JOURNAL LA MEDIHEALTICO

VOL. 05 ISSUE 03 (643-649), 2024
DOI: 10.37899/journallamedihealtico.v5i3.1156

Literature Review: The Effect of Ajwa Date Fruit Consumption on Fasting Blood Sugar Levels in Perimenopausal Women

Elsa Amalia Hariandini[1,2], Nasrudin Andi Mappaware[2,3], Nasarudin Nawir[3,4], Arni Isnaini Arfah[5], Ida Royani[6], Zulfahmida[7]

[1]*Students of the Faculty of Medicine at Universitas Muslim Indonesia*
[2]*Ibnu Sina Hospital*
[3]*Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Muslim Indonesia*
[4]*Sawerigading Hospital Palopo City*
[5]*Department of Physiology, Faculty of Medicine, Universitas Muslim Indonesia*
[6]*Department of Nutrition, Faculty of Medicine, Universitas Muslim Indonesia*
[7]*Department of Biochemistry, Faculty of Medicine, Universitas Muslim Indonesia*

**Corresponding Author: Elsa Amalia Hariandini*
E-mail: elsaamalia0016@gmail.com

Article Info

Article history:
Received 1 March 2024
Received in revised form 27 March 2024
Accepted 29 May 2024

Keywords:
Fasting Blood Sugar
Ajwa Dates
Perimenopause

Abstract

The active substances contained in date extract such as flavonoids, steroids, phenols and saponins have an anti-diabetic function which is useful in controlling glycemic and fat in diabetes patients. Perimenopause is a poorly defined period of time that surrounds the final years of a woman's reproductive life, usually between the ages of 30 and 40. Insulin affects many hormones, including sex hormones (estrogen, progesterone, and testosterone). This hormonal imbalance can disrupt the balance of other hormones. In the basic principles of bioethics there are four aspects, namely beneficence, non-maleficence, autonomy and justice. Maqashid Al Shariat contains 5 values, namely Hifz ad din, hifz an nafs, hifz al maal, hifz al nasl, and hifz al aql. In the perspective of Islamic jurisprudence, it consists of five rules, namely Al Ageu bi Maqashida, La dharara wa laa dirara,, Al masyaqqah tajlibut, Al yaqinu la yuzalu bi syaq, and Al adatu muhakkamah. A 46 year old woman G1P1A0 Gravid 34 weeks with a history of regular menstruation every month. Blood pressure 110/80 mmHg with BMI 30.24 (Obes 2). The results of the fasting blood sugar examination were found to be 130 mg/dl. The diagnosis in this patient is diabetes mellitus. The treatment given to this patient is a regulated eating pattern and implementation of a diet pattern. In the bioethical perspective, it fulfills the non-maleficence aspect, the principles of fiqh are Al iau bi maqashida, La dharara wa laa dirara, and Al adatu muhakkamah.

Introduction

Ajwa dates, also known as Prophet's dates, are a type of dates grown in Saudi Arabia, particularly in Al-Madinah Al-Munawara, and hold significant value in treating several diseases. The chemical composition of Ajwa dates includes sucrose (3.2 g/100g), glucose (51.3 g/100g), fructose (48.5 g/100g), protein (2.91 g/100g), lipid (0.47 g/100g), and ash (3.34 g/100g). Among popular dates in Indonesia (Sukkari and Ajwa), Ajwa dates have the highest fructose content. Metabolism analysis was conducted on 12 types of dates from Saudi Arabia to determine the nutritional composition of each type of date. It was revealed that the highest phenolic content was found in Ajwa dates, while the highest flavonoid content was found in Ajwa dates followed by Saffawi dates. Active compounds found in date extracts such as

flavonoids, steroids, phenols, and saponins function as anti-diabetic agents. Research has shown that consuming dates benefits in glycemic and lipid control in diabetic patients.

In the Southeast Asian region, Indonesia ranks third with a diabetes diagnosis rate of 11.3%. According to Budiharsana (2017), data collection on diabetes mellitus patients aged ≥15 years showed a prevalence of diabetes mellitus in Indonesia based on doctor's diagnosis in those aged ≥15 years of 2%. In Budiharsana (2017), the prevalence of diabetes mellitus in women was higher than in men, at 1.78% versus 1.21%. Over the past five years, the prevalence in women has shown a slight increase compared to men.

The prevalence of diabetes mellitus increases with age, peaking at ages 55-64, and decreases after passing that age range. This increasing pattern occurred in Riskesdas 2013 and 2018, indicating that the older the age group, the greater the risk of diabetes. The increase from 2013 to 2018 occurred in the age groups of 45-54 years, 55-64 years, 65-74 years, and ≥75 years. Based on the above data, it can be concluded that the perimenopausal period indicates the onset of increased risk of diabetes mellitus, characterized by fluctuating hormones (Ahmad & Rosendale, 2022; Kopanos, 2021).

