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Glaucoma Risk Factors

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ABSTRACT

Background: Glaucoma is the second leading cause of blindness for over 70 million people worldwide. Bilateral blindness occurs with an estimated 10%. In Indonesia, the prevalence of glaucoma is 0,46%. That means, that 4 to 5 out of 1.000 people suffer from glaucoma.
Content: The aim of this study was to analyze four risk factors that can affect the occurrence of glaucoma, namely age factor with diabetes and hypertension history, gender, family medical history, and race. This research used a literature review from 20 journals containing four risk factors for glaucoma. The results showed that diabetes and hypertension are often found in the elderly and that glaucoma symptoms can be exacerbated by increased intraocular pressure. Moreover, glaucoma patient with a positive family medical history of glaucoma has a higher value of intraocular pressure than glaucoma patients without the positive family medical history of glaucoma. Other results showed that men are more at risk because they have a different axial length than women, and Asians are considered riskier than Europeans because Asians' awareness of eye health is very low.
Conclusion: Based on the review, four risk factors could greatly affect the occurrence of glaucoma.

Keywords: Blindness; glaucoma; intraocular pressure; open-angle; risk factors

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Introduction

Glaucoma is a progressive degeneration of eye nerve damage caused by blockage of the eye's fluid flow system (aqueous humor). Aqueous humor is a natural fluid that plays a role in protecting the shape of the eye, supplying nutrients, and sterilizing dirt in the eye. The pressure inside the eyeball will remain normal if the fluid in the eyeball is absorbed periodically to avoid accumulation. However, if there is a build-up of fluid, the pressure on the eyeball will increase and cause damage to the optic nerve fibers. The symptoms can include visual disturbances with reduced visual fields, pain in the eyes, to headaches. These symptoms are often not noticed by patients in the early stages because has no significant effect. However, the patient will realize it after experiencing severe visual disturbances or even blindness. Each glaucoma patient has a different disorder in pathoglaucos, risk factors, treatment, manifestations, non-specificity, and prognosis.[1;2;3] In general, glaucoma is classified into two types, namely primary and secondary glaucoma. The most common primary glaucoma in the world is primary open-angle and angle-closure glaucoma.[4]

The prevalence of glaucoma worldwide is estimated at 10% who are bilaterally blind. In Indonesia, the prevalence of glaucoma was 0,46%, which means that 4 to 5 people out of 1.000 Indonesians had glaucoma. Based on online hospital application information (SIRS online), the number of glaucoma visits has increased the incidence of glaucoma during the period 2015-2017.[2] The prevalence of glaucoma will increase if it is influenced by several factors, such as age, gender, race, family history, and history of comorbidities (diabetes mellitus and hypertension) and a history of the eye examination.[1]

Subheading 1

The method used a literature review, where the literature search was carried out on several databases using an electronic-based that is accredited/indexed by Sinta/Scopus, such as Science Direct, Pubmed, Ministry of Health Data Center, and other database sources. The inclusion criteria in the study include a minimum of 20 reference articles or journals with the last 10 years published, internationally and nationally accredited and relevant to the topic of this research, while the exclusion criteria include articles or journals that do not have an ISSN.

Research or case studies that relate to glaucoma risk factors were obtained as a result of data analysis in this study. There are 20 studies from international journals. Based on the 20 studies, consist of nine journals discussed the age factor with diabetes and hypertension so that it can affect the development glaucoma. The nine journals used several methods, such as systematic review and meta-analysis, cross-sectional, imaging and clinical, retrospective case-control and longitudinal. The results from the nine journals showed that the elderly group is riskier of developing glaucoma because there are supporting risk

factors, such as comorbidities due to increasing age and the more susceptible to diabetes and hypertension to develop glaucoma. In addition, there were five journals that discussed the effect of gender factors on the developing glaucoma. The methods in that five journals were case-control, longitudinal cohort, cross-sectional, clinical and observational and retrospective. The results from five journals showed that men are riskier of developing glaucoma than women, although there was one journal that says that women are riskier of developing glaucoma. However, biologically, men are riskier.

Six other journals discussed family history and race, two journals discussed the effect of family history on glaucoma and four discussed the effect of race on glaucoma. Two journals discuss the effect of family history factors using cross-sectional methods and case reports of comparative studies. The results from these two journals showed that positive family history is strongly associated with the incidence of primary open-angle glaucoma and primary angle-closure, especially among first-degree relatives. Then, four journals that discussed the effect of race factors used prospective, cohort, cross-sectional observational and systematic review methods. The results from four journals showed that the incidence of glaucoma in Asia is higher than in Europe.

Subheading 2

Research related to glaucoma risk factors was obtained as a result of data analysis in this study. There were 20 related journals. The explanation for each journal can be seen in Table 1.

Table 1. Glaucoma Risk Factors Data Analysis

Factor	Method	Result
Age factor with diabetes and hypertension history	Imaging and clinical	The mean age of patients with primary open angle glaucoma and open glaucoma was 73.2 ± 11.16 and 67.8 ± 9.9, respectively. The relationship between the two was very statistically significant. In their study, researchers compared age groups, where the age group of 50-59, 60-69, 70-79 and ≥ 80 respectively had about 2,051 times, 3,283 times, 5,474 times, and 6,972 times more exposure to primary open-angle glaucoma.[5]
	Systematic review and meta-analysis	Diabetes mellitus is another risk factor associated with primary open angle closure and is often found in the elderly. Researchers said that the results of case-control studies or cohort studies had about

Factor	Method	Result
		1.4 times greater risk of developing

			primary open-angle glaucoma.[6]
		Cross-sectional	The prevalence rates in diabetic, pre-diabetic, and non-diabetic patients with glaucoma at ≥ 40 years of 9.5%, 3.5% and 2.6% respectively.[7]
		Cross-sectional and case control	Diabetics were more often found to have glaucoma with an average age of 59.6 ± 8.11.[13]
		Prospective study	Hypertension is a comorbid condition that generally affects the elderly, especially people with glaucoma. Researchers found that 56% of hypertensive patients with an average age of 58.7 had glaucoma. The investigators said that the association between hypertension and primary open angle glaucoma was 13.95%.[8]
		Retrospective case control	Hypertension increased the risk of glaucoma severity by 31%.[9]
		Cross-sectional observational	There was a difference between the value of intraocular pressure in hypertensive patients and controls. The value showed 15.37 ± 2.01 mmHg and 13.41 ± 2.82 mmHg.[10]
		Longitudinal study	The value of intraocular pressure in hypertensive patients of 15.4 ± 3.0 mmHg was strongly associated with the formation of glaucoma, cribrosa and axoplasmic flow disturbance.[11]
	Gender	Case-control	Men had about 1.64 times riskier of developing primary open angle glaucoma.[12]
		Cross-sectional	Men are riskier due to hormonal factors (not having estrogen) and health factors, as well as environmental conditions that allow them to experience an increase in intraocular pressure.[13]
		Retrospective	Women can be riskier of developing glaucoma, with a percentage of 54.5% of 1,000 participants.[14]
		Retrospective longitudinal cohort	Estrogen treatment was able to reduce the risk of developing primary open angle glaucoma in the long term until the woman experienced menopause.[15]
		Clinical study and observation	Estrogen treatment was able to reduce intraocular pressure by 0.5 mmHg in elderly women, while pregnant women in the third trimester were able to reduce intraocular pressure by 10% due to an increase in estrogen and progesterone.[16]
	Family Medical History	Cohort	The relationship between glaucoma and a positive family history of glaucoma is very strong in the relationship between

			siblings, mothers, fathers or children who have glaucoma.

Factor		Method	Result
			Researchers found that participants who had a positive family history of glaucoma had intraocular pressure values > 30 mmHg and retinal nerve fiber layer thickness > 80 µm. Another result found that 35% of the subjects in the study had a positive family history of glaucoma from a first-degree relative.[17]
		Cross-sectional	A positive family medical history of glaucoma can be derived from a first-degree relative. Researchers showed that there were 55.5% of men had primary open angle glaucoma from first-degree relatives. Moreover, someone with a positive family history of glaucoma has about 7-15 times more risk of developing glaucoma.[18]
		Comparative case report	25% of primary angle closure patients and 21.5% of primary open angle glaucoma patients got the disease from one family member. In other words, primary angle closure was found in the relationship with parents and primary open angle glaucoma was found in the relationship between siblings and offspring.[19]
Race		Prospective	The incidence of glaucoma in Europe, especially acute angle closure occurred in Scotland with a percentage increase of 29% and 31% in 2012 and 2013. However, when compared with the prevalence in Asia (Singapore), Scotland has decreased prevalence of 46% (1998-2012). In other words, the Chinese race had a higher prevalence of primary angle closure glaucoma.[20]
		Cohort	The prevalence of glaucoma in Northern Ireland is similar to that of the rest of the European population, with an estimated prevalence of 2.83%.[21]
		Cross-sectional	The prevalence of glaucoma in Asia was higher than in Europe. It was found that nearly 10,000 Asian populations were affected by glaucoma.[22]
		Systematic review and meta-analysis	The highest prevalence of glaucoma was found in East Asia and Central South Asia, which was 65.2%. This is caused by the increasing population and lack of awareness of eye health. In contrast to Europe, where in Europe has communities that are concerned with their own health so

that they can influence other individuals to be aware of a disease.[23]

Conclusion

Based on the results of the literature review, it can be concluded that the prevalence of glaucoma is different in each region in the world. This is influenced by factors of age, gender, family medical history and race. From these four factors, it was found that age of > 40 with a history of diabetes mellitus and hypertension as well as a family medical history can increase the risk of developing glaucoma. Likewise, with gender, where men are more at risk of developing glaucoma, and based on race, Asians are considered more at risk of developing glaucoma.

