycles in female students with primary dysmenorrhea.** *Life Sci J* 2013;10(6s):835-841] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 132

**Key words:** Menstruation, primary dysmenorrhea, honey, students, bleeding

### Introduction

One of the common problems of women is dysmenorrhea which was formerly known as the mystery in gynecology. Primary dysmenorrhea is a Greek word describing painful contraction of uterine muscles that appears during women menstruation [1]. Being experienced by a large group of women, menstrual pain is the most common complaint among women [2]. Primary dysmenorrhea is due to progesterone decrease and uterine muscle vasoconstriction and its ischemia which usually occurs 2 to 3 years after menarche (the first menstruation) [1]. Menstrual pain usually begins a few hours before bleeding and lasts 32 to 48 hours [1-3]. It seems that occurrence of menstrual pain and its associated symptoms such as nausea, vomiting, fatigue, and headaches are due to release of prostaglandins during menstruation. After incidence of menstruation, more than half of women experience some degree of dysmenorrhea. A study of Iranian medical students showed that 63.5 percent of Iranian woman students suffered from menstrual pain [4]. As a result of this problem, 10 to 15 percent of women need 1-to-3-day break every month [1]. Therefore, economically-socially primary menstrual pain has always drawn serious attention and is considered as the reason of losing time, work, and school [3].

Because women constitute at least 42 percent of adult workforce, millions of hours are losing annually. This way, if an effective medicine is not prepared for that, about 600 million hours will be lost [5]. Non-steroidal drugs are considered as a typical remedy for menstrual pain which can cause side effects such as headaches, dizziness, heartburn, constipation, diarrhea, fatigue, dysuria, drowsiness, anorexia, nausea, acne, acute asthma, vomiting, and gastrointestinal bleeding [6]. Regarding high costs for both the patient and the government, insufficient and unsatisfactory remedies available, recommendations of American Food and Drug Administration (FDA), and developing alternative medications, using medicinal herbs are remarkably increasing [7]. Honey has long been documented as having healing properties [8, 9, & 10]. Honey has been used medicinally since ancient times by Egyptians, Greeks and Romans, evidence of which can be found in the Koran, Bible, Torah and Talmud [11 & 12]. Honey was so highly regarded by the ancient Egyptians that offerings were given as food for gods. Not only did they recognize its healing properties they also used it for embalming and preservation of bodies [13].

Honey is believed to be effective in preventing and alleviating both fungal and bacterial infections and Manuka honey is reported to be

effective against Methicillin Resistant Staphylococcus Aureus (MRSA) [14, 15, & 16]. Pure honeys contain a currently unidentified plant-derived compound with antimicrobial activity; and they have anti-inflammatory properties [17]; and because of having enzymes, minerals, and prostaglandins, they are effective in alleviating pain (menstrual pain, backaches, headaches, etc.) [18 & 19]. Moreover, pure honey opens body capillaries and vessels and controls menstrual bleeding [20]. Wolf's (2001) study showed that pure honey has a more effective impact on treating diseases and relieving their symptoms compared to impure honey [21]. There are contradictory studies on the effects of pure and impure honey on treatment and relief of menstrual pain. In their studies, Jamshidian (2000) and Matlabnezhad *et al* (2008) have concluded that consuming pure honey has a wonderful relieving effect while impure honey does not have this properties [22 & 23]. The study conducted by Afaghi *et al* (1999); however, has showed that both types of honey are effective in treating diseases so they can be included in daily diets [24]. Many research works reported the use of honey for treatment of both wounds and infections [25, 26, & 27]. However, there are few comparative studies on the effects of different types of honey on menstrual pain. Using medications is the first phase of treatment in patients with menstrual pain. If the patient is prohibited from drug consumption or if the patient does not respond to the medicine positively, prostaglandin inhibitors that have different side effects will be used. Therefore, presenting a non-pharmacologic therapy is evident and necessary for patients who do not respond to the medicine positively or suffer from its side effects or do not intend to consume drugs (2). Therefore, there is now a resurgence of interest in the use of honey as an adjunct or alternative treatment in health care (28). Nevertheless, many of the acclaimed uses of honey are anecdotal and not evidence-based (29). Bearing whatever has been said in mind, the present study was aimed at figuring out the effects of pure and impure honey consumption on pain intensity, amount of bleeding, bleeding duration, and interval between two successive bleedings in primary menstruation.

