Original Article

Efficacy of Honey Vaginal Application on A Wide Scale of Patients with Dyspareunia

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ABSTRACT

Objective: Most people who lead healthy lifestyles tend to use natural products as supplements, complementary medicine or alternative treatments. Honey is God's precious gift to mankind. Honey has been highly appreciated and extensively used since ancient history due to its high nutritional and therapeutic values we aim to assess the effectiveness of intravaginal honey in reducing dyspareunia.

Materials and Methods: Our study took place in the department of Obstetrics and Gynecology at Kasr Elainy From May 2018 till August 2019 the study was done on 300 participants, according to the calculated Sample size. The participants were divided into Group A (150 participants) and Group B (150 participants). Group A received Placebo treatment in the form of KY gel to be applied by the patient intravaginally for 3 weeks, while group B would apply pure bee honey intravaginally also for 3 weeks.

Results: Applying pure bee Honey intravaginally daily at bed time can help moisturize dry vagina and treat infection and thus improve symptoms of dyspareunia. Honey is superior to Ky gel with the same over the counter availability with no side effects.

Conclusion: Reduction of Dyspareunia can be one of the many benefits of honey and improvement was related to consistent use.

Key Words: Dyspareunia, intravaginal honey, pilot study.

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INTRODUCTION

Honey is a known, loved nutrient that has long been known for its health benefits. We would like to highlight a new addition to its benefits which is, being used intravaginally for improving dyspareunia[1].

Dyspareunia in women is defined as recurrent or persistent pain with sexual activity that causes marked distress or interpersonal conflict[2]. It may be classified as entry or deep. Entry dyspareunia is pain with initial or attempted penetration of the vaginal introitus, whereas deep dyspareunia is pain that occurs with deep vaginal penetration. Dyspareunia is also classified as primary (i.e., occurring with sexual debut and thereafter) or secondary (i.e., beginning after previous sexual activity that was not painful)[2]. Determining whether dyspareunia is entry or deep can point to specific causes, although the primary vs. secondary classification is less likely to narrow the differential diagnosis[3-5].

Dyspareunia can have a negative impact on a woman's mental and physical health, body image, relationships with partners, and efforts to conceive. It can lead to, or be associated with, other female sexual dysfunction disorders, including decreased libido, decreased arousal, and anorgasmia. Significant risk factors and predictors for dyspareunia include younger age, education level below a college degree, urinary tract symptoms, poor to fair health, emotional problems or stress, and a decrease in household income greater than 20%[6,7-9]. Natural honey can be defined as a sweet, flavorful liquid substance of high nutritional value and immense therapeutic benefit[10]. Most bacteria, viruses and fungi are sensitive to medicinal honey, as it is a very effective broad-spectrum antimicrobial agent. Researchers have demonstrated the antimicrobial activity of natural honey against Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus as well as other Gram-positive and Gram-negative bacteria[11-14]. These authors opine that the formation of hydrogen peroxide (H_2O_2) enhances the antibacterial capability of honey.The other beneficial health effects of varieties of natural honey and apitherapeutic

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practices include treatment of general body pain, chest pain, menstrual pain, fatigue, vertigo, postnatal disorders, male impotence, and respiratory distress such as cough, bronchitis, pharyngitis, throat aches, and urinary tract infection (URTI). These effects might be connected with the high energy content of honey, in addition to its effects against bacterial infection and inflammatory processes[15,16]. In one reproductive study, Zaid *et al*.[17] reported the effects of tualang honey from Malaysia on menopausal rodents. The observation of uterine atrophy prevention informed the suggested use of honey as an alternative to hormone replacement therapy by these authors.

The conclusion can be drawn that the antioxidant constituents, anti-inflammatory activity, free radical scavenging capability, reduction in necrotized tissue and the provision of a rich energy source are among the more important mechanisms of honey's effects[18-20].

This study aims to add to the benefits of honey, that not only is it a nutrient with antibacterial activity to be used for wound infection and common colds, but that through intravaginal application can be used to reduce discomfort felt during intercourse for those with such complaint and is a remedy available in almost every home in addition to having no side effects.