Conflicts of Interest

None

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References

1. Rayungsista A. Characteristics of Primary Glaucoma in Eye Clinic of RA Basoeni Hospital, Mojokerto, Indonesia. Folia Medica Indonesiana. 2018 Oct 12;54(3):172.
2. Sunderland S. Physiology, Aqueous Humor Circulation.
3. Schuster AK, Erb C, Hoffmann EM, Dietlein T, Pfeiffer N. The diagnosis and treatment of glaucoma. Deutsches Arzteblatt International. 2020 Mar 27;117(13):225–34.
4. Pusat Data dan Informasi Kementrian Kesehatan RI. infoDatin_glaukoma_2019.
5. Gálvez-Rosas A, Serrano-Miranda AT, Ridaura-Valencia C, Mundo-Fernández EE, Barojas-Weber E. Association of risk factors with primary open angle glaucoma in adults over the age of 40. Gaceta de Mexico. 2019 Jan 30;154(1).
6. Zhou M, Wang W, Huang W, Zhang X. Diabetes mellitus as a risk factor for open-angle glaucoma: A systematic review and meta-analysis. PLoS ONE. 2014 Aug 19;9(8).
7. Zhao D, Cho J, Kim MH, Friedman D, Guallar E. Diabetes, glucose metabolism, and glaucoma: The 2005-2008 National Health and Nutrition Examination Survey. PLoS ONE. 2014 Nov 13;9(11).
8. Kumar U, Kumar Sharma D, Author C. To Determine the Clinical Association between Glaucoma and Systemic Hypertension, as well as the Impact on Visual Morbidity.
9. Kuang TM, Xirasagar S, Kao YW, Shia BC, Lin HC. Association of Systemic Hypertension With Primary Open-angle Glaucoma: A Population-based Case-Control Study. American Journal of Ophthalmology. 2020 Oct 1;218:99–104.
10. Deb A, Kaliaperumal S, Rao V, Sengupta S. Relationship between systemic hypertension, perfusion pressure and glaucoma: A comparative study in an adult Indian population. Indian Journal of Ophthalmology. 2014 Sep 1;62(9):917–22.
11. Chua J, Chee ML, Chin CWL, Tham YC, Tan N, Lim SH, et al. Inter-relationship between ageing, body mass index, diabetes, systemic blood pressure and intraocular pressure in Asians: 6-year longitudinal study. British Journal of Ophthalmology. 2019 Feb 1;103(2):196–202.
12. Khachatryan N, Pistilli M, Maguire MG, Salowe RJ, Fertig RM, Moore T, et al. Primary open-angle African American Glaucoma Genetics (POAAGG) study: Gender and risk of POAG in African Americans. PLoS ONE. 2019 Aug 1;14(8).
13. Vinitha KR, Sreenivas SB. Gender difference in ocular pressures among prehypertensive individuals. International Journal of Current Research and Review. 2021 Jan 1;13(1):56–8.
14. Othman TM, Ahmed M, Hafez A, Hewady A. conditions of the Creative Commons Attribution (CC BY-SA) license (http://creativecommons.org/licenses/by/4.0/) Gender and Glaucoma: Findings from a Hospital-based Study in Upper Egypt [Internet]. Vol. 83, The Egyptian Journal of Hospital Medicine. 2021. Available from: https://ejhm.journals.ekb.eg/
15. Newman-Casey PA, Talwar N, Nan B, Musch DC, Pasquale LR, Stein JD. The potential association between postmenopausal hormone use and primary open-angle glaucoma. JAMA Ophthalmology. 2014;132(3):298–303.
16. Vajaranant TS, Maki PM, Pasquale LR, Lee A, Kim H, Haan MN. Effects of Hormone Therapy on Intraocular Pressure: The Women's Health Initiative-Sight Exam Study. American Journal of Ophthalmology. 2016 May 1;165:115–24.
17. O'Brien JM, Salowe RJ, Fertig R, Salinas J, Pistilli M, Sankar PS, et al. Family History in the Primary Open-Angle African American Glaucoma Genetics Study Cohort. American Journal of Ophthalmology. 2018 Aug 1;192:239–47.
18. Rajendrababu S, Gupta N, Vijayakumar B, Kumaragurupari R, Krishnadas SR. Screening first degree relatives of persons with primary open angle glaucoma in India. Journal of Current Glaucoma Practice. 2014 Sep 1;8(3):107–12.
19. Kong X, Chen Y, Chen X, Sun X. Influence of family history as a risk factor on primary angle closure and primary open angle glaucoma in a Chinese population. Ophthalmic Epidemiology. 2011 Oct;18(5):226–32.
20. Chua PY, Day AC, Lai KL, Hall N, Tan LL, Khan K, et al. The incidence of acute angle closure in Scotland: A prospective surveillance study. British Journal of Ophthalmology. 2018 Apr 1;102(4):539–43.
21. McCann P, Hogg R, Wright DM, Pose-Bazarra S, Chakravarthy U, Peto T, et al. Glaucoma in the Northern Ireland Cohort for the Longitudinal Study of Ageing (NICOLA): Cohort profile, prevalence, awareness and associations. British Journal of Ophthalmology. 2020 Nov 1;104(11):1492–9.
22. Tham YC, Lim SH, Gupta P, Aung T, Wong TY, Cheng CY. Inter-relationship between ocular perfusion

pressure, blood pressure, intraocular pressure profiles and primary open-Angle glaucoma: The Singapore Epidemiology of Eye Diseases study. British Journal of Ophthalmology. 2018 Oct 1;102(10):1402–6.
23. Chan EWE, Li X, Tham YC, Liao J, Wong TY, Aung T, et al. Glaucoma in Asia: Regional prevalence variations and future projections. Vol. 100, British Journal of Ophthalmology. BMJ Publishing Group; 2016. p. 78–85.

CASE REPORT Open Access

Scarlet Fever- a Diagnostic Challenge for Physicians: a Case Report of Scarlet Fever, Hepatitis, and Sepsis in a 15 –year and 6 month– old Female Adolescent with Severe Acute Malnutrition

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ABSTRACT

Scarlet fever is a term used for an infection caused by a Group A Streptococcal bacteria. The early treatment of scarlet fever is strongly essential either to prevent further spreading of infection or to prevent the risk of complications consisting of peritonsillar and retropharyngeal abscess, sepsis, hepatitis, acute rheumatic fever, glomerulonephritis, pneumonia, endocarditis, and meningitis.

We present a case of scarlet fever with sepsis, hepatitis, and severe acute malnutrition in a 15 year and 6 months old female adolescent. Since the patient had specific clinical features of scarlet fever with continuous fever, sore throat, and productive cough since 4 days, followed by general red maculopapular rash initially from the head and progressively spreading to the rest of her body. The patient also diagnosed with sepsis, hepatitis, and severe acute malnutrition. Erythromycin, ursodioxycolic acid, vitamin C, folic acid, and vitamin b complex were given to the patient. Rapid diagnosis and prompt treatment are important to prevent other potential complications such as sepsis, abscess, and acute rheumatic fever. Early diagnosis of scarlet fever simultaneously with adequate treatment will prevent the complications of the disease and its spreading among other children

Keywords: Scarlet fever; sepsis; hepatitis; severe acute malnutrition; adolescent

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Introduction

Scarlet fever is a term used for an infection caused by a Group A Streptococcal bacteria presenting with exudative pharyngitis and maculo-papular rash.[1] Outbreak of the disease has been noted in 2009 in Vietnam and China figuring for 23,000 cases and 100,000 cases; respectively. Report of the outbreak was also documented in the UK covering 12,906 cases between September 2015 and April 2016.[2–5] The characteristic of 'strawberry tongue' or a 'raspberry tongue' accompanied by fever and maculo-papular rash is a common symptom of scarlet fever.[6,7] The early treatment of scarlet fever is strongly essential either to prevent further spreading of infection or to prevent the risk of complications consisting of peritonsillar and retropharyngeal abscess, sepsis, hepatitis, acute rheumatic fever, glomerulonephritis, pneumonia, endocarditis, and meningitis.[1,8–10]

The term 'severe acute malnutrition (SAM) has been used to diagnose children with severe wasting and kwashiorkor (also known as nutritional edema) and replaced the previous term of 'protein-energy malnutrition'.[11] In 2013, an estimated 2.9 million children under five were admitted globally for treatment of SAM. Children with SAM are nine times more likely to die than well-nourished children.[12] Children with malnutrition are at significantly higher risk of more severe disease and suffer significantly more acute and long-term morbidity and mortality when infected, including scarlet fever.[13] This report is to highlight the importance of early diagnosis and prompt treatment of scarlet fever in a malnourished child to prevent either risk of complications or the spreading of the disease among other children.

Case

A –15 years and 6 month- old female adolescent was referred on April 24, 2021 to Wahidin Sudirohusodo Hospital Makassar due to a general red rash spreading over her whole body one day before referring (Figure1). She complained of continuous fever, sore throat, and productive cough for 4 days, followed by a general red maculopapular rash initially from the head and progressively spreading to the rest of her body one day before admission. There was a previous history of amputation of her right leg due to osteosarcoma at the orthopedic of the Wahidin Sudirohusodo Hospital Makasar. There was no exposure to patients with Kawasaki syndrome as well as typhoid fever. The other history of illness was unremarkable.

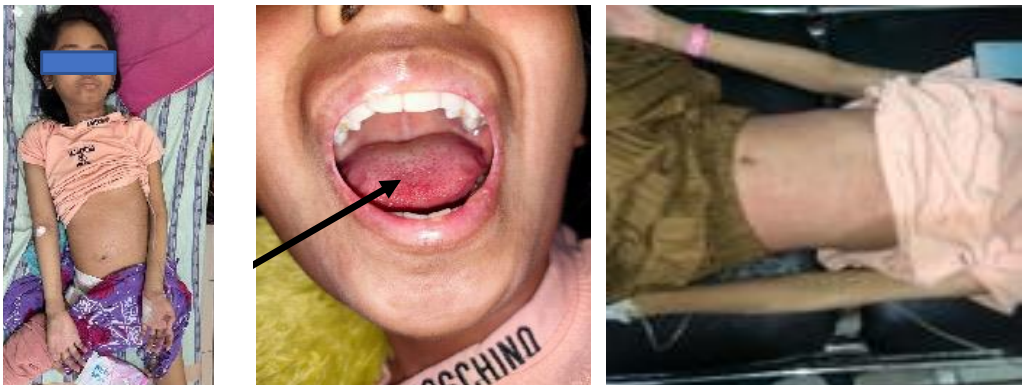

Fig 1. The patient and her strawberry tongue and general red maculopapular rash (black arrow)

The physical findings showed a severely ill, malnourished, and conscious female adolescent with the fever of 38.5^{0}C, blood pressure 90/60mmHg, pulse 104/min, respiration rate 24/min, Sp02: 99% room air, capillary refill time < 3 secs and pain scale 0. There were signs and symptoms of general maculopapular rash over the whole body, enlarged tonsils, pharyngeal hyperemic, strawberry tongue, absent of lymphadenopathy, ribs xylophone, wasting, and right leg amputation. The further examination of the abdomen, heart, and lungs documented normal findings. The nutritional status demonstrated a severe malnutrition adolescent with normal stature. (Fig1) The Center score for this patient was three consisting of fever 1, enlarged tonsils 1, and cough 1.