There is one marker, irregular menstruation, that can be used to objectively define and establish what is called the menopausal transition (Woods et al., 2021). This irregularity will be perceived by the patient as a period of menstruation that is skipped or longer duration (about 40-60 days) between periods. There is no universal pattern; each woman will experience changes that are characteristic of her own individuality (Kaiser & Trappes, 2021). According to women's health studies worldwide, changes in glucose homeostasis observed around menopause are associated with chronological aging rather than menopause itself (Nappi et al., 2022). However, follow-up from the same study concluded that lower premenopausal estradiol (E2) levels during early menopausal transition are associated with a 47% higher risk of diabetes, consistent with the role of ovarian aging. Insulin levels in premenopausal women increase in women with normal weight, overweight, and obesity.

Methods

The research conducted is a Literature Review with a Narrative Review design. The data used in this study are secondary data, including post-observation studies and various literature obtained through the internet, such as research findings from theses, national journals, international journals, Clinical Key, textbooks, and ebooks.

Result and Discussion

Table 1. Previous Research

Year of Publication	Title	Authors	Method	Results	Conclusion
2016	The Effect of Ajwa Date (Phoenix dactylifera L) Variety on Blood Glucose Levels in Type 2 Diabetes Mellitus Patients	Sri Pramesthi Wisnu Bowo Negoro	Quantitative study using pre-experimental approach with One-group pretest-posttest design.	In the research findings, it was observed that in group 1 (aged 46-60 years), the administration of Ajwa dates had an impact on blood glucose levels in patients with diabetes mellitus. The results showed an increase in blood glucose levels in the treatment group (patients with diabetes mellitus)	There was a significant difference in the increase in blood glucose levels before and after the administration of Ajwa dates in the age group of 46-60 years. There was no significant difference in blood glucose levels before and after the administration of Ajwa dates in the age group of 18-21 years. An increase in blood glucose levels was observed in the group of patients with diabetes mellitus. Meanwhile, a decrease was observed in the normal respondent group.

2021	The Effect of Ajwa Dates on the Increase of Hemoglobin Levels in Third Trimester Pregnant Women	Titin Yulianti, Iis Tri Utami	Quasi-experimental study	The research findings revealed that before being given Ajwa dates, the hemoglobin levels of 18 individuals in the intervention group averaged 10.32 g/dL. After being given Ajwa dates, the hemoglobin levels increased to an average of 10.79 g/dL. This study indicates that the hemoglobin levels of the respondents increased by 0.47 g/dL after being given Ajwa dates.	The administration of Ajwa date seed water extract at a dose of 10 ml (100g/L) daily continuously for 8 weeks can reduce blood glucose concentration in Streptozotocin (STZ)-induced diabetic rats
2018	The Effect of Ajwa Date Fruit Extract (Phoenix dactylifera L) on Blood Glucose Levels in Mouse Embryos (Mus musculus)	Nur Setianingsih	Experimental study using Completely Randomized Design (CRD)	The research findings indicate that there is no difference in blood glucose levels with the administration of various doses of Ajwa date fruit extract (Phoenix dactylifera L).	On average, there is no effect of administering Ajwa date fruit extract (Phoenix dactylifera L) at doses of 3, 5, and 7 grains for 5 days on blood glucose levels in mouse embryos (Mus musculus)
2018	The Effect of Various Doses of Ajwa Date Fruit Extract (Phoenix dactylifera) on Blood Glucose Levels in Pregnant Mice (Mus musculus)	Andita Febrianti	Experimental study using Completely Randomized Design (CRD)	Based on the data from blood glucose measurements in pregnant female mice after administration of date fruit extract, the lowest result was observed in group K7 (dose 7.28 mg/kgBW), which was 159±100.397 mg/dl, while the highest was seen in group K5 (dose 5.2 mg/kgBW), which was 192.67±73.734 mg/dl. Group K0 (control) had an average glucose level close to the average blood glucose level in group K7, which was 164±63.731 mg/dl, whereas group K3 had an average blood glucose level ranging from 179.17±45.83 mg/dl.	Based on the statistical analysis results, there was no significant difference observed in each group. The administration of Ajwa date fruit extract (Phoenix dactylifera) at doses of 3, 5, and 7 grains did not show statistically significant differences in blood glucose levels in pregnant mice (Mus musculus) in each group. The optimal dose in this study was found in the treatment group K7 (7.28 mg/kg BW mice), with an average of 159±100.397 mg/dl, as it was optimal in preventing an increase in blood glucose levels in pregnant mice.
2018	Study of Correlation between BMI and Fasting Blood Glucose in Perimenopausal Women	Shaugfta Aara, Meenakshi Shaarma, Wisnu Istanto	Analysis of Variance (ANOVA)	Based on the research findings, where a value of $p < 0.05$ is considered significant, it was found that the mean fasting blood glucose level in women with normal weight is 88.29 ± 9.87 mg/dl. Women who are overweight have an average fasting glucose level of 93 ± 19.36 mg/dl, while obese women have an average fasting glucose level of 112.26 ± 14.16 mg/dl.	There is a positive correlation between fasting blood glucose and BMI in perimenopausal women of normal weight and overweight, while a significant correlation is observed in obese perimenopausal women. This is because during perimenopause, insulin sensitivity decreases, especially with weight gain, and also through the menopausal transition, BMI and total body fat percentage significantly increase.