PATIENTS AND METHODS

Our study took place in the department of Obstetrics and Gynecology at Kasr Elainy From May 2018 till August 2019 the same study was done on 300 participants, according to the calculated Sample size. The participants were divided into Group A (150 participants) and Group B (150 participants).

Results were then statistically analyzed and the Sample size was calculated using the (G power software) to detect the efficacy of honey vaginal application on a wide scale of patients with dyspareunia, and accordingly it was found that an appropriate size would be 150 participants per group, so a total of 300 participants.

Group A received Placebo treatment in the form of KY gel to be applied by the patient intravaginally for 3 weeks, while group B would apply pure bee honey intravaginally also for 3 weeks.

Dyspareunia was defined as continuous unremitting or intermittent pain associated with intercourse. Deep dyspareunia was defined as dyspareunia following deep penetration. Secondary dyspareunia was defined as dyspareunia developing after a period of painless intercourse[5,6].

The placebo treatment assigned for Group A was recommended to be applied intravaginally by the patient at bed time and before intercourse (if it were to take place), to be applied regularly every day, for a duration of 3 weeks. During the first week no recording of the pain score is required from the patient, and accordingly it is explained to the Patient that the treatment will need time to work before any improvement can be felt. On the following 2 weeks Patients are instructed to attempt intercourse at least twice per week and record their pain score following each act of intercourse.

Group B is instructed to apply pure bee honey daily, intravaginally for 3 weeks in the same fashion as the placebo group, and then do the same recording of their pain score, following each act of intercourse, in the later 2 weeks as well. Results were then compared between the 2 groups.

Inclusion criteria

Women in childbearing age as well as postmenopausal women could participate. Candidates were between the ages of 20 to 60 years old.

Patients have experienced the dyspareunia after a period of painless intercourse, and refer to it as deep dyspareunia, not on touch of the vestibule.

Patients with vaginal infection on examination were included if first line treatment to treat the infection has not caused relief of symptoms.

Patients with vaginal examination revealing vaginal dryness or no obvious cause for the dyspareunia were particularly included.

Exclusion criteria

Patients were excluded if the Dyspareunia was dating since the onset of sexual activity (primary), was related to a certain position, and if the dyspareunia was vestibular(superficial)and was due to and organic cause such as vulvar dermatosis or vaginal anomalies or pelvic floor myalgia, Patients were excluded if they proved to be sensitive to either products in the study groups, Patients were also excluded if they were concomitantly using other lubricants or hormonal therapy.

Patients instructions

Patients were first subjected to a pelvic examination to point out the exact site of the pain, followed by speculum examination to rule out exclusion criteria. Patient were counseled that the relief would not to be expected following the first application but rather on regular use of the treatment.

Group A were then given Placebo treatment (in the form of a bottle filled with Ky gel), while Group B would apply pure bee honey. Ky gel was chosen for placebo treatment due to its lubricant effect and being usually the first line of treatment tried by most couples experiencing dyspareunia due to the over counter availability with no need for prescription. Patients were instructed to apply 1 cm of either the placebo or the honey just at the introitus using a syringe and then wait for 2 days without treatment to test for any sensitivity for either product.

Patients who were then legible for the study were instructed to apply 3 cm of either treatments intravaginally, using a syringe, to be done daily before bedtime and immediately before any act of intercourse if it were to take place. Patients are allowed to stand after that and walk normally to the bathroom if they wish to do so. Patients were not asked to abstain from intercourse during the first week but were asked to attempt penetration at least twice per week during the latter 2 weeks and make a score of their pain using the Numeric Rating Scale (with 10 being the worst pain and 0 being free of pain) following each act of intercourse.

Statistical analysis

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social sciences) version 25. Data was summarized using mean, standard deviation quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons between quantitative variables were done using unpaired t test. For comparing categorial data, Chi square (c2) and fisher exact tests were performed. Repeated measure ANOVA was done to compare NPS in each group all through the study. Correlations between quantitative variables were done using Pearson's correlation. *P-values* less than 0.05 were considered as statistically significant.

RESULTS

Three-hundred dyspareunia patients were included in the study, and divided in to two groups; group 1:150 patients received placebo; group 2: 150 patients received honey with no significant differences between the two groups regarding (age, BMI, DOD) (P value = 0.43, 0.46, and 0.74) respectively (Table1).