Laboratory examination showed Hb 14.3 g/dl, WBC 17.100/mm^3, platelet 247.000, blood glucose 123 mg/dl, ureum 18 mg/dl, creatinine 0.54 mg/dl, albumin 3.5 gr/dl, sodium 137 mmol/l, potassium 4.7 mmol/l, chloride 105 mmol/l, CRP 32.5 mg/l, procalcitonin 2.8 ng/ml, SGOT 806 U/L, SGPT 554 U/L, direct bilirubin 4.03 mg/dl, total bilirubin 5.62 mg/dl, alkali fosfatese 162 IU/L, gamma GT 90 IU/L and ASTO 328 IU/ml. Hepatitis examination: HbsAg, anti Hbs AG and anti HCV non-reactive. Blood culture: Klebsiella Pneumonia. Chest x ray and electrocardiograph showed normal impression.

Definitive diagnosis: Scarlet fever, hepatitis, sepsis and severe acute malnutrition. The patient was admitted with working diagnosis of scarlet fever based on examination and increased Anti-streptolysin O titer). The treatment for scarlet fever was erythromycin 250 mg/ 6 hours for streptococcus eradication because benzathine penicillin was not available. The patient had malnutrition, so she also received malnutrition management according to WHO guideline by giving F75 / 3 hours, vitamin C 50 mg / 12 hours, folic acid 1 mg / 24 hours, vitamin B complex 1 tablet / day. Sepsis resulted in blood culture results with Klebsiella pneumonia infection, therefore antibiotic ceftriaxone 1 gram / 12 hours was administered. The patient also had hepatitis resulting in jaundice and elevation of transaminase enzyme and bilirubin, so she also received ursodeoxycholic acid 250 mg/8 hours.

On the 9th day of treatment, her general condition was still weak but the rash decreased progressively

day by day. On the 22nd day of treatment, the general condition was good, the rash almost disappeared and signs of hepatitis were reduced. On day 26 of treatment, the patient recovered clinically with no more signs and symptoms of scarlatina, sepsis and hepatitis, she was discharged after completing the antibiotic therapy and further follow up was conducted at the child health policlinics of the Wahidin Sudirohusodo Hospital Makassar. The prognosis: Quo ad Vitam (survival), Quo ad sanationam (cured): Quo ad functionam (functional): bonam.

Discussion

Since our case presented with scarlet fever, SAM complicated with sepsis and hepatitis based on the clinic and laboratory features, therefore different from Kawasaki syndrome and typhoid fever. Our case presented with a history of 4 days of fever, sore throat, strawberry tongue, cough without mucous membrane exchanges, bilateral conjunctival injection, or cervical lymphadenopathy, which surely did not fulfill the criteria of Kawasaki syndrome.[14] Although Kawasaki syndrome may be accompanied by elevation of serum transaminase and hyperbilirubinemia but without pyuria and thrombocytosis on admission, we can ruled out the Kawasaki syndrome.[15] Typhoid fever was also ruled out due to no signs and symptoms of characteristic salmon-colored spots on trunk and abdomen, bradycardia,or exposure to patients with typhoid fever.[10] Hepatitis is a rare complication of scarlet fever in the pediatric population. The pathophysiologic mechanism is unclear. Direct bacterial injury, toxicity and immunologic mediation have been proposed. Liver biopsies in patients with scarlet fever have shown granulocytic infiltration of the portal areas and hepatocytic degeneration.[16] Diagnosis of Scarlet fever was mostly based on the clinical features and supported by the elevated ASO titer.[4] Since our patient presented with 4 days of fever, sore throat, cough, characteristic general maculopapular rash, and elevated ASO titer, the hepatitis was surely following the clinical presentation of Scarlet fever. On further follow-up, the liver transaminases were reduced day by day up to normal.

Malnutrition should be considered as a silent killer due to malnutrition potentially leading to the death of children every day as supported by one study estimating around 20 million severely acute malnourished children in the whole world and the report also showed approximately one million children die from severe acute malnutrition every year in the developing countries, more than 25% of children under five are undernourished that accounts about 143 million children.[17] Globally, 55 million children under the age of five are estimated to be wasted, of whom 19 million (35%) are severely wasted or severely malnourished.[18] Major contributing factors for severe malnutrition are poor child-feeding practices, infectious disease, poor hygiene and sanitation.[19] Co-existing infection increases the risk of death among severely malnourished children.[20] Wasting is an important indicator of acute malnutrition which impairs the immune response and predispose to invasive infection. Comorbidity of malnutrition makes the child more vulnerable to invasive

infection. Several previous studies have been shown to have a significant association between severe acute malnutrition with Klebsiella bacteremia.[21] The relationship between scarlet fever and malnutrition may be a mere coincidence or it may suggest that those weakened by some level of nutritional deficiency were particularly liable to be among victims of the disease.[22] In this patient, sepsis due to klebsiella infection and scarlet fever could be easily acquired due to the patient's malnourished condition which lowered the patient's immunity. Fortunately, our patient were diagnosed early and prompt adequate measurements was given to her to prevent the risk of other severe complications and especially death.

The physicians should be focusing on early recognition of scarlet fever and prompt treatment to prevent the complications due to a delay of diagnosis among older children were which frequency 2.8 times as likely when a sore throat was present at onset, with symptoms often resembled any viral infection.[23]

To the best of our knowledge, this case was the first case of scarlet fever and SAM complicated by sepsis and hepatitis in female adolescent in the Wahidin Sudirohusodo Hospital Makassar.

Conclusion

Early diagnosis and rapid treatment of scarlet fever are strongly important to prevent the potentially severe complications such as sepsis, hepatitis, acute rheumatic fever, glomerulonephritis, pneumonia, endocarditis, and meningitis. Early diagnosis of scarlet fever simultaneous with adequate treatment will prevent the complications of the disease and its spreading among other children. The physicians should be focusing on early recognition of scarlet fever and rapid treatment to prevent the potentially severe complications.

Declaration

Ethics Approval and Consent to Participate

DR Wahidin Sudirohusodo Hospital's ethics committee and review board has approved this study.

Consent for Publication

Written informed consent was obtained from the patient's legal guardian for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Authors' contributions

ANF, NMP and HA were responsible for the management of our patient; ANF, NMP and HA participated in the study design and coordination and helped draft the manuscript. All authors read and approved the final manuscript.

Conflict of Interests

The authors declare that they have no competing interests.

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Reference

1. Wessels MR. Pharyngitis and Scarlet Fever. In: Ferretti JJ, Stevens DL, Fischetti VA, editors. Streptococcus pyogenes : Basic Biology to Clinical Manifestations. Oklahoma City (OK); 2016.
2. Lu Q, Wu H, Ding Z, Wu C, Lin J. Analysis of Epidemiological Characteristics of Scarlet Fever in Zhejiang Province, China, 2004-2018. Int J Environ Res Public Health. 2019 Sep;16(18).
3. Ben Zakour NL, Davies MR, You Y, Chen JHK, Forde BM, Stanton-Cook M, et al. Transfer of scarlet fever-associated elements into the group A Streptococcus M1T1 clone. Sci Rep [Internet]. 2015;5(1):15877. Available from: https://doi.org/10.1038/srep15877
4. Basetti S, Hodgson J, Rawson TM, Majeed A. Scarlet fever: a guide for general practitioners. London J Prim Care (Abingdon) [Internet]. 2017 Aug 11;9(5):77–9. Available from: https://pubmed.ncbi.nlm.nih.gov/29081840
5. Sayers DR, Bova ML, Clark LL. Brief report: Diagnoses of scarlet fever in Military Health System (MHS) beneficiaries under 17 years of age across the MHS and in England, 2013-2018. MSMR. 2020 Feb;27(2):26–8.
6. Huang Y, Wen Y, Jia Q, Wang L, Cheng Q, Liu W, et al. Genome analysis of a multidrug-resistant Streptococcus sanguis isolated from a throat swab of a child with scarlet fever. J Glob Antimicrob Resist. 2020 Mar;20:1–3.
7. Muzumdar S, Rothe MJ, Grant-Kels JM. The rash with maculopapules and fever in children. Clin Dermatol. 2019;37(2):119–28.
8. Turner CE, Pyzio M, Song B, Lamagni T, Meltzer M, Chow JY, et al. Scarlet Fever Upsurge in England and Molecular-Genetic Analysis in North-West London, 2014. Emerg Infect Dis. 2016 Jun;22(6):1075–8.
9. Wong SSY, Yuen KY. Streptococcus pyogenes and re-emergence of scarlet fever as a public health problem. Emerg Microbes Infect [Internet]. 2012;1. Available from: https://doi.org/10.1038/emi.2012.9
10. Wang LY, Young T-H. Hepatitis, gallbladder hydrops, splenomegaly, and ascites in a child with scarlet fever. Pediatr Emerg Care. 2012 Nov;28(11):1215–7.
11. Bhutta ZA, Berkley JA, Bandsma RHJ, Kerac M, Trehan I, Briend A. Severe childhood malnutrition. Nat Rev Dis Prim. 2017 Sep;3:17067.
12. Department of Nutrition for Health and Development World Health Organization. Global Nutrition Targets 2025 Stunting Policy Brief. World Health organization. 2014.
13. Titi-Lartey OA, Gupta V. Marasmus [Internet]. StatPearls. 2020 [cited 2021 Aug 23]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK559224/#__NBK559224_dtls__
14. Son MBF, Newburger JW. Kawasaki disease. Pediatr Rev. 2013 Apr;34(4):151–62.
15. Fimbers AM, Shulman ST. Kawasaki Disease. Pediatr Rev. 2008;29(9):308–16.
16. Gidaris D, Zafeiriou D, Mavridis P, Gombakis N. Scarlet Fever and hepatitis: a case report. Hippokratia. 2008;12(3):186–7.
17. Mena MB, Dedefo MG, Billoro BB. Treatment Outcome of Severe Acute Malnutrition and Its Determinants among Pediatric Patients in West Ethiopia. Int J Pediatr. 2018;2018:8686501.
18. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, et al. Maternal and child undernutrition: global and regional exposures and health consequences. Lancet (London, England). 2008 Jan;371(9608):243–60.
19. Jamro B, Junejo AA, Lal S, Bouk GR, Jamro S. Risk Factors for Severe Acute Malnutrition in Children under the Age of Five Year in Sukkur. Pakistan Journal of Medical Research. 2012;51(4):111–3.
20. Ashworth A. Efficacy and effectiveness of community-based treatment of severe malnutrition. Food Nutr Bull. 2006 Sep;27(3 Suppl):S24-48.
21. Akhter S, Ahmed T, Sarker SA, Sarmin M, Shahid ASMSB, Shahunja KM, et al. Factors Associated with Klebsiella Bacteremia and Its Outcome in Under-Five Children Admitted with Diarrhea. Int J Pediatr. 2016;2016:4760610.
22. Curtis BSM, Curtis SM. Nutrition and Scarlet Fever Mortality during the Epidemics of 1860 – 90 : The Sundsvall Region. Social History of Medicine 2004;17(2):199–221.
23. Herdman MT, Cordery R, Karo B, Purba AK, Begum L, Lamagni T, et al. Clinical management and impact of scarlet fever in the modern era : findings sectional study of cases in from a cross- - London , 2018 – 2019. BMJ Open 2021;1–9.