#### **Method**

The present investigation is a crossover, one-blinded, quasi-experimental study. Subjects consisted of nursing students residing in dormitories of Kashan Medical Sciences University in the academic year of 2008-2009. Subjects were selected based on some factors including age range of 18-35, regular 28-day menstrual cycle, moderate and severe menstrual pain during each cycle, failing to menstruate during night. Some probable subjects were crossed out based on factors such as consuming steroidal anti-inflammatory

drugs and oral contraceptives, having pain during the whole bleeding or all over the cycle, having allergy to honey, and having genital disease. Using the available method, subjects were selected after moral consideration were taken, written consent was acquired, the purposes of the study were explained, emphasis on the confidentiality of the collected information was made, and subjects announced their willingness to participate in the research (n=90). Afterwards, the mean score of the students' menstrual pain was assessed during three successive cycles by the researcher; and the subjects marked the number of the pain they felt on the pain meter ruler. Subjects whose mean score of menstrual pain in three successive cycles was 4 or more were considered as moderate and severe menstrual pain (30) and those who also had the above mentioned factors were considered as the final subjects of the research. Therefore, 60 qualified students were selected and randomized into two groups, thirty of whom were treated by using pure honey (the first group) and the other thirty (the second group) by using impure honey. In fact, both groups performed like control groups by themselves. Pure and impure honeys were gained from producers of pure honey and one of the town supermarkets, respectively. Both honeys were examined in the biochemistry laboratory of Medical Sciences University and their degrees of purity were specified to be 95% and 20% for the pure honey and the impure one, respectively. It was figured out that the impure honey was contained minerals, sugar, water, sucrose, and many other additives. Both honeys had the same appearance and packing.

#### **Measurements**

Required data were collected using a two-sectioned questionnaire. The first section included demographic information and questions about menstruation (e.g., location of menstrual pain, waking at night because of menstrual pain, number of consumed painkillers in previous menstruation, bleeding duration, amount of bleeding, interval between two bleeding, and family menstrual pains) and the second section was Visual Analog Scale (VAS). Validity of the first section was gauged based on its content; that is the questionnaire was given to 10 field experts and their viewpoints were taken into account. Its reliability was specified as 0.78 through Cronbach's alpha test. Visual Analog Scale is a 10-centimeter horizontal line on the left and right ends of which the expressions "without pain" and "maximum imaginable pain" are written, respectively. In this scale, numbers range from zero (no pain) to 10 (maximum imaginable pain) which should be specified by the patient. Pain is classified into three types: slight (1-3), moderate (4-6), and severe (7-9) [31].

### Study Procedure

Initially, the first section of the questionnaire about demographic and menstrual information was completed by the researcher through interviewing. Then, patients in both groups were required to mark the point on the VAS that best represented their pain. Used sanitary pads were counted by the subjects in order to specify the amount of bleeding. Filling two third of the pad was taken as the criterion of changing it. Using more than 15 sanitary pads, 5 to 15 pads, and less than 5 pads were considered as high bleeding, moderate bleeding, and low bleeding, respectively. To control threatening variables such as the distance between the dormitories and the university (dormitory A and B were 100 and 200 meters away from the university, respectively) and also to eliminate the effect of exercise and nutrition, crossover study was applied. After beginning of menstruation cycle, the first group was given 5 teaspoons of pure natural honey, 40 grams, every morning until the next menstruation cycle began [19]. Then, in their next cycle the amount of menstrual pain before the menstruation, at the onset of menstruation, one, two, and three hours after its beginning was assessed using the VAS. After ten days, the same group was given the same amount of impure honey every other day until the beginning of the next cycle; and their menstrual pain was assessed in the previous way. The second group had the same procedure but they were first given impure honey the pure honey and the amount of their pain was gauged using VAS. Students were provided another jar of honey to consume as they had been instructed. At the end of their menstruation cycles, students were asked about their amount of bleeding, bleeding duration, and the interval between their bleeding; and the collected information was compared to their previous data. All the students were supervised regarding the appropriate and timely consumption of the given honey by the researcher. Patients were urged to avoid taking any medications, painkillers, or other ways to relieving their pain until their menstrual pain was gauged. Collected data were analyzed through repeated measure ANOVA, exact fisher, chi square, and T-test using SPSS 14 software.