Table 1: background characteristics

	Placebo N=150	Honey N =150	*P value*
Age	36.6±9.89	35.76±9.06	0.43
BMI	24.46±4.38	24.84±4.52	0.46
DOD (months)	12.46±4.9	12.65±5.00	0.74

(Table 2) show; no significant difference in the mean basal NPS between dyspareunia patients received placebo and those received honey (*p value* =0.71).

Significant decrease in NPS mean in dyspareunia patients applied honey compared two those received placebo treatment in all records all through the study (*p value* <0.001).

Table 2: recorded pain between both groups

	Placebo N=150	Honey N =150	*P value*
Basal pain	6.57±1.22	6.62±1.26	0.71
1st record	6.58±1.27	5.46±1.49	<0.001
2nd record	6.44±1.17	4.73±1.44	<0.001
3rd record	6.42±1.06	4.02±1.5	<0.001
4th record	6.38±1.1	3.21±1.58	<0.001

(Table 3) show; no significant difference in the mean NPS in dyspareunia patients received placebo treatment between all records all through the study (*p value* =0.1).

Significant progressive decrease in NPS mean with time in dyspareunia patients applied honey (*p value* <0.001).

Table 3: comparison of dysparunia between both groups

	Basal pain	1st record	2nd record	3rd record	4th record	*P value*
Placebo N =150	6.57	6.58	6.44	6.42	6.38	0.1
Honey N=150	6.62	5.46	4.73	4.02	3.21	<0.001

No significant difference in basal pain severity between the two groups of patients. The severity of pain is significantly in patients applied honey in compare to patients received placebo in all records (*p value*<0.001). 50.7% of dyspareunia patients received placebo and 50 % of those applied honey had severe pain at the basal record, the severity is progressively decreased with time in patients received honey in compare to received placebo all through the study; to become 24% of group II patients had severe pain in compare to group I whose 44% had severe pain in the first record (*p value* <0.001). 14.7% of group II patients had severe pain in compare to group I whose 36% of them had severe pain in the second record (*p value* <0.001). 6.7% of group II patients had severe pain in compare to group I whose 38.7% of them had severe pain in the third record (*p value* <0.001). 2.6 % of group II patients had severe pain in compare to group I whose 29.3 % of them had severe pain in the second record (p value <0.001).

Correlation analysis between dyspareunia, DOD and age, BMI in all participating patients

There was significant positive correlation between the age of the patients and the severity of pain at the basal records (*p value* =0.03, r =0.125). Also, between age and DOD (*p value*= 0.011, r = 0.147). on the other side there was significant positive correlation between DOD and age (*p value*= 0.02, r = 0.135), and BMI *p value* <0.001, r= 0.238) (Tables 4,5).

Table 4: detailed comparison between basal and recorded pain in both groups

	Placebo N=150	Honey N =150	*P value*
Basal pain			
No pain	0(0%)	0(0%)	
Mid	0(0%)	0(0%)	0.9
Moderate	74(49.3%)	75(50%)	
Severe	76(50.7%)	75(50%)	
1st record			
No pain	0(0%)	0(0%)	
Mid	0(0%)	16(10.7%)	<0.001
Moderate	84(56%)	98(65.3%)	
Severe	66(44%)	36(24%)	
2nd record			
No pain	0(0%)	0(0%)	
Mid	0(0%)	28(18.7%)	<0.001
Moderate	96(64%)	100(66.7%)	
Severe	54(36%)	22(14.7%)	
3rd record			
No pain	0(0%)	0(0%)	
Mid	0(0%)	56(37.3%)	<0.001
Moderate	92(61.3%)	84(56%)	
Severe	58(38.7%)	10(6.7%)	
4th record			
No pain	0(0%)	0(0%)	
Mid	0(0%)	94(62.7%)	<0.001
Moderate	106(70.7%)	52(34.7%)	
Severe	44(29.3%)	4(2.6%)	

Table 5: *P value* of pain compaired to different parameters

		Basal pain	Age	BMI	DOD
Basal pain	r	1	.125*	-.002	.147*
	P value		.030	.970	.011
	N	300	300	300	300
DOD	r	.147*	.135*	.238**	1
	P value	.011	.020	<.001	
	N	300	300	300	300

DISCUSSION

The application of honey intravaginally for improvement of dyspareunia has not been studied before. However, applying Honey intravaginally is not new for many. This is a common practice among some countries such as Yemen owing to the known benefits of Honey.