2020	Antidiabetic and Antinephropathic Potential of Ajwa Pit & Pulp (Phoenix dactylifera) in Alloxanized Diabetic Rats	Iram Imran, Imran Maqsood, Farwa Naqvi, Maryam Mansoor, Sadia Chiiragh	Analysis of Variance (ANOVA)	Based on the results, it was found that Ajwa pit significantly decreases serum glucose levels (348±67 vs 252±60 mg/dl), while the effect of Ajwa pulp is much less pronounced. Ajwa pulp does not significantly decrease serum glucose levels (348±67 vs 290±60 mg/dl).	Ajwa pit (seed) exhibits anti-hyperglycemic effects and strong protection against kidney damage caused by prolonged diabetes mellitus. The highest polyphenol, bioflavonoid, and antioxidant levels are considered responsible for these effects.
2021	Aqueous Ajwa Dates Seeds Extract Improves Memory Impairment in Type-2 Diabetes Mellitus Rats by Reducing Blood Glucose Levels and Enhancing Brain Cholinergic Transmission	Vasudeva Mani, Minhajul Arfeen, Sultan Sajid	Experimental method using control study	Based on the results of acute toxicity studies, there was a significant difference in the effect of Aqueous Ajwa Seeds Extract (AASE) between the first day [$F(4,25) = 34.88$, $p < 0.001$] and the thirtieth day [$F(4,25) = 34.52$, $p < 0.001$], indicating a decrease in blood glucose levels in Streptozotocin-Nicotinamide-induced Sprague Dawley (SD) rats. Additionally, administration of AASE at doses of 200 and 400 mg/kg increased plasma insulin levels in diabetic-induced rats.	The administration of AASE at doses of 200 and 400 mg/kg in Sprague Dawley (SD) rats reduced blood glucose levels and increased plasma insulin levels.
2022	The Effect of Date Consumption on Blood Glucose Levels After Breaking the Fast in Medical Students of UMI	Rajabul Haery, Nurfachanti Fattah, Rachmat Faisal Syamsu, Shulhana Mokhtar, Nesyana Nurmadila	Analytical method with Comparative Test	Results of the research showed that blood glucose levels in all 140 respondents (100%) were within normal range, as fasting blood glucose levels were found to be <110 mg/dl. It can be observed that the number of subjects during pre-test and post-test remained the same, with 140 participants in both instances. The mean blood glucose level during pre-test was 86.02 mg/dl with a standard deviation of 7.211.	Based on the results and discussions presented above, the average blood glucose level before breaking the fast with dates among medical students of Universitas Muslim Indonesia, batch 2017, was 86.02±7.211 mg/dl. The average blood glucose level after breaking the fast with dates among medical students of Universitas Muslim Indonesia, batch 2017, was 121.24±6.314 mg/dl. Furthermore, based on the Wilcoxon test, a significant value of $0.000 < 0.05$ was obtained, indicating an increase in blood glucose levels before and after breaking the fast.

In women entering perimenopause, estrogen and progesterone levels usually fluctuate irregularly, leading to unstable blood glucose levels. The ovaries produce fewer eggs. Estrogen decreases and insulin resistance begins to occur, causing an increase in blood glucose levels, while sometimes a decrease in progesterone makes cells more sensitive to insulin, leading to a decrease in blood glucose levels. Ajwa dates, rich in primary metabolites such as sugars and proteins, have lower glucose levels compared to fructose, making them safe for individuals with glucose modulation issues, such as type II diabetes. Ajwa dates have a moderate glycemic index, thus being safe for diabetic patients. Active components in Ajwa date seed extract, especially flavonoids, tannins, saponins, cardiac glycosides, steroids, palmitate, oleic acid, and stearate, function as anti-diabetic agents.

