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- ❖ HOTNIDAH NASUTION  
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- ❖ ARRISMAN  
Islamic Law And Business Ethics: Case Study of Forest Fires for Clearing the Lands



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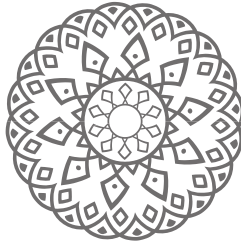
**EDITORIAL OFFICE:**

Fakultas Syariah dan Hukum UIN Syarif Hidayatullah Jakarta  
Jl. Ir. H. Juanda 95 Ciputat, Jakarta 15412  
Telp. (+62-21) 74711537, Faks. (+62-21) 7491821  
Website: <http://journal.uinjkt.ac.id/index.php/ahkam/index>  
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## TRACING THE CONCEPT OF *FAJR* IN THE ISLAM MOSAIC AND MODERN SCIENCE

*Susiknan Azhari*

**Abstrak:** Paper ini berupaya menelusuri beberapa pandangan mengenai waktu Fajr yang akurat. Studi ini menemukan bahwa konsep-konsep yang berbeda mengenai Fajr dalam dunia Islam disebabkan oleh dua faktor: hadits Imamah Jibril yang terlalu umum dalam pemikiran dan cara-cara yang berbeda dalam memahami hadits “ghalas” dan ‘isfar” tanpa mempertimbangkan kondisi dan cuaca ketika hadits tersebut diucapkan. Selain itu, para astronom Muslim berfokus pada matahari dan mengabaikan pesan nash. Hal ini, pada gilirannya, menyebabkan kalim kebenaran.

**Kata kunci:** Ghalas, Isfar, jarak zenith ke matahari

**Abstract:** This article is an attempt at tracing several points of view concerning the precise time of *Fajr*. The study suggests that different concepts of fajr in the world of Islam arose for two reasons: the Imamah Jibril hadith is too general in notion and the different ways in understanding the “*ghalas*” and “*isfar*” hadith without considering the condition and weather by the time the hadith was spoken. In addition, muslim astronomers focus on the empirical observation on the position of the sun and neglects the nas of the message. This, in turn, urges the truth claim.

**Keywords:** Ghalas, Isfar, distance of zenith of the sun

**ملخص:** محاولة هذه المقالة لتتبع العديد من وجهات النظر فيما يتعلق بالوقت الدقيق للفجر. تشير الدراسة إلى أن مفاهيم الفجر المختلفة في عالم الإسلام نشأت لسببين: إن حديث الإمامة جبريل هو مفهوم عام أكثر من اللازم، والطرق المختلفة لفهم "الغلس" و"الإسفار" الحديث دون النظر في الشرط والطقس من قبل وقت الحديث. إضافة إلى ذلك، يركز علماء الفلك المسلمون على الملاحظة التجريبية على موقع الشمس ويهملون الرسالة. هذا بدوره، يحث على المطالبة الحقيقة.

**الكلمات المفتاحية:** غلاس، إسفار، المسافة بين ذروة الشمس

## Introduction

In the Islamic astronomy study, determining the beginning of praying time is somewhat neglected. A research conducted by the writer reveals that the most popular Islamic astronomy study is the beginning of the month in lunar year instead of that of praying time. It is quite understandable since the issue concerns when the fasting month (Ramadan), Syawal and Zuhijah begin whereas praying time, no doubt, is considered final. The existence of praying time schedule in islam community proves the idea.

The moslem's belief in the start of praying time began to shake as Syaikh Mamduh Farhan al-Buhairi wrote an article entitled "*Salah Kaprah Waktu Subuh*" (The Misconception of the Fajr-Praying Time) published in a series in a magazine Qiblati (Syaikh Mamduh al-Buhairi, 2010, Susiknan Azhari, 2012:323). The situation pushed moslem to hold discussions on the issue to review the accepted fajr-praying time.

Based on the writer's file, Hanafi S. Djamari had written an article entitled "*Menelaah Kembali Awal Shalat Subuh*" (Reviewing the fajr-praying time) published in Republika newspaper of May 21, 1999 before Syaikh Mamduh did. Hanafi, in his article, suggested a review on the concept of the distance of zenith of the sun at dawn. He claimed that  $-18^{\circ}$  was relevant in recent time (Susiknan Azhari, 2012:323). Unfortunately, moslem did not respond accordingly.

Study on the concept of *fajr* had actually been conducted by some previous researchers who focused more on normative aspects which makes review on the concept is relevant. The review has to relate with the message of *nas* to both the geography and the weather as the hadith was conveyed. It has an important value as *syar'i* and science-based dawn is the target solution.