The sense of improvement felt by our Candidates in this study caused by Honey and not by KY gel would exclude that the lubricant effect of honey would be the cause for the improvement. The precise effect Honey has on the vaginal epithelium needs further studies to be conducted on the cell level. However, the improvement caused by Honey, could be due to the antifungal effect of honey. The most appraised point after the application by most patients was the reduction in offensive vaginal discharge and the burning sensation usually felt after intercourse.

The application of Honey intravaginally has been studied before for evaluating the effect of Honey on Yeast infection.

According to a paper published online 2013 comparing the effect of honey and miconazole against Candida albicans, concluded that the inhibitory effect of honey without the fungicide effect is a very good trend in the treatment of vaginal candidiasis[18].

The antimicrobial properties of honey have been confirmed in different studies, which could be the effect of the following factors: Osmotic effect: Eighty-two percent of honey contains a high concentration of carbohydrates, but a low volume of water. It could inhibit the growth of bacteria by cell dehydration. Fungi are more resistant to high osmotic pressure than bacteria, Acidity: The honey pH, 3.2-4.5, is due to the organic acids particularly glutamic acid, pyruvic acid, malic, and citric acid, whereas, the minimum pH for bacteria growth is 7.2-7.4, Hydrogen peroxide (H_2O_2) is often produced in diluted honey as a result of glucose oxidation and Stimulation of the immune system by B and T-cell cytogenesis and neutrophil activation[19-22].

The effect of intravaginal Honey on dyspareunia improvement could also be attributable to the hormone like properties of Honey, which would be the cause of sense of improvement in the group of patients, whom the complain of dyspareunia, is mainly due to vaginal dryness. It has been suggested before in previous studies that honey can be used as an alternative for Hormone replacement therapy[17].

In a previous study, Bee pollen and honey were tested for the alleviation of hot flushes and other menopausal symptoms in breast cancer patients, showed evidence that honey and bee pollen improve menopausal symptoms in breast cancer patients receiving antihormonal treatment. As it was observed there was an increase in the serum levels of estradiol with honey treatment in patients receiving aromatase inhibitors/inactivators[23].

Another study, Daily consumption of Tualang honey for 2 weeks in female adult ovariectomized rats, a model for menopausal symptoms, provided protective and beneficial effects. Tualang honey was shown to prevent uterine atrophy, vaginal epithelium atrophy, promote increased bone density and suppress the increased of body weight[17].

Also, another study aiming to assess the estrogenic activity of Manuka honey, proved Manuka honey to have estrogenic activity, as monitored using MCF-7 breast cancer cell growth promotion assay[24].

Candidate estrogenic components from honey are likely to be flavonoids. Past research showed that flavonoids mediate estrogenic activity[25-30].

In order to enumerate the benefits on applying Honey intravaginally, it should also be mentioned that intravaginal honey has been tried before in previous studies for infertility treatment. In a study byAbdelhafiz,*et al*. to evaluate the efficacy of pericoital intravaginal applications of a mixture of Egyptian bee honey and royal jelly (H/RJ) in the midcycle for the treatment of infertility due to asthenozoospermia, concluded that this might be a simple and reasonably effective method of treating asthenozoospermia[31].

Another study by Kavousi M., *et al*.[32] studying the effect of a natural vaginal product based on honey on the success of intrauterine insemination (IUI) in infertility treatment, concluded that it seems that the use of this vaginal product for a longer period of time and across several menses cycles before IUI, may produce more positive results.

Recommending Honey over Ky gel is related also to the rare but possible side effects that may occur with KY gel; Signs of an allergic reaction, like rash; hives; itching; red, swollen, blistered, or peeling skin with or without fever; wheezing; tightness in the chest or throat; trouble breathing, swallowing, or talking; unusual hoarseness; or swelling of the mouth, face, lips, tongue, or throat ,Signs of skin infection like oozing, heat, swelling, redness, or pain, Very bad skin irritation, Bleeding that is not normal from the affected part and Fever.