### Results

The results of the study showed that 60% of the first group and 53.3% of the second group aged 20-25, 86.7% of the first group and 76.6% of the second group were single, bleeding duration was 4-6 days in 60% of the first group and 70% of the second group. The results of the statistics tests proved no demographical difference between the two groups ( $P > 0.05$ ) and they were the same regarding these variables (see Table 1). There was a significant

decrease in the mean intensity of menstrual pain in the first group after consuming pure honey ( $P < 0.002$ ). However, there was no significant change in the intensity of menstrual pain in the same group after they consumed impure honey ( $P=0.4$ ). Moreover, comparing the effects of consuming pure and impure honeys on the menstrual pain in the first group in their first 3 hours of menstruation showed that there was a significant difference ( $P < 0.02$ ). In the following hours; however, no significant difference was observed (See Table 2). During pure honey consumption, the mean intensity of menstrual pain in the second group also dropped ( $P=0.004$ ). However, there was no significant decrease in their menstrual pain when they consumed impure honey ( $P=0.9$ ). Moreover, comparing the effects of consuming pure and impure honeys on the menstrual pain in the second group in their first 3 hours of menstruation showed that there was a significant difference ( $P < 0.02$ ) (See Table 3). Comparing the first and the second group 3 hours after pure honey consumption showed that there was no significant difference between them ( $P=0.13$ ). Comparing the first and the second group 3 hours after impure honey consumption also showed that there was no significant difference between them ( $P=0.09$ ) (See Table 4). There was a significant decrease in the amount of bleeding after consuming both types of honey ( $P=0.03$ ). However, none of the honey had a significant effect on bleeding duration and interval between two bleedings (See Table 5).

### Discussion

Although there is no certain cause of primary dysmenorrhea, excessive production of endometrial prostaglandins is considered as an acceptable theory about its cause. Therefore, decreasing production of prostaglandins should be taken into account in developing its medicine [32]. The results showed that pure honey caused menstrual pain to drop. This can be due to the fact that pure honey decreases concentration of the prostaglandins of the blood [19]. Therefore, it seems that pure honey can be used as a remedy for menstrual pain. On the other hand, because honey contains remarkable amounts of glucose and fructose, it can play an important role in its protective performance [33 & 34]. In their study, Karimi *et al* (2007) compared the effect of diet on the dormitory students' menstrual pain. The results of their study showed that those whose menstrual pain was lower than average consumed pure honey in their diets [19]. In Karimi's study, pure honey was consumed by the subjects regardless its amount and it was observed that their menstrual pain decreased significantly.

	Parameter	First Group (n=30)	Second Group (n=30)	Statistical Test
		Number (%)	Number (%)	
Age (year)	15-20	9 people (30%)	11 people (36.6%)	Chi square=2.2 p=0.1
	20-25	18 people (60%)	16 people (53.3%)	
	25-30	3 people (10%)	3 people (10%)	
Marriage	Married	4 people (6.6%)	6 people (20%)	Fischer=2.67 P=0.34
	Single	26 people (86.7%)	23 people (76.6%)	
	Divorced	0	1 people (3.3%)	
Location of Pain	Back and Legs	20 people (83.3%)	18 people (60%)	Chi square=3.56 P=0.76
	Head	8 people (13.3%)	9 people (30%)	
	Both of the above	2 people (3.3%)	3 people (10%)	
Waking up because of Menstrual Pain	Most of the Time	19 (43.3%)	21 (70%)	Chi square=3.7 P=0.15
	Sometimes	6 (40%)	5 (6.16%)	
	Not at all	5 (16.7%)	4 (13.3%)	
Menstrual History in the Family	Has	20 (90%)	22 (73.3%)	Fischer=3.1, P=0.54
	Does not have	10 (10%)	8 (26.6%)	
Bleeding Duration	2-3 days	10 (3.3%)	8 (26.6%)	Chi square=4.2 P=0.1
	4-6 days	8 (60%)	21 (70%)	
	More than 7 days	2 (6.6%)	1 (3.33%)	
Amount of Bleeding based on Counting the Pads	3-5 pads	10 (33.3%)	8 (26.6%)	Chi square=2.79 P=0.91
	5-10 pads	6 (20%)	7 (3.23%)	
	10-15 pads	14 (46.6%)	15 (50%)	
The Interval between two Bleedings	15-25 days	7 (23.3%)	9 (30%)	Chi square=3.89 P=0.56
	25-35 days	21 (70%)	18 (60%)	
	15-25 days	2 (6.66%)	3 (10%)	