CASE REPORT Open Access

Expanded Dengue Syndrome with Status Epilepticus in a Nine Months Old Boy: A Case Report

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ABSTRACT

Dengue fever is a major global public health challenge in tropical and subtropical countries. The clinical spectrum of dengue infection ranges from mild illness to the life-threatening severe forms of the disease with plasma leakage, severe bleeding, or multi-organ failure, which may be fatal. The term expanded dengue syndrome is used for atypical manifestations of dengue fever. This study presented a case of expanded dengue syndrome with status epilepticus in a 9-month-old boy hospitalized with the chief complaint decreased of consciousness with fever and seizures. From the physical examination, there was a decrease in consciousness with GCS 9 accompanied by fever, ascites, and gastrointestinal bleeding. On laboratory examination, hyponatremia, increased transaminase enzymes, and hypoalbuminemia with positive dengue IgM were found. The patient had specific clinical features of expanded dengue syndrome with status epilepticus the appropriate anti-convulsion, vasopressor, and fluid management was given to the patient.

In cases of dengue virus infection, it is important to prevent other potential complications such as expanded dengue syndrome with status epilepticus. Early diagnosis of expanded dengue syndrome simultaneously with adequate treatment will prevent the complications of the disease.

Keywords: Dengue; status epilepticus; infant

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Introduction

Dengue is one of the mosquito-borne viral infections as a result of single-stranded RNA virus infection which can be transmitted with the aid of using the Aedes aegypti and Aedes albopictus mosquito species.[1] Dengue fever is a major global challenge in subtropical and tropical countries. The case has been increasing 30 times globally between 1960 and 2010 due to population growth, global warming, urbanization, inefficient mosquito control, and lack of health care facilities. More than two billion people live in dengue-endemic regions, and approximately four hundred million infections arise annually, with mortality rates exceeding 5-20% in several regions.[2] As a tropical country in South East, Indonesia is 2 predominant mosquito vector species DENV, Aedes aegypti, and Ae. albopictus is endemic to nearly all regions.[3]

The presentation of dengue has various manifestations starting from asymptomatic infection, to intense bleeding, hemodynamic instability or even death. While fever, headache, malaise, bleeding manifestations, shock and hemoconcentration are regarded as manifestations of the disease, a typical conditions have additionally been reported, which might be now called expanded dengue syndrome.[4] Expanded dengue syndrome is used to describe cases that are neither dengue shock syndrome nor dengue hemorrhagic fever. The atypical symptoms of expanded dengue syndrome are multi-organ and multi-faceted, involving organs such as the liver, brain, heart, kidneys, and CNS. Neurological symptoms, which affect both the central and peripheral nervous systems, are more frequently observed and reported. Patients are characterized by encephalitis, meningitis, stroke (both hemorrhagic and ischemic), hypopotassic palsy, encephalopathy, seizures, mononeuropathy, polyneuropathy, and Guillain-Barre syndrome or Miller-Fisher syndromes. Expanded dengue syndrome carries a high rate of mortality and morbidity.[5,6] This report is to highlight the importance of early diagnosis and prompt treatment of expanded dengue syndrome with status epilepticus to prevent either risk of complications.

Case

A 9-month-old boy was referred on April 15, 2021 to Dr Wahidin Sudirohusodo Hospital Makassar due to a decrease of consciousness 2 hours before admission. There is a history of seizure 1 time with a duration of more than 30 minutes, all of the body, and after a seizure, the patient is unconsciousness. There was a fever in the last 5 days. There is dyspnea 3 hours before admission. There is vomiting 8 times and not projectile. History hospitalized at P Hospital for 1 day and received paracetamol 75 mg/8 hour/intravenous, ceftriaxone 750 mg/24 hour/intravenous, diazepam 5 mg/rectal and Ringer Acetate Fluid infusion 3 ml/kgBW/hour = 22.5 ml/hour. The patient was then discharged and referred to the emergency department at RSUP Dr Wahidin with diagnosed respiratory failure and seizure. There was dengue haemorrhagic fever in the environment where the patient lived.

The physical findings showed a severely ill, good nourished, and unconscious (GCS 9) with the fever of 38.5^{0}C, blood pressure 80/60mmHg, pulse 144/min, respiration 54/min, Sp02: 99%, capillary refill time > 3 secs and pain scale 0. There were signs and symptoms of bleeding manifestation (gastrointestinal bleeding from nasogastric tube). From the abdomen found ascites with shifting dullness examination and hepatomegaly. A further examination of the heart, lungs, and neurologic documented normal findings.

Laboratory examination showed Hb 6.4 g/dl, WBC 6.300/mm^3, platelet 20.000, blood glucose 150 mg/dl, urea 12 mg/dl, creatinine 0.28 mg/dl, albumin 2.9 gr/dl, sodium 116 mmol/l, potassium 4.4 mmol/l, chloride 94 mmol/l, SGOT 607 U/L, SGPT 160 U/L, dengue IgM positive and IgG negative.

The definitive diagnosis was expanded dengue syndrome, post status epilepticus, and anemia et caused by gastrointestinal bleeding. The patient was admitted with a working diagnosis of expanded dengue syndrome based on decreased of consciousness. The treatment for expanded dengue syndrome was fluid resuscitation, vasopressor and management of comorbidities. The patient had an imbalance electrolytes, thus he also received correction sodium fluid. Status epilepticus resulted from examination, therefore anti-convulsion was administered. The patient had also anemia caused by gastrointestinal bleeding, hence received a packed red cell transfusion.

On 4 days of hospitalization (fever days 8), the general condition was good and conscious with a vital sign within normal limits and ascites decreased. The prognosis: Quo ad vitam dubia, quo ad sanationam dubia and quo ad functionam bonam.

Discussion

Our case presented with 5 days of fever, status epilepticus, and anemia et caused by gastrointestinal bleeding. The classic symptoms of dengue have expanded by affecting different organ systems. Dengue must be considered as a probable diagnosis in patients who live in or recently traveled to a dengue-endemic area, presenting with fever and at least two of the following: nausea, vomiting, rash, aches and pains, positive tourniquet test, leukopaenia, or any of a set of defined warning signs (abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, mucosal bleeding, lethargy, restlessness, hepatomegaly, increase in hematocrit with rapid decrease in platelet count).[7]

In 2012, the World Health Organization (WHO) introduced a new term known as expanded dengue syndrome, with uncommon manifestations in different organs comparable to the cardiovascular system, the nervous system, the kidneys, the gut, and therefore the hematologic system. Recognizing the characteristics of expanded Dengue Syndrome (EDS) is critical in determining the appropriate treatment.[5,8] Atypical symptoms in patients with severe organ injuries such as liver, kidneys, brain, and heart associated with dengue fever are increasingly reported in patients with dengue hemorrhagic fever (DHF) and dengue fever

with no evidence of plasma leakage. These atypical symptoms could be associated with co-infection, complications, or complications of prolonged shock, and can be summarized in expanded dengue syndrome.[9]

Patients with gastrointestinal and hepatic system involvement are characterized by asymptomatic elevation of liver enzymes, fulminant liver failure, acute pancreatitis, acalculous cholecystitis, peritonitis, sub-acute intestinal obstruction (SAIO), and spleen rupture. Neuropathology may be associated with direct viral entry into the CNS, autoimmune responses, and metabolic changes. In an animal experimental study, it has been found that infection with the dengue virus damages the blood-brain barrier (BBB), indicating virus invasion. Autoimmune responses and metabolic changes have been observed in most neurological complications of dengue fever.[10] Liver injury could be caused by dengue virus infection. Dengue virus is hepatotropic, inflicting liver cell damage and elevated aminotransferases. The higher level of Aspartate aminotransferase (AST) than alanine aminotransferase level is possible because of myositis, and the release of AST from injured muscle cells.[11]

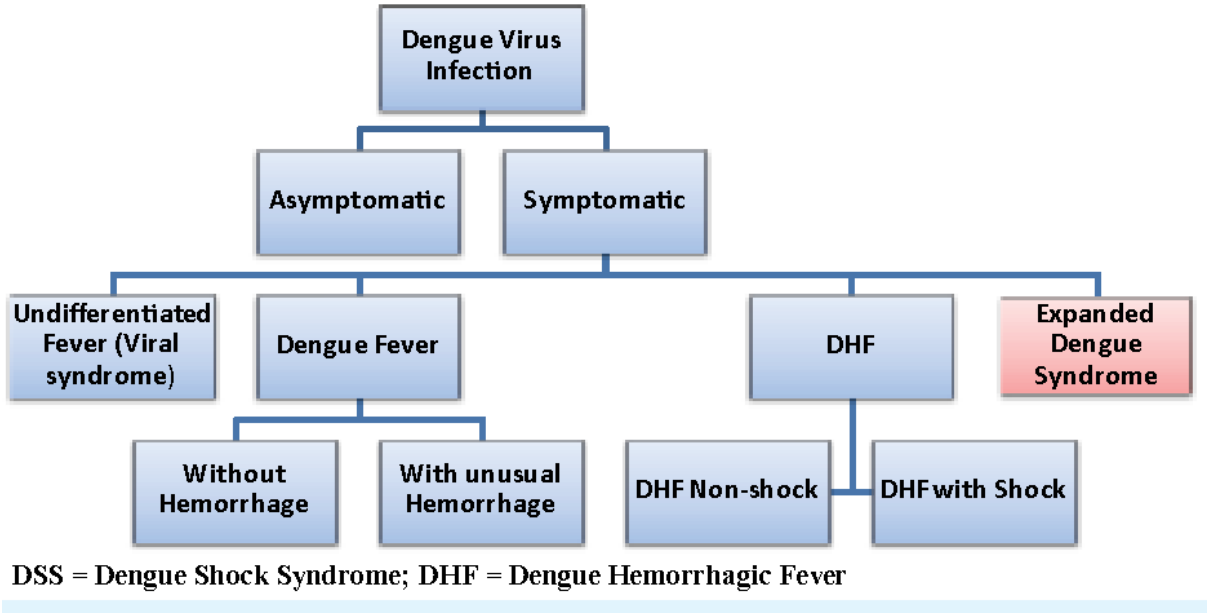

Fig. 1: Classification of dengue.[9]