CONCLUSION

Honey is superior to Ky gel and with easy access just as the later. Honey can in addition help reduce infection symptoms such as excessive vaginal discharge and offensive discharge, which Ky gel can't do. As per our participants Honey didn't cause any sense of stickiness, nor did it flow again out of the vagina following application, which might be the reason holding some from trying it intravaginally, due to its sticky consistency. Accordingly, improving dyspareunia symptoms can be added to the many benefits of Honey. Applying honey intravaginally can help treat candidiasis, improve dyspareunia and may also benefit in treatment of infertility.

CONFLICT OF INTERESTS

There are no conflicts of interest.

REFERENCES

1. Lewis RW, Fugl-Meyer KS, Corona G, *et al*. Definitions/epidemiology/risk factors for sexual dysfunction. J Sex Med. 2010;7(4 pt 2):1598–1607.
2. Ferrero S, Ragni N, Remorgida V. Deep dyspareunia: causes, treatments, and results. Curr Opin Obstet Gynecol. 2008;20(4):394–399.
3. Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States: prevalence and predictors [published correction appears in JAMA. 1999;281(13):1174]. JAMA. 1999;281(6):537–544.
4. Eteraf-Oskouei T, Najafi M. Traditional and modern uses of natural honey in human diseases: A review. Iran J Basic Med Sci. 2013;16(6):731–742.
5. Alvarez-Suarez JM, Tulipani S, Diaz D, Estevez Y, Romandini S, Giampieri F, *et al*. Antioxidant and antimicrobial capacity of several monofloral Cuban honeys and their correlation with color, polyphenol content and other chemical compounds. Food Chem Toxic. 2010;48(8–9):2490–2499. doi: 10.1016/j.fct.2010.06.021.
6. Olaitan PB, Adeleke EO, Ola OI. Honey: a reservoir for microorganisms and an inhibitory agent for microbes. Afr Health Sci. 2007;7(3):159–165.
7. Ajibola A. Phd thesis. Johannesburg, South Africa: University of the Witwatersrand; 2013. Effects of dietary supplementation with pure natural honey on metabolism in growing Sprague-Dawley rats.
8. Atwa AA, AbuShahba RY, Mostafa M, Mohamed IH. Effect of honey in preventing gingivitis and dental caries in patients undergoing orthodontic treatment. Saudi Dent J. 2014;26(3):108–114. doi: 10.1016/j.sdentj.2014.03.001.
9. Molan P. Why honey is effective as a medicine. 1. Its use in modern medicine. Bee Wrld. 1999;80:79–92.
10. Basualdo C, Sgroy VS, Finola MM, Marioli J. Comparison of the antibacterial activity of honey from different provenance against bacteria usually isolated from skin wounds. Vet Microbiol. 2007;124:375–381.
11. Vit P, Huq F. Systematic reviews on interventions with honey in cancer. In: Vit P, Roubik DW, editors. Stingless bees process honey and pollen in cerumen pots. Facultad de Farmacia y Bioanálisis, Universidad de Los Andes; Mérida, Venezuela: 2013. pp. 1–9. http:123456789/35292

12. Watanabe K, Rahmasari R, Matsunaga A, Haruyama T, Kobayashi N. Anti-influenza viral effects of honey in vitro: potent high activity of manuka honey. Arch Med Res. 2014;45(5):359–365. doi: 10.1016/j.arcmed.2014.05.006.

13. Ajibola A. In: Physiological effects of natural honey on wounds in animals. 1st ed. Lynch S, editor. KG, Germany: LAP; 2014.

14. Israili ZH. Antimicrobial properties of honey. Am J Ther. 2014;21(4):304–323. doi: 10.1097/MJT.0b013e318293b09b.

15. Heppermann B. Towards evidence based emergency medicine: Best BETs from the Manchester Royal Infirmary. Bet 3. Honey for the symptomatic relief of cough in children with upper respiratory tract infections. Emerg Med J. 2009;26(7):522–523.

16. Meda A, Lamien EC, Millogo J, Romito M, Nacoulma OG. Ethnopharmacological communication therapeutic uses of honey and honeybee larvae in central Burkina Faso. J Ethnopharm. 2004;95:103–107.