From Putra (2022) research titled "The Effect of Ajwa Date (Phoenix dactylifera L) Consumption on Blood Sugar Levels in Type 2 Diabetes Mellitus Patients," the findings reveal an increase in blood sugar levels in group one, consisting predominantly of type 2 diabetes mellitus patients, with 14 individuals (87.5%) being female, and with an average age range of respondents between 46 and 60 years old. Conversely, a decrease in blood sugar levels is observed in group two, comprising healthy individuals, with 11 individuals (57.89%) being male, and with an average age range of respondents between 18 and 21 years old.

From Hasan & Mohieldein (2016) study titled "In Vivo Evaluation of Anti-Diabetic, Hypolipidemic, and Antioxidative Activities of Saudi Date Seed Extract on Streptozotocin-Induced Diabetic Rats," the results indicate changes in blood glucose levels in normal rats and diabetic rats after treatment with date seed extract. Statistical analysis using the Student's t-test for continuous variables yielded a p-value of <0.001, suggesting a significant relationship between the administration of Ajwa date seed extract and a significant decrease in blood glucose levels in diabetic rats. This is attributed to the significant reduction in blood glucose concentration in Streptozotocin-induced diabetic rats over an 8-week period. Additionally, the study reflects better glycemic control and insulin levels, as well as a significant decrease in body weight in Streptozotocin-induced diabetic rats due to the loss of structural protein.

Based on Setianingsih (2018) study titled "The Effect of Ajwa Date (Phoenix dactylifera L.) Fruit Pulp Extract on Blood Glucose Levels in Mouse (Mus musculus) Embryos," the findings reveal that there is no significant difference in blood glucose levels with the administration of various doses of Ajwa date fruit pulp extract (Phoenix dactylifera L.). Although there is no increase in blood glucose levels in embryos, it does not imply an absence of difference altogether. There are differences among the groups of administration, but they are not meaningful. Additionally, this study is supported by previous research conducted by Andita Febrianti et al. (2018), where the One Way ANOVA test yielded a value of p=0.8555 (p> 0.05). This indicates that there is no statistically significant difference in blood glucose levels in pregnant mice (Mus musculus) after the administration of Ajwa date extract (Phoenix dactylifera).

From Pranita et al. (2011) study titled "Study of Correlation of BMI with Fasting Blood Glucose in Perimenopausal Women," the results show that the mean fasting blood glucose in women with normal weight is 88.29 (SD .) + 9.87) mg/dl. Overweight women have an average glucose level. Thus, it can be concluded that the study demonstrates a positive correlation between fasting blood glucose and BMI in perimenopausal women of normal weight and overweight, while a significant correlation is observed in obese perimenopausal women. Furthermore, fasting plasma glucose levels predict further diabetes risk and related diseases in perimenopausal women.

From Imran et al. (2020) study titled "Antidiabetic and Antinephropathic Potential of Ajwa Pit & Pulp (Phoenix dactylifera) in Alloxanized Diabetic Rats," the results indicate a significant change where Ajwa date seeds significantly decrease serum glucose levels. Statistical analysis using one-way Analysis of Variance (ANOVA) and Tukey's test for all group differences and comparisons yielded a p-value of <0.05, which is considered statistically significant. This is supported by research conducted by Ahmed et al. (2017) which demonstrates that orally administered date fruit suspension reduces severe hyperglycemia in alloxan-induced diabetic animals. The dietary fiber along with fructose present in dates (low glycemic index) reduces carbohydrate absorption rates, decreases insulin demand, and controls blood glucose levels.

From Vasudeva Mani et al. (2022) study titled "Aqueous Ajwa dates seeds extract improves memory impairment in type-2 diabetes mellitus rats by reducing blood glucose levels and enhancing brain cholinergic transmission," significant differences are observed indicating a decrease in blood glucose levels in streptozotocin-nicotinamide-induced Sprague Dawley (SD)

rats with the administration of AASE (Aqueous Ajwa seeds extract) at doses of 200 and 400 mg/kg. Treatment with AASE (Aqueous Ajwa seeds extract) reduces blood glucose levels. This is corroborated by previous research showing that date seed extract can protect liver tissue against diabetic cytotoxic damage, which may be involved in maintaining glucose and insulin metabolic homeostasis and increasing their levels.