Dengue fever is classified into undifferentiated fever, dengue fever (DF), and dengue hemorrhagic fever (DHF). If the fever is accompanied by at least two clinical findings, the diagnosis requires epidemiological or laboratory findings to prove the dengue virus infection. In the DHF definition, 4 criteria are required; fever, bleeding symptoms, thrombocytopenia (platelet count, ≤100,000 platelets / mm3), and evidence of plasma leakage. Supporting laboratory finding does not require to diagnose DHF.[12] Expanded dengue syndrome includes severe organ injury such as the liver, kidneys, brain, and heart associated with dengue infection.[13]

Laboratory diagnostics for confirming dengue virus infection may include the detection of viruses, viral nucleic acids, antigens or antibodies, or a combination of these. The IgM antibody was the first immunoglobulin isotype to emerge. These antibodies are detectable in fifty percent of the patients by day 3-5 after onset, increasing to 80% by day 5, and 99% by day 10. The level of IgM peaked in 2 weeks after the onset of symptoms, and decreased to levels that are generally undetected for 2-3 months. Meanwhile, anti-dengue serum IgG is usually detectable in the low titer by the end of the first week of illness, which then slowly increase, and still detectable for months or even for a lifetime.[14]

There are still no definitive antiviral agents available for the treatment of dengue infections. The current treatments are general care with an emphasis on intensive hematological monitoring, fluid replacement, and blood transfusions as needed.[10] Hypovolemia shock due to dengue infection, characterized by increased systemic vascular resistance due to plasma leakage and manifested by a narrowed pulse pressure. When hypotension occurs, it should be suspected that other than plasma leakage, major bleeding or potential gastrointestinal bleeding could have occurred. DSS fluid resuscitation, unlike other types of shock such as septic shock, involves the transfusion of packed red blood cells in the case of massive bleeding.[15]

To the best of our knowledge, this case was the case of boy in the Wahidin Sudirohusodo Hospital Makassar who presented with expanded dengue syndrome with status epilepticus.

Conclusion

Early diagnosis and rapid treatment of expanded dengue syndrome is strongly important to prevent the potential severe complications such as status epilepticus, bleeding manifestation, hypovolemic shock and other organ damage. Early diagnosis of expanded dengue syndrome simultaneously with adequate treatment will prevent the complications of the disease. The physicians should be on focusing early recognition of scarlet fever and rapid treatment to prevent the potential severe complications.

Conflict of Interests

The authors declare that they have no competing interests.

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Reference

1. Tantawichien T, Thisayakorn U. Dengue. Neglected Tropical Diseases - South Asia. 2017. p. 329–48.
2. Hasan S, Jamdar SF, Alalowi M, Al Ageel Al Beaiji SM. Dengue virus: A global human threat: Review of literature. J Int Soc Prev Community Dent. 2016;6(1):1–6.
3. Harapan H, Michie A, Mudatsir M, Sasmono RT, Imrie A. Epidemiology of dengue hemorrhagic fever in Indonesia: analysis of five decades data from the National Disease Surveillance. BMC Res Notes. 2019 Jun;12(1):350.
4. Tansir G, Gupta C, Mehta S, Kumar P, Soneja M. Expanded dengue syndrome in secondary dengue infection : A case of biopsy proven rhabdomyolysis induced acute kidney injury with intracranial and intraorbital bleeds. 2017;6(4):314–8.
5. Mohanty B, Sunder A, Pathak S. Clinicolaboratory profile of expanded dengue syndrome - Our experience in a teaching hospital. J Fam Med Prim care. 2019 Mar;8(3):1022–7.
6. Jayasinghe HMAU, Pinto V, Jayasinghe Arachchi T, Wasala WMASB, Abeygunawardane S, Dissanayake D. Expanded Dengue Syndrome: A Case of Subarachnoid Haemorrhage, Cranial Diabetes Insipidus, and Haemophagocytic Lymphohistiosis. Vol. 2021, Case reports in infectious diseases. 2021. p. 9932525.
7. Rajapakse S, Wattegama M, Weeratunga P, Sigera PC, Fernando SD. Beyond thrombocytopaenia, haemorrhage and shock: the expanded dengue syndrome. Pathog Glob Health. 2018 Dec;112(8):404–14.
8. Umakanth M, Suganthan N. Unusual Manifestations of Dengue Fever: A Review on Expanded Dengue Syndrome. Cureus. 2020 Sep;12(9):e10678.
9. Kadam DB, Salvi S, Chandanwale A. Expanded Dengue. J Assoc Physicians India. 2016 Jul;64(7):59–63.
10. Li G-H, Ning Z-J, Liu Y-M, Li X-H. Neurological Manifestations of Dengue Infection. Front Cell Infect Microbiol. 2017;7:449.
11. Sudulagunta SR, Sodalagunta MB, Sepehrar M, Bangalore Raja SK, Nataraju AS, Kumbhat M, et al. Dengue shock syndrome. Vol. 2016, Oxford medical case reports. 2016. p. omw074.
12. Srikiatkhachorn A, Rothman AL, Gibbons R V, Sittisombut N, Malasit P, Ennis FA, et al. Dengue--how best to classify it. Clin Infect Dis an Off Publ Infect Dis Soc Am. 2011 Sep;53(6):563–7.
13. Kularatne SAM, Rajapakse MM, Ralapanawa U, Waduge R, Pathirage LPMMK, Rajapakse RPVJ. Heart and liver are infected in fatal cases of dengue: three PCR based case studies. BMC Infect Dis. 2018 Dec;18(1):681.
14. Nisalak A. LABORATORY DIAGNOSIS OF DENGUE VIRUS INFECTIONS. Southeast Asian J Trop Med Public Health. 2015;46 Suppl 1:55–76.
15. Kalayanarooj S, Rothman AL, Srikiatkhachorn A. Case Management of Dengue: Lessons Learned. J Infect Dis. 2017 Mar;215(suppl_2):S79–88.

REVIEW ARTICLE Open Access

The Effect of Siwak Wood Extract (Salvadora Persica) Solution on Oral Heatlh: Literature Review

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ABSTRACT

Background: In terms of beliefs, culture and values or life practices, Islam encourages its adherents to keep themselves and their environment clean, including guidance on maintaining oral hygiene using miswak.. Siwak extract has an antibacterial effect, is effective against bacteria that play a role in the formation of dental plaque thus, with a decrease in plaque bacteria, the salivary pH will also increase One of the contents of miswak (Saldavora persica) hich is useful for preventing dental plaque is trimethylamine (TMA). In addition, it is also potential as an antibacterial.(3) (4) The World Health Organization (1987) recommends the use of miswak as an effective tool for oral health, with the mechanical action of soft-wood fibers and the therapeutics action of its chemical content.
Content: it is necessary to conduct a Literature Review study to determine the effect of a solution of siwak wood extract (Salvadora Persica) on oral health. The feature of this research is we want to know with siwak extract can be maintained acid-base balance in salivary pH which can kill some bacteria in the mouth. The purpose of this study was to determine the effect of a solution of siwak wood extract on oral health. Literature Review with Systematic review design.

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(Continued from previous page)

Conclusion: The effect of a solution of siwak wood extract on oral health, concluded that siwak extract can affect salivary pH, production of salivary secretions, reduce plaque scores and inhibit the microorganisms development int he oral cavity.

Keywords : Siwak wood extract; Salvadora persica; Oral health

Introduction

Islam in terms of beliefs or culture and values or norms of life also encourages its followers to keep themselves and their environment clean, including guidance provided for maintaining oral hygiene using miswak.[1] Miswak (Misswak, meswak, miswaki, siwaki, Sewak) is one of the most widely used ancient chewing sticks obtained from Salvadora persica L (Arak Tree) or toothbrush tree.[2] Siwak (salvadora persica) contains trimethylamine, salvadorine, chloride, fluoride, silica, sulfur, mustard oil, vitamin C, resins, tannins, saponirs, flavonoids, and sterols. One of the contents of miswak (salvadora persica) which is useful for preventing dental plaque is trimethylamine (TMA). In addition, it is also potential as an antibacterial.[3] Apart from having antimicrobial effects, Salvadora persica has mild laxative, diuretic, anti-pyretic, anti-inflammatory, astringent, and analgesic effects.[4]

Prevention of acid imbalance in saliva can be done mechanically or chemically, with mouth rinses that are considered cheaper, efficient, environmentally friendly, and have minimal side effects. The World Health Organization (1987) recommends the use of miswak as an effective tool for oral health, with the mechanical action of soft-wood fibers and the therapeutic action of its chemical content.(5) The 2017 Global Burden of Disease Study estimates that oral disease affects nearly 3.5 billion people worldwide, with dental caries being the most common condition. Globally, an estimated 2.3 billion people suffer from dental caries and more than 530 million children suffer from primary dental caries.(6) The results of the 2018 Basic Health Research (Riskesdas) stated that the largest proportion of dental problems in Indonesia was damaged/cavities/sick teeth (45.3%). Meanwhile, the majority of oral health problems experienced by the Indonesian population are swollen gums and/or ulcers (abscesses) by 14%.(7)(8) Based on the above background, the authors are interested in making a literature review to determine the effect of a solution of siwak wood extract (*Salvadora Persica*) on oral health.

Subheading 1

This study uses literature search sources using an Electronic Based that is accredited/indexed by Sinta such as Biomed Central, Portal Garuda, Google Scholar, Elsevier / Clinical Key, PubMed, and other database sources. Inclusion criteria in the form of articles with keywords: Effect of a solution of siwak wood extract (salvadora persica) on oral health, the literature contains 20 references with a publication period of the last 3 years counting backward from the year KTI was carried out. If it is not found, then it is allowed to withdraw until a maximum of the last 10 years, references to international accredited scientific journals, references to national accredited scientific journals, references from citations to lecturers' writings in the form of research, literature reviews, case reports, Clinical Key references, Text books, and proceeding books. While the exclusion criteria, namely the references obtained are not related to the effect of siwak wood extract solution (Salvadora persica) on oral health, references cannot be accessed in full.