  

Honey Consumption Intensity of Menstrual Pain	Pure Honey Consumption in the First Cycle	Impure Honey Consumption in the Second Cycle	Statistical Test
	Standard Deviation ± Mean	Standard Deviation ± Mean	
Before Menstruation	7.1 ± 1.2	8.3 ± 2.1	T = 2.5 P = 0.31
Immediately after Menstruation	7 ± 2.1	7.2 ± 1	T = 3.45 P = 0.20
One Hour after Menstruation	6.8 ± 0.85	7.8 ± 0.25	T = 2.13 P = 0.11
Two Hour after Menstruation	5.1 ± 1.1	7.1 ± 0.81	T = 2.10 P = 0.10
Three Hour after Menstruation	4.3 ± 1.5	6.9 ± 1.5	T = 1.23 P = 0.02
Repeated Measure ANOVA	F =3.45 P*=0.002	F =2.1 P =0.4	

  

Honey Consumption Intensity of Menstrual Pain	Pure Honey Consumption in the First Cycle	Impure Honey Consumption in the Second Cycle	Statistical Test
	Standard Deviation ± Mean	Standard Deviation ± Mean	
Before Menstruation	7.1 ± 3.2	8.2 ± 1.1	T = 2.5 P = 0.31
Immediately after Menstruation	6.3 ± 1.5	8 ± 1.5	T = 3.45 P = 0.20
One Hour after Menstruation	5.2 ± 2.2	7.5 ± 1.2	T = 2.13 P = 0.11
Two Hour after Menstruation	6.1 ± 2.1	6.1 ± 2.3	T = 2.10 P = 0.10
Three Hour after Menstruation	7.2 ± 1.3	4.1 ± 2.2	T = 1.23 P = 0.02
Repeated Measure ANOVA	F =2.15 P =0.9	F =4.18 P*=0.004	

Honey Consumption Menstrual Pain Intensity	Pure Honey		Impure Honey			Statistics Test
	First Group	Second Group	Statistics Test	First Group	Second Group	
	SD±Mean	SD±Mean		SD±Mean	SD±Mean	
Before Menstruation	7.1 ± 1.2	8.2 ± 1.1	T=4.1 P=0.01	8.3 ± 2.1	7.1 ± 3.2	T=2.34 P=0.05
Immediately after Menstruation	7 ± 2.1	8 ± 1.5	T=3.24 P=0.02	7.2 ± 1	6.3 ± 1.5	T=3.15 P=0.01
One Hour after Menstruation	6.8 ± 0.85	7.5 ± 1.2	T=2.78 P=0.05	7.8 ± 0.25	5.2 ± 2.2	T=2.17 P=0.03
Two Hour after Menstruation	5.1 ± 1.1	6.1 ± 2.3	T=2.90 P=0.01	7.1 ± 0.81	6.1 ± 2.1	T=2.24 P=0.04
Three Hour after Menstruation	4.3 ± 1.5	4.1 ± 2.2	T=2.21 P=0.13	6.9 ± 1.5	7.2 ± 1.3	T=1.43 P=0.09
Repeated Measure ANOVA	F=3.45 P*=0.002	F=4.18 P*=0.004		F=2.14 P=0.4	F=2.15 P=0.7	

  