Conclusion

Based on the findings from several relevant studies on "The Effect of Ajwa Dates Consumption on Fasting Blood Glucose Levels in Perimenopausal Women," it can be concluded that Ajwa dates have beneficial effects in lowering blood glucose levels. This conclusion is drawn from 8 journal studies which indicate that Ajwa dates have a low glycemic index, thus stabilizing and controlling blood glucose levels in the body. Therefore, it is highly recommended for consumption by adolescents up to perimenopausal women.

References

Ahmad, S. R., & Rosendale, N. (2022). Sex and gender considerations in episodic migraine. *Current pain and headache reports*, *26*(7), 505-516. https://doi.org/10.1007/s11916-022-01052-8

Ahmed, S., Khan, R. A., Jamil, S., & Afroz, S. (2017). Antidiabetic effects of native date fruit Aseel (Phoenix dactylifera L.) in normal and hyperglycemic rats. *Pakistan journal of pharmaceutical sciences*, *30*(5).

Budiharsana, M. (2017). Risk differences between elderly men and women toward doctor-diagnosed diabetes mellitus in urban areas in Indonesia: 2013 National Basic Health research data. *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal)*, *12*(1), 15-21.

Febrianti, A., Biologi, P. S., Sains, J., Sains, F., Teknologi, D. A. N., Islam, U., & Sunan, N. (2018). Pengaruh Pemberian Berbagai Dosis Ekstrak Daging Buah Kurma Ajwa (Phoenix Dactylifera) Terhadap Kadar Glukosa Darah Mencit (Mus Musculus) Bunting. *Under-graduate, Universitas Islam Negeri Sunan Ampel Surabaya*.

Hasan, M., & Mohieldein, A. (2016). In vivo evaluation of anti diabetic, hypolipidemic, antioxidative activities of Saudi date seed extract on streptozotocin induced diabetic rats. *Journal of clinical and diagnostic research: JCDR*, *10*(3), FF06. https://doi.org/10.7860/JCDR/2016/16879.7419

Imran, I., Butt, I. M., Naqvi, F., Mansoor, M., & Chiragh, S. (2020, December). Antidiabetic and antinephropathic potential of Ajwa pit & pulp (Phoenix dactylifera) in alloxanized diabetic rats. In *Proceedings* (Vol. 34, No. 1, pp. 39-43). https://doi.org/10.47489/p000s341z7401-5mc

Kaiser, M. I., & Trappes, R. (2021). Broadening the problem agenda of biological individuality: individual differences, uniqueness and temporality. *Biology & Philosophy*, *36*(2), 15. https://doi.org/10.1007/s10539-021-09791-5

Kopanos, S. (2021). *Association of menopausal symptoms with metabolic profile: A mixed-effects model analysis of a large cohort of postmenopausal women* (Doctoral dissertation, Aristotle University Of Thessaloniki).

Mani, V., Arfeen, M., Sajid, S., & Almogbel, Y. (2022). Aqueous Ajwa dates seeds extract improves memory impairment in type-2 diabetes mellitus rats by reducing blood glucose levels and enhancing brain cholinergic transmission. *Saudi Journal of Biological Sciences*, *29*(4), 2738-2748. https://doi.org/10.1016/j.sjbs.2021.12.060

Nappi, R. E., Chedraui, P., Lambrinoudaki, I., & Simoncini, T. (2022). Menopause: a

cardiometabolic transition. *The Lancet Diabetes & Endocrinology*, *10*(6), 442-456. https://doi.org/10.1016/S2213-8587(22)00076-6

Pranita, A., Phadke, A. V., Singh, R., & Joshi, A. R. (2011). Correlation of BMI with fasting blood glucose in perimenopausal women. *Indian journal of physiology and pharmacology*, *55*(4), 390-391.

Putra, M. F. E. (2022). *Perbedaan Pengaruh Buah Kurma Ajwa (Phoenix Dactylifera) Dan Nasi Putih (Oriza Sativa L.) Ir 64 Terhadap Kadar Gula Darah Pada Penderita Diabetes Melitus Tipe 2 Di Puskesmas Kasihan 2 BantuL* (Doctoral dissertation, Universitas Muhammadiyah Yogyakarta).

Setianingsih, N. (2018). Pengaruh Pemberian Ekstrak Daging Buah Kurma Ajwa (Phoenix Dactylifera L.) Terhadap Kadar Glukosa Darah Embrio Mencit (Mus Musculus). *Universitas Islam Negeri Sunan Ampel Surabaya*.

Woods, N. F., Mitchell, E. S., Coslov, N., & Richardson, M. K. (2021). Transitioning to the menopausal transition: a scoping review of research on the late reproductive stage in reproductive aging. *Menopause*, *28*(4), 447-466. https://doi.org/10.1097/GME.0000000000001707