Journal Name (year of publication)	Tittle	Method	Authors
2021	(Salvadora persica)	Experimental	ErnieThioritz, Asridiana, Khoirunnisa Ilham
2021	Antibacterial activity of siwak wood extract (Salvadora persica) against Staphylococcus bacteria Epidermidis	Experimental	Nugroho Eko W B
2021	Comparative Evaluation of the Antibacterial Effects of GIC Containing Chlorhexidine and Siwak on Streptococcus mutans and Streptococcus sobrinus in Carious Children	Experimental	Amruta J Kalpavriksha, Shakuntala Bethur Siddaiah,Shivaprasad Bilichodmath, Somanna Prabhakara, Hanumantha Rao HM
2019	Impact of fungicide salvadora persica L. (miswak) extract on the growth of foodborne pathogens Aspergillus species	Experimental	Amna Ali Saddiq, Monagi H. Alkinani
2018	Differences in gargling a solution of siwak extract (salvadora persica) on oral saliva secretion in the elderly with hypertension, diabetes mellitus and does not have Systemic disease at	Experimental	Syamsiah syam, RisnayantiAnas, Andi nelda yunita

	Tresna Werdha Social Institution, Gau Mabaji		
2018	Antibacterial activity of siwak wood (salvadora persica) ether fraction against staphylococcus aureus in vitro	Experimental	RIZA AMALIA, Nurul marfu'ah, Surya amal
2017	The effectiveness of toothpaste containing siwak (salvadora persica) extract in reducing	Experimental	Zulfikri
2017	Effect of siwak wood powder extract (Salvadora persica) on the growth of Streptococcus bacteria mutans	Experimental	Mardia Apriansi
2016	Differences in salivary pH before and after gargling with siwak solution in patients with diabetes mellitus at the dr.h. soewondo kendal	Experimental	Chyntia adha purnama sari, Mugi hartoyo, Wulandari M
2016	2016 Evaluation of Antibacterial Properties of Fresh Siwak Extract and Siwak Extract Immersed in 0.5% Sodium Fluoride Against Streptococcus Mutans	Experimental	Priyanka SG, Nagesh L,Puja C Yavagal
2015	antibacterial activity of siwak (Salvadora persica L.) extract on hygiene	Experimental	Mohammad abhary, Abdulaziz al-hazmi
2015	Effect of gargling with a solution of siwak (salvadora persica) extract on pH oral saliva	Experimental	Tiara adzakiyah, IndrawatiLipoeto, Nila kusuma
2015	Effect of gargling siwak extract in preventing the occurrence of stomatitis in patients undergoing chemotherapy at SMC RS telogorejo	Experimental	Veronica maya novita, Sripuguh kristiyawati, Supriyadi.
2014	The effectiveness of siwak (salvadora persica) and siwak toothpaste on the accumulation of dental plaque in children	Experimental	Indra bramanti, Iwa sutarjoRS, Navilatul ula, Muhammad isa
2014	Test the effectiveness of extracts of miswak (Salvadora persica) at various concentrations against Dental plaque formation	Experimental	Ervina diah Ruslinawati,Rahma Sri Praptiningsih,Siti Chumaeroh

2013	Effectiveness of ethanol extract of siwak wood (salvadora persica) by percolation method on the growth of resistant staphylococcus aureus isolate 248 multiantibiotic	Experimental	Fuad fatkhurrohman, Anamedawati
2013	The antifungal effect of the ethanolic extract of siwak (salvadora persica) on the growth of the fungus Candida albicans on the media saboraud dextrose agar	Experimental	Rizki AMALIAH, Al Munawir, Rosita Dewi
2012	Effect of siwak (salvadora persica) extract solution on Streptococcus mutans: in vitro study and in vivo	Experimental	Oedijani SANTOSO, AiniPramoda Wardani, Nilakusumasari

Subheading 2

1. Effect of Siwak Extract (Salvadora Persica) on saliva pH

The content of essential oils in siwak stems such as benzyl isothiocyanate can stimulate the flow of saliva in the oral cavity. This increase in salivary flow will increase the salivary bicarbonate buffer activity so that the salivary pH will also increase. [5]

In a study conducted by Ernie et al. Researchers concluded that siwak (salvadora persica) is very suitable to be used as an alternative mouthwash that can maintain the balance of the degree of acidity (pH) of the oral cavity. Therefore in this case the Siwak mouthwash can maintain a normal acid-base balance in the oral cavity. [6] Research conducted by Tiara et al. There is an average pH of saliva before rinsing with a 50% miswak extract solution of 6.56. There is an average pH of saliva after gargling with a 50% miswak extract solution of 7.4. Gargling with a 50% miswak extract solution can increase the pH of saliva. [5] In a study conducted by Mohammad abhary et al. The saliva pH of the collected samples was measured before and after rinsing with siwak mouthwash. The use of siwak mouthwash showed an increase in salivary pH from an average of 6.93-7.28 for all 40 samples. The effect of salivary pH on the total number of bacteria after using miswak mouthwash where there was a decrease in the total number of bacteria and inversely with the increase in pH.[7] In a study conducted by Oedijani Santoso et al. The results of the minimum inhibitory level test showed that the use of 50% siwak extract caused the growth of S. mutans not to grow, so if a mouthwash with 50% siwak extract was used, it might disturb the microbial balance in the oral cavity.

At this stage of the study, 25% of siwak extract was used as a mouthwash, so as not to disturb the

normal flora of the oral cavity. Giving a 25% siwak extract solution (in vivo) can significantly increase the salivary pH.[8]

This research is following the study was conducted by *Catur Eka Sukma et al. Research concluded that the combination of brushing using siwak and toothpaste for 10 days can reduce the amount of anaerobic bacteria in gingival samples.(22)*

2. Effect of Siwak Extract (Salvadora Persica) on microorganisms

Several researchers reported the antibacterial effect of miswak against cariogenic bacteria and periodontal pathogens, especially Bacteroides species, and inhibited plaque formation. Another study stated that siwak extract has antibacterial activity against Streptococcus mutans and S. faecalis. [9] Siwak (Salvadora persica) has been widely used since the time of the Prophet Muhammad as an alternative mouth cleanser. Siwak ethanol extract is known to have substances such as saponins, tannins, salvadorin, and flavonoids that function as antibacterial and antifungal agents. [10]

In a study conducted by Nugroho eko W. B. Siwak can be used as an alternative herbal antimicrobial agent against both S. mutans and S. sobrinus. Conventional anhydrous GIC was the least effective in reducing the mean numbers of S. mutans and S. sobrinus.[11] In a study conducted by Amna ali saddiq et al. The results showed that the different concentrations of S persica extract used had a suppressive impact on the growth of A niger, A flavus, and A fumigatus. High concentration (100 mg/mL). Aqueous extract of S persica siwak showed a strong fungicidal effect against Aspergillus species, and this may support the utilization of this extract as an antifungal agent versus aspergillosis-associated diseases.[12] In a study conducted by Riza Amalia et al. Siwak wood can be used as alternative medicine in preventing or treating periodontal disease caused by Staphylococcus aureus bacterial infection. [13]

In a study conducted by Mardia Apriansi. Giving siwak wood powder extract with different concentrations had a very significant effect and inhibited the growth of Streptococcus mutans bacteria. [14] In a study conducted by Priyanka SG et al. The three different solvent extracts (Distilled water, Ethanol and Ethyl acetate) were sensitive to the tested microorganisms but were found to be high against distilled water followed by ethanol and ethyl acetate. 0.5% of miswak extract soaked in sodium fluoride showed antibacterial activity against S. mutans and L. acidophilus. The 0.5% aquadest extract of the siwak extract soaked in sodium fluoride showed higher antibacterial efficacy against S. mutans than the ordinary siwak extract.[15] In a study conducted by Rizki amaliah et al. The inhibition zone has started to form from the smallest concentration, which is 6.25% and is increasing along with the addition of the extract concentration to 50% where the higher the concentration given, the higher the inhibition zone produced. [10] In a study conducted by Fuad Fatkhurrohman and Ana Medawati. The ethanolic extract of siwak wood by the percolation method was able to inhibit the growth of the second largest bacteria causing multiantibiotic-resistant oral cavity inflammation, namely Staphylococcus aureus isolates 248, y in vitro. [16] In a study

conducted by Oedijani Santoso et al. Miswak extract solution can inhibit the growth of S. mutans (in vitro), and the concentration of 50% was the lowest concentration that was effective in inhibiting the growth of S. mutans. Giving a 25% siwak extract solution (in vivo) can significantly increase the salivary pH. [8]

3. Effect of Siwak Extract (Salvadora Persica) on Dental Plaque

The presence of silica substance in the siwak also helps the mechanical action of the miswak in cleaning plaque. The siwak toothpaste contains chloride which is useful in removing stains silica which is a tooth-cleaning agent and trimethylamine which functions in reducing calculus and stains, so that both siwak and siwak toothpaste can inhibit the formation of dental plaque. [9]

In research conducted by Zulfikri. The average score of dental plaque before brushing with toothpaste containing siwak extract ranged from 1.2 to 3.6 with an average plaque index of 2.18, and after brushing the teeth ranged from 0.2 to 0.8 with an average plaque index was 0.48. There is an effect of brushing teeth using toothpaste containing siwak extract in reducing plaque scores.[17] In a study conducted by Indra bramanti et al. The results of this study also showed that there was no significant difference between the basic toothpaste group and the siwak toothpaste group. The existence of a non-significant difference in the mean difference in plaque scores between the control group and siwak toothpaste, among others, is possible because this study was conducted on adolescent children (12-15 years), where the child's motor skills have developed well so that they can brush their teeth based on the recommended method with optimal. [9] In a study conducted by Ervina et al. The results showed that the siwak extract with a concentration of 50% was the most effective extract in inhibiting the formation of dental plaque and the effect was even better when compared to the siwak extract with a concentration of 75% and 100%, even with chlorhexidine which was recommended as a mouthwash. [18]

4. Benefits of Siwak Extract (Salvadora Persica) for patients who have certain diseases

Siwak extract has an antibacterial effect, is effective against bacteria that play a role in the formation of dental plaque, so with a decrease in plaque bacteria, the salivary pH will also increase. The content of essential oils in the stem of the miswak such as benzyl isothiocyanate can increase the secretion of saliva in the oral cavity. This increase in saliva production will increase the salivary bicarbonate buffer activity so that the salivary pH will also increase. [19] Research conducted by Cyntia et al. Before treatment, all respondents had an acidic pH, after being given the treatment with gargling with siwak solution, most of the respondents' saliva pH changed to neutral 19 (57.6%), remained acidic 7 (21.2%), changed to alkaline 7 (21.2%) respondents. Gargling with miswak solution is an effective way to increase salivary pH in DM patients who experience a decrease in salivary pH, especially in DM patients who have a high risk of developing complications in the mouth. [20] Research conducted by Syamsiah syam et al. The results of the average oral saliva secretion of the elderly at the Tresna Werdha Gau Mabaji Gowa Social Home after

gargling a 25% siwak extract solution (Salvadora Persica) were hypertension (HT) 4.514ml/5minutes, diabetes mellitus (DM) 4.875ml/5minutes, and no systemic disease 4,379ml/5min. Difference change in secretion saliva between diabetes mellitus and not having systemic disease because it produces a p or sig value of 0.007 <0.05 so that diabetes mellitus has a higher change in salivary secretion compared to other data. [19] In a study conducted by Veronica et al. the oral condition of patients in the control group who did not experience stomatitis were 3 (17.6%) respondents and 14 (82.45) respondents who experienced stomatitis. So it can be concluded that there is an effect of gargling siwak extract in preventing the occurrence of stomatitis (p = 0.000, p <0.05) in patients undergoing chemotherapy at SMC Telogorejo Hospital. [21]

Conclusion

After using a solution of siwak (Salvadora persica) extract, the salivary pH tends to be more stable and under normal conditions. Siwak wood extract (Salvadora persica) can effectively inhibit the growth of Streptococcus mutans, Streptococcus sobrius, Staphylococcus aureus, Stapylococcus epidermidis and Lactobacillus acidophilus bacteria. In addition to antibacterial, miswak extract can also be used as an antifungal that effectively inhibits the development of Aspergillus sp. and Candida albicans. Brushing teeth using toothpaste containing siwak extract can reduce dental plaque scores. After gargling a solution of siwak wood extract, it can increase salivary secretion and pH in the elderly who have systemic disease (diabetes mellitus and hypertension) and the elderly who do not have systemic disease and prevent the occurrence of stomatitis in patients undergoing chemotherapy. From 18 journals that have been studied, the authors can conclude that the extract solution of siwak wood (Salvadora persica) provides many benefits for the health of the oral cavity at the age of children, adolescents, adults to the elderly.