Parameter Group	Bleeding Duration (day)	Bleeding Amount	Interval between two Bleedings
	SD ± Mean	SD ± Mean	SD ± Mean
Before Treatment	5.59 ± 0.14	11.25 ± 0.45	28.24 ± 0.32
Pure Honey	5.18 ± 0.27	1.42 ± 0.68	27.86 ± 0.49
Impure Honey	5.4 ± 0.23	10.65 ± 0.64	28.67 ± 0.66
ANOVA	F=5.8 P=0.21	F=3.38 P*=0.03	F=4.36 P=0.18

In the present study; however, pure and impure honeys with specified doses were given to the subjects and the final effects were observed and assessed. The findings of this study are in line with those of Karimi's. The present study showed that the subjects' mean intensity of menstrual pain decreased significantly before, intermediately after, one hour, two hours, and three hours after pure honey consumption. In the second group that consumed impure honey, no significant difference was observed in different times. Pure honey consumption likely decreases menstrual pain intensity. The probable mechanism of pure honey effect is secondarily related its spasmolytic properties [35]. This mechanism is also proved by research conducted by Alexandrovich *et al* [36]. In the present study, it was also concluded that medicinal herbs like honey can control smooth uterine muscles caused by oxytocin and E<sub>2</sub> prostaglandins and hence it can decrease menstrual pain and backaches [37]. The present study showed that pure honey was more effective in decreasing primary dysmenorrhea compared to impure honey. The reason for ineffectiveness of impure honey is the fact that it contains other materials such as water, sugar, and flower extract which decrease its effectiveness [38]. The results of the research conducted by Hejazi *et al* (2009) showed that consuming medicinal herbs such as cumin and honey is effective in decrease of systematic symptoms of menstruation [39]. Tork Zahrani *et al* (2007) have conducted a study titled "The Effect of Medicinal Herbs such as Honey on Menstrual Pain". The results of their study showed that herbal medicines are effective in decreasing menstrual pains

such as backaches. Their study also showed that there was bleeding decrease after honey was consumed [40]. In their study; however, Murakmi *et al* have showed that carbohydrate consumption had no effect on menstrual pain decrease [41]. In their study, they used impure sugar instead of honey. Their study has concluded that impure carbohydrates are not effective in decreasing menstrual pain. This finding is in line with the finding of the present study that impure honey could not decrease menstrual pain. Consumption both types of honey, compared to the stage before consumption, proved no significant effect on bleeding duration and the interval between two successive bleedings. In Tork Zahrani's research, it was also observed that bleeding duration did not change after patients suffering from primary dysmenorrhea had consumed honey [40]. Since honey is considered as a herbal medicine, the results of the present study showed that honey consumption had no effect on bleeding duration and the interval between two successive bleedings. Prostaglandins are the cause of menstrual pain and its associated symptoms such as heavy bleeding [42]. E<sub>2</sub> and E<sub>2α</sub> prostaglandins cause uterine blood flow to increase [43]. Moreover, E<sub>2</sub> prostaglandin is vasodilator and increases bleeding in women suffering from menstrual pain [44]. Research has showed that on average the amount of bleeding is about 30-40 millimeters a month in a regular menstruation cycle [42] and about 35 millimeters serous fluid is released [43]. In the present study, the amount of bleeding decreased after the subjects consumed both types of honey. Therefore, bleeding decrease can be due to the anti-prostaglandin properties of honey [44].



Unavailability of 100% pure honey can be mentioned as one of the limitations of the study. In addition, it is highly recommended that other studies should be conducted on specifying the effective dose of pure honey to treat and prevent primary dysmenorrhea, comparing the effects of different types of herbal medicines on treating primary dysmenorrhea, comparing the effects of pure and impure honeys on the intensity of menstrual pain in the first three days of menstruation.

### Conclusion

The findings of the study support the effects of honey on menstrual pain and bleeding; and since compared to synthetic medicines, using herbal ones associates less side effects, it seems that pure honey can be used as an effective herbal medicine in treating and preventing primary dysmenorrhea and its associated symptoms. Therefore, it is recommended that women should consume honey continually in order to prevent menstrual pain because prevention is better than treatment.

### Conflict of interest

There is no conflict of interest in this paper.

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