17. Zaid SM, Sulaiman SA, Sirajudeen NM, Othman NH. The effects of tualang honey on female reproductive organs, tibia bone and hormonal profile in ovariectomised rats – animal model for menopause. BMC Compl Altern Med. 2010;10:82. doi: 10.1186/1472-6882-10-82.

18. Banaeian-Borujeni S1, Mobini GR, Pourgheysari B, Validi M.Comparison of the effect of honey and miconazole against Candida albicans in vitro,2013 Jul 30;2:57. doi: 10.4103/2277-9175.115800. eCollection 2013.

19. Küçük M, Kolayl S, Karaoğlu Ş, Ulusoy E, Baltac C, Candan F. Biological activities and chemical composition of three honeys.

20. Lusby PE, Coombes AL, Wilkinson JM. Bactericidal activity of different honeys against pathogenic bacteria. Arch Med Res. 2005;36:464–7.

21. Ozlugedik S, Genc S, Unal A, Elhan AH, Tezer M, Titiz A. Can postoperative pains following tonsillectomy be relieved by honey?: A prospective, randomized, placebo controlled preliminary study. Int J Pediatr Otorhinolaryngol. 2006;70:1929–34.

22. Boukraâ L, Bouchegrane S. Additive action of honey and starch against Candida albicans and Aspergillus niger. Rev Iberoam Micol. 2007;24:309–11.

23. Münstedt K, Voss B, Kullmer U, Schneider U, Hübner J.,Bee pollen and honey for the alleviation of hot flushes and other menopausal symptoms in breast cancer patients,Mol Clin Oncol. 2015 Jul; 3(4): 869–874. Published online 2015 May 4. doi: 10.3892/mco.2015.559

24. Khathleen Henderson *et al*.,Evaluation of Manuka Honey Estrogen Activity Using the MCF ... https://pdfs.semanticscholar.org/24f5/93e0a9e47b0abf3812d6599e596c98dae6e8.pdf1 Dec 2016 ... Aims: To assess the estrogenic activity of Manuka honey using the MCF7 cell ... supplemented with 10% charcoal stripped FBS and evaluated.

25. Miksicek RJ. Commonly occurring plant flavonoids have estrogenic activity. Mol. Pharmacol. 1993;44(1):37-43. PMID: 8341277

26. Zava DT, Duwe G. Estrogenic and antiproliferative properties of genistein and other flavonoids in human breast cancer cells in vitro. Nutr. Cancer. 1997;27(1):3140. PMID: 8970179

27. Le Bail JC, Varnat F, Nicolas JC, Habrioux G. Estrogenic and antiproliferative activities on MCF-7 human breast cancer cells by flavonoids. Cancer Lett. 1998;130(1):209-16. PMID: 9751276

28. Han DH, Denison MS, Tachibana H, Yamada K. Relationship between estrogen receptor-binding and estrogenic activities of environmental estrogens and suppression by flavonoids. Biosci Henderson *et al*.; JABB, 10(3): xxx-xxx, 2016; Article no.JABB.29887 10 Biotechnol Biochem. 2002;66(7):1479-87. PMID: 12224631 DOI: 10.1271/bbb.66.1479

29. van der Woude H, ter Veld MG, Jacobs N, van der Saag PT, Murk AJ, Rietjens IM. The stimulation of cell proliferation by quercetin is mediated by the estrogen receptor. Mol. Nutr. Food Res. 2005;49(8):763-71 PMID: 15937998 DOI: 10.1002/mnfr.200500036

30. Galluzzo P, Marino M. Nutritional flavonoids impact on nuclear and extranuclear estrogen receptor activities. Genes. Nutr. 2006;1(3-4):161-76. PMCID: PMC3454832 DOI: 10.1007/BF02829966

31. Abdelhafiz AT1, Muhamad JA.,Midcycle pericoital intravaginal bee honey and royal jelly for male factor infertility,Int J Gynaecol Obstet. 2008 May;101(2):146-9. doi: 10.1016/j.ijgo.2007.11.012. Epub 2008 Jan 28.

32. 32.Kavousi M, Khadem Ghaebi N, Najaf Najafi M, Mokaberinejad R, Feyzabadi Z, Salari R.Avicenna J Phytomed. 2019 Jul-Aug;9(4):310-321., PMID: 31309070