The suggestions are, necessary to do more specific research on the benefits of a solution of siwak wood extract (Salvadora persica) for the treatment of diseases. And it needs to be investigated further by looking at the active chemical substances that have functioned as antiplaque, antibacterial, and active chemical substances that affect salivary secretion and salivary pH and it is hoped that future researchers will have other variables or interventions, besides the benefits of Siwak extract for patients with diabetes mellitus, hypertension and patients undergoing chemotherapy.

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Reference

[1] Bramantoro, T. *et al.* Miswak users' behavior model based on the theory of planned behavior in the country with the largest muslim population. *Clin. Cosmet. Investig. Dent.* **10**, 141–148 (2018).
[2] Nordin, A. *et al.* Miswak and oral health: An evidence-based review. *Saudi J. Biol. Sci.* **27**, 1801–1810 (2020).
[3] Sartika, E. D. & Universitas Sumatera Utara. Perbedaan Efektifitas Kayu Siwakdengan Sikat Gigi Menggunakan PastaGigi Nonherbal Terhadap Oral HigieneIndeks (OHI) pada Jemaah MesjidAl-Jihad Medan. (2018).
[4] Jassoma, E., Baeesa, L. & Sabbagh, H. The antiplaque/anticariogenic efficacy of Salvadora persica (Miswak) mouthrinse in comparison to that of chlorhexidine: A systematic review and meta-analysis. *BMC Oral Health* **19**, 1–14 (2019).
[5] Adzakiyah, T., Lipoeto, I. & Kasuma, N. Pengaruh Berkumur dengan Larutan Ekstrak Siwak (Salvadora persica) Terhadap pH Saliva Rongga Mulut. *J. Sains Farm. Klin.* **2**, 74 (2015).
[6] Thioritz, E. & Ilham, K. Ph Saliva Setelah Penggunaan Obat Kumur Siwak (Salvadora Persica). *Media Kesehat. Gigi Politek. Kesehat. Makassar* **20**, 29–34 (2021).
[7] Abhary, M. & Al-Hazmi, A.-A. Antibacterial activity of Miswak (Salvadora persica L.) extracts on oral hygiene . *J. Taibah Univ. Sci.* **10**, 513–520 (2016).
[8] Oedijani Santoso, Aini Pramoda Wardani, N. K. Pengaruh Larutan Ekstak Siwak (Salvadora Persica) Terhadap Streptococcus Mutans: Studi In Vitro dan In Vivo. *Media Med. Indones.* **46**, 6–11 (2012).
[9] Bramanti, I., Rs, I. S., Ula, N. & Isa, M. Efektifitas siwak (Salvadora persica) dan pasta gigi siwak terhadap akumulasi plak gigi pada anak-anak (Effectiveness of Siwak (Salvadora persica) and siwak toothpaste on dental plaque accumulation in children). **47**, 153–157 (2014).
[10] Amaliah, R., Munawir, A., Dewi, R., Ilmiah, A. & Penelitian, H. Efek Antifungal Ekstrak Etanol Siwak (Salvadora persica) terhadap Pertumbuhan Jamur Candida albicans pada Media Saboraud Dekstrose Agar. *Artik. Ilm. Has. Penelit. Mhs. Jember 2013* 4 (2013).
[11] Kalpavriksha, A. J., Siddaiah, S. B., Bilichodmath, S., Prabhakara, S. & Hanumantha Rao, H. M. Comparative evaluation of antibacterial effect of gic containing chlorhexidine and miswak on streptococcus mutans and streptococcus sobrinus in early childhood caries children: A pcr study. *Int. J. Clin. Pediatr. Dent.* **14**, 229–234 (2021).
[12] Saddiq, A. A. & Alkinani, M. H. Fungicidal Impact of Salvadora Persica L. (Miswak) Extract on Growth of Foodborne Pathogens, Aspergillus Species. *Dose-Response* **17**, 1–5 (2019).
[13] Amalia, R. & Amal, S. AKTIVITAS ANTIBAKTERI KAYU SIWAK (Salvadora persica) FRAKSI ETER TERHADAP BAKTERI Staphylococcus aureus SECARA IN VITRO. **2**, 1–7.
[14] Apriansi, M. *et al.* PENGARUH EKSTRAK SERBUK KAYU SIWAK (Salvadora persica) TERHADAP PERTUMBUHAN BAKTERI Streptococcus mutans. *Agroqua J.* **15**, 29–34 (2017).
[15] SG, P., L, N. & Yavagal, P. C. Evaluation Of Antibacterial Property Of Fresh Miswak Extract And 0 . 5 % Sodium Fluoride Impregnated Miswak Extract Against Streptococcus Mutans And Lactobacillus Acidophilus – An Invitro Study. **3**, (2016).
[16] Fatkhurrohman, F., Medawati, A. & Yogyakarta, M. Efektifitas Ekstrak Etanol Kayu Siwak (Salvadora Persica L .) Dengan Metode Perkolasi Terhadap Pertumbuhan Staphylococcus Aureus Isolat 248 Yang Resisten Multiantibiotik The Effectifity Siwak Wood Etanolic (Savadora Persica L .) Extract With Percolatio. 34–41.
[17] Zulfikri. efektifitas pasta gigi yang mengandung ekstrak siwak (salvadora persica) dalam menurunkan skor plak gigi. **XI**, 20–25 (2017).
[18] Ruslinawati, E. D., Praptiningsih, R. S. & Chumaeroh, S. UJI EFEKTIFITAS EKSTRAK SIWAK (Salvadora Persica) BERBAGAI KONSENTRASI TERHADAP PEMBENTUKAN PLAK GIGI - Studi terhadap Murid MTsN

Sale. *ODONTO Dent. J.* **1**, 16 (2015).
[19]Syam, syamsiah. dkk. perbedaan berkumur larutan ekstrak siwak (salvadora persica) terhadap sekresi saliva rongga mulut lanjut usia dengan hipertensi, diabetes mellitus dan tida memiliki penyait sistemik di panti sosial tresna werdha gau mabaji gowa tahun 2017. **10**, (2018).
[20]Rsud, D. I. & Kendal, H. S. PERBEDAAN pH SALIVA SEBELUM DAN SESUDAH BERKUMUR DENGAN LARUTAN SIWAK PADA PASIEN DIABETES MELLITUS. 1–10.
[21]Novita, V. M., Kristiyawati, S. P. & Supriyadi. Pengaruh kumur ekstrak siwak dalam mencegah terjadinya stomatitis pada pasien yang menjalani kemoterapi di smc rs telogorejo. *Ilmu Keperawatan dan Kebidanan* **4**, 1–9 (2015).
[22]*Sukma, C.E., Elyani H. & Yahya A. Pengaruh Menyikat Gigi dengan Kombinasi Pasta Gigi dan Siwak (Salvadora persica) terhadap Jumlah Koloni Bakteri Anaerob pada Saliva dan Mukosa Gingiva Santri Ar-Razi. Jurnal Kedikteran Komunitas Vol.8 No.1 (2020).*

REVIEW ARTICLE Open Access

The Effect of Consumption Ajwa Dates (Phoenix Dactylifera L.) on the Duration of the First Stage of Labor

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ABSTRACT

Background: Parturition is the process of expelling the products of conception that begins with the first stage of the process. The length of the first stage can be influenced by nutritional factors. Islam is a religion that also provides a solution by consuming Ajwa dates. Therefore, the researcher wants to write a scientific paper on "The Effect of Consumption Ajwa Dates to the First Stage of Labor".
Content: Consumption of Ajwa dates during early delivery may shorten the duration of first stage labor in pregnant women.
Conclusion: Ajwa dates (*Phoenix dactylifera L.*) have an indirect effect on uterine contractions as if increased of prostaglandin when we eat7 or 100 grams of Ajwa dates (based on Rasulullah's hadits) so the duration of the first-stage of labor in pregnant women who consume Ajwa dates is shorter than in pregnant women who do not consume them.

Keywords: Phoeniceae; Islam; Pregnant Women; Parturition

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Introduction

Labor or parturition is a process of expelling living products of conception from the uterus through the vagina to the outside world.(1) Normal labor is divided into four stages, namely the first stage, second stage, third stage, and fourth stage.(1) First stage Labor begins from the occurrence of uterine contractions and cervical dilatation until it reaches complete dilatation (10 cm). In this phase, adequate contractions (power) are needed to initiate labor. Weakening of uterine contractions or inadequate contractions is the cause of non-smooth labor.(2)

Based on this, the risk of Maternal Mortality Rate (MMR) can continue to increase if not addressed. According to Meiwita Budhiharsana, Chair of the Scientific Committee of the International Conference on Indonesia Family Planning and Reproductive Health (ICIFPRH), in *Info Singkat Puslit BKD,* until 2019 Indonesia's MMR is still high, at 305 per 100,000 live births.(3) The risk of prolonged labor or slow labor progress is the cause of death. mother.(3)

Clinical trials have been carried out by Nasiri M, et al in their 2019 article saying that the effects of dates on different pregnancy outcomes include labor pain, cervical dilation, duration of pregnancy, duration of various stages of labor (stage I, stage II, stage III, stage IV).), the rate of bleeding after delivery, and others.(4)

Based on the above background, the researcher wants to write a scientific paper in the form of a literature review on "The Effect of Giving Ajwa Dates to the First Stage of Labor".

Subheading

The biological name of the date comes from the fruit: phoenix (Greek) which means red or purple fruit and "dactylifera" which means "like a finger" because the fruit clusters are like human fingers.(5) Dates that grow in Saudi Arabia and are famous from the words of the Prophet Muhammad which reads: "Whoever eats 7 Ajwa dates between two sandy soils of Medina in the morning, the poison will not harm until the evening." (Sahih Muslim No. 3813).(6) The nutritional content of dates depends on the variety of dates and their water content. Generally contain the following substances sugar (a mixture of glucose, sucrose, and fructose), protein, fat, fiber, vitamins A, B1, B2, B3, potassium, calcium, iron, chlorine, copper, magnesium, sulfur, phosphorus, and some enzymes.(7)

Table 1. Research Result

Comparison of the Duration of the First-Stage of Labor Based on the Type of Dates Consumed

No.	Author	Type of dates	Phase	Duration	Desc.
1.	Resti	Ajwa	Latent & Active	11,35 hour (681 min)	Primipara

2.	Nuguelis Razali, et al	Ajwa	Latent Active	7,42 hour (445,5 min) 3,56 hour (213,5 min)	Primipara
3.	O. Al-kuran, et al	Ajwa	Latent Active	8,5 hour (510 min) 3,85 hour (231 min)	Primipara & Nulipara
4.	Alireza Bagherzadeh Karimi, et al	Ajwa	Latent & Active	Ajwa dates reduce the duration of the active phase significantly.	Systematic Review Method
5.	Morteza Nasiri, et al	Ajwa	Latent & Active	Consumption of dates by pregnant women can significantly reduce the duration of the first stage of labor.	Systematic Review Method
6.	Andriani, Rezah	Tunisia	Active	3,85 hour (231,1 min)	Primipara & Multipara
7.	Firdausi, Nadya	Sukkari	Active	2,43 hour (145,8 min)	Multipara
8.	Ruri Yuni Astari, Dzikri Yupita Dewi	Sekkeri/ Sukkari	Latent & Active	9,56 hour (573,6 min) 5,21 hour (312,6 min)	Primipara Multipara
9.	Izzaddinn E. Ahmed, et al	Rotana	Active	3,22 hour (193,635 min)	Primipara & Multipara
10.	Kordi, Masoumeh Meybodi, et al	Mazafati Bam	Active	5,48 hour (329,00 min)	Nulipara

One study revealed that by consuming dates before delivery, besides being filling, is also useful for making uterine contractions more regular, making it easier for the birth process in labor, and reducing postpartum hemorrhage.[8] Carbohydrates as these reinforcers are sugars that are absorbed and used by the body's cells shortly after consumption. Dates also contain saturated fatty acids and unsaturated fatty acids. Fatty acids in addition to producing energy also help provide prostaglandins. Fatty acids can help store energy and strengthen the uterine muscles. Dates also contain hormones that can stretch the uterus before the birth of the baby.[8]

Nowadays, there is a growing interest in the oral intake of natural ingredients, such as fruits during pregnancy and childbirth to improve the quality of life of both the mother and the fetus. So it is important to consider the potential of fruits in reducing complications during pregnancy, the progress of labor, and after delivery, especially fruits recommended by the teachings of the Islamic religion rahmatan lil'alamin,

such as dates, especially Ajwa dates (Phoenix dactylifera L.) as fruit that is highly recommended and liked by the Prophet.[6]

Based on this study, it was revealed that pregnant women who were members of the date-consuming group had adequate uterine contractions and a shorter duration of the first stage compared to pregnant women who did not consume dates at all. This applies to all types of parity, whether primiparous, multipara, or nulliparous.[4,9–17]

Two of the ten journals revealed that consuming dates, both Ajwa dates (Phoenix dactylifera L.) and rotana dates could improve the quality of uterine contractions at the time of delivery, in other words, the group of date consumers tended to experience adequate uterine contractions.[9,16]

In addition, five of these journals examined the effect of Ajwa dates on the duration of the first stage of labor and reported that the average duration of the first stage of labor among consumers of Ajwa dates was significantly shorter than those who did not consume Ajwa dates at all.(4,9–12) However, there are many limitations in these studies which can increase the risk of bias in the research results. As it is not known for certain the number of dates that must be given in order to have a positive impact, the optimal length of time for giving dates, and the attention given to the intervention group tends to be more than the other participants.[4,10–12]

In a similar study, but using different variables, namely using other types of dates (Tunisia dates, Sukari dates, rotana dates, and Mazafati bam dates) by looking at their effect on the duration of the first stage of labor, it was found that these dates also provide a positive impact on labor progress. Five out of ten journals revealed that the duration of the first stage in participants who consumed dates shortened or became shorter than those who did not consume dates.[13–17]

The results of this study are in line with the benefits of the content of dates, especially Ajwa dates (Phoenix dactylifera L.) which are rich in substances that can be useful in the process of progress of labor, such as high carbohydrate/sugar content as an energy source for the mother, high content of fatty acids quite important in the synthesis of prostaglandins during labor, and the content of dates which resemble the hormone oxytocin which can stimulate contractions in the uterine muscles.[6,7]

Conclusion

Ajwa dates are one of the fruits that are highly recommended by Islam for consumption and have long been known by the public. Ajwa dates also contain content that is rich in benefits, one of which is useful in the progress of labor, in this case, the duration of the first stage of labor. Ajwa dates (Phoenix dactylifera L.) have an indirect effect on uterine contractions, namely by influencing oxytocin receptors and prostaglandin synthesis, so that they can stimulate and increase myometrial contractions. In addition the duration of the first stage in the group of pregnant women who were given Ajwa dates (Phoenix dactylifera

L.) could be shorter, so the delivery process could be smoother. Thus, giving Ajwa dates to pregnant women also has a positive effect on medical practice, such as the occurrence of normal and easy childbirth without using any intervention.

Suggestions for further research, namely by increasing the number of samples and measuring uterine contractions and the duration of the first stage of labor objectively. In addition, it is also recommended to conduct research using appropriate methods related to sample control (uniformity of gestational age of the participating mothers, control of diet/food recall 24 hours, number of patient parity, number of dates given) to reduce bias, as well as research more about the effect of Ajwa dates on the levels of prostaglandins and oxytocin levels of pregnant women before delivery by taking into account other labor factors.

Conflict of Interest

No potential conflict of interest relevant to this article was reported

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References

1. Saifuddin AB, Rachimhadhi T, Wiknjosastro GH E. Ilmu Kebidanan. 4th ed. editors, editor. JAKARTA: PT. Bina Pustaka Sarwono Prawirohardjo; 2018. 981 p.
2. Yuliana. Wellness and healthy magazine. Wellness Heal Mag [Internet]. 2019;2(February):187–92. Available from: https://wellness.journalpress.id/wellness/article/view/v1i218wh
3. Susiana S. Angka Kematian Ibu: Faktor Penyebab dan Upaya Penanganannya. INFO Singk Kaji Singk Terhadap Isu Aktual dan Strateg [Internet]. 2019;XI(24):13–8. Available from: http://berkas.dpr.go.id/puslit/files/info_singkat/Info Singkat-XI-24-II-P3DI-Desember-2019-177.pdf
4. Nasiri M, Gheibi Z, Miri A, Rahmani J, Asadi M, Sadeghi O, et al. Effects of consuming date fruits (Phoenix dactylifera Linn) on gestation, labor, and delivery: An updated systematic review and meta-analysis of clinical trials. Complement Ther Med [Internet]. 2019;45(March):71–84. Available from: https://doi.org/10.1016/j.ctim.2019.05.017
5. Dewi LP, Yusup IR, Siti M. Faktor Berbuahnya Pohon Kurma (Phoenix dactylifera) Di Kampus 2 UIN Sunan Gunung Djati Bandung. J Bio Educ. 2020;5(1):16–23.
6. Rahmani AH, Aly SM, Ali H, Babiker AY, Srikar S, Amjad A. Therapeutic effects of date fruits (Phoenix dactylifera) in the prevention of diseases via modulation of anti-tumour activity. Int J Clin Exp Med. 2014;7(3):483–91.
7. Khasanah N. Kandungan Buah-Buahan Dalam Al-Qur'an: Buah Tin (Ficus carica L), Zaitun (Olea europea L), Delima (Punica granatum L), Anggur (Vitis vinivera L), Dan Kurma (Phoenix dactylifera L) Untuk Kesehatan. Phenom J Pendidik MIPA. 2016;1(1):5.
8. Ayu Permata Addini L, Titisari I, Eko Wijanti R. Pengaruh Pemberian Kurma Terhadap Kemajuan Persalinan Kala Ii Ibu Bersalin Di Rumah Sakit Aura Syifa Kabupaten Kediri. J Kebidanan Kestra. 2020;2(2):126–34.
9. Resti. Efek Pemberian Buah Kurma Ajwa (Phoenix dactylifera L.) Terhadap Kontraksi Uterus dan Lama Kala 1, Kala 2 dan Kala 3 Persalinan. 2021. p. 1–127.
10. Bagherzadeh Karimi A, Elmi A, Mirghafourvand M, Baghervand Navid R. Effects of date fruit (Phoenix dactylifera L.) on labor and delivery outcomes: A systematic review and meta-analysis. BMC Pregnancy Childbirth. 2020;20(1):1–14.
11. Razali N, Mohd Nahwari SH, Sulaiman S, Hassan J. Date fruit consumption at term: Effect on length of gestation, labour and delivery. J Obstet Gynaecol (Lahore). 2017;37(5):595–600.
12. Al-Kuran O, Al-Mehaisen L, Bawadi H, Beitawi S, Amarin Z. The effect of late pregnancy consumption of date fruit on labour and delivery. J Obstet Gynaecol (Lahore). 2011;31(1):29–31.
13. Andriani R. Konsumsi Kurma pada Akhir Kehamilan Terhadap Pematangan Serviks. J Delima Harapan. 2021;8(September):53–61.
14. Firdausi N. Pengaruh Pemberian Kurma Sukkari pada Ibu Bersalin terhadap DUrasi Persalinan. 2021;3(2):117–24.
15. Astari RY, Dewi DY. Konsumsi Kurma pada Akhir Kehamilan Terhadap Percepatan Kala 1 Persalinan. 2019;1:177–85.
16. Ahmed IE, Mirghani HO, Mesaik MA, Ibrahim YM, Amin TQ. Effects of date fruit consumption on labour and vaginal delivery in Tabuk, KSA. J Taibah Univ Med Sci [Internet]. 2018;13(6):557–63. Available from:

https://doi.org/10.1016/j.jtumed.2018.11.003

17. Kordi M, Meybodi FA, Tara FR, Fakari F, Nemati M, Shakeri M. Effect of dates in late pregnancy on the duration of labor in nulliparous women. Iran J Nurs Midwifery Res. 2017;22(5):383–7.