## Praying Schedule in History

There are some verses in the holy Quran discussing praying time, i.e. QS. An-Nisa' verse 103, QS. Al-Isra' verse 78, QS. Taha verse 130, and QS. Hud verse 114 in addition to a number of hadith from the prophet saw. A study by Jalaluddin al-Khanji informed us that, in *Kutubut Tis'ah*, as many as 543 hadith discussing praying time are on the list. The hadith are composed of 77 hadith from Sahih al-Bukhari,



73 hadith from Sahih Muslim, 35 hadith from Sunan At-Tirmidzi, 131 hadith from Sunan an-Nasai, 45 hadith from Sunan Abu Daud, 40 hadith from Sunan Ibnu Majah, 30 hadith from Sunan ad-Darimi, 28 hadith from al-Muwatta' Imam Malik, and 84 hadith from al-Musannif Ibn Abi Syaibah.

Of the mentioned hadith, when assessing praying time, "Imamah Jibril" is the most popular (Wahbah Az-Zuhaily, 1989:1:506). From them, ulamas formulated praying time into five times: Zuhur, Asar, Magrib, Isyak, and Subuh. At the beginning of Islam, determining praying time was merely the task of *muadzin* who had to look at the position of the sun every time they were about to pray. When the hints in the hadith were seen, the beginning of praying time was due.

As time went by and interaction with other cultures particularly with Egypt, a nation with the tradition of observation compiled in the form of "*Zij*" (a table on astronomy), inspired them, moslem scientists started to arrange a schedule for praying time. David A. King, an Islamic astronomy manuscript researcher, as cited by Auni Muhammad al-Khasawanah, mentioned that Al-Khawarizmi was the first person who created praying time table and chose Baghdad as the standard of time. The table included the shadows of the sun at Zuhur time, at the beginning and end of Asar time written in "hisab jumali" (*Abajadun hawazun*) (Auni Muhammad al-Khasawanah, 1999;114-115, David A. King, 1993).

In the 3<sup>rd</sup> H/9<sup>th</sup> AD century Ali bin Amajur improved al-Khawarizmi's work and made it more complete. Abu Ali al-Marrakushi even added the angular time and "*rasdul qiblah*". His model inspired other Islam astronomers who not only improved the table but they also involved arts in its appearance to create new-look models like the ones from Syria, Tunis, and Istanbul. History tells that ancient praying timetables presented as both a collective of data and an amazing art.

Nowadays some tables are under province-based calculation, while others are under city-based calculation with time conversion for other cities. Praying time schedule attached in the Ummul Qura, Egypt, and JAKIM of Malay calenders is a good example for the city-based calculation. And this is what happens with most Indonesian's tables.

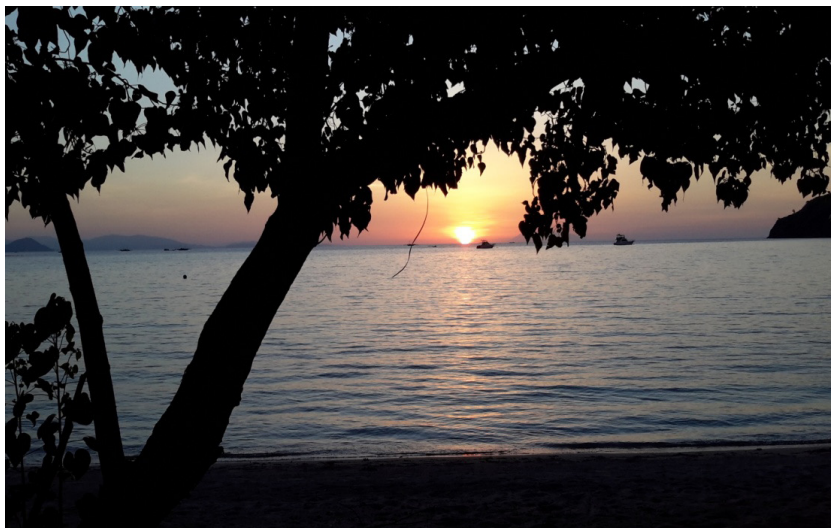
## The *Fajr*: In the Islam Mosaic and Modern Science

As stated in the holy Quran and hadith, praying time coincides with the position of the sun in the sky. Therefore, when determining the time, the most important astronomical data (*zīj*) is the position of the sun, in particular, its height (h) or distance of zenith (*bu'du as-sumti*)  $Z_m = 90^\circ - h$ . Morning twilight, sunrise, culmination, sunset, and evening twilight are closely related to the distance of zenith of the sun (Moedji Raharto, 2002:8).

Zuhur prayer begins when the whole solar disc has left meridian, about 2 minutes after at noon (Mohammad Ilyas, 1984). At top culmination, the center of the solar disc is at the meridian. However, for practical reason, median time is the middle time between sunrise and sunset.

Asar praying time has been a subject of difference in fiqh literatures because the phenomenon on which the calculation is based is unclear. In the above hadith, the prophet saw., was led to pray asar by angel Gabriel when the length of a shadow was the same as its object's height. Gabriel led prophet saw. the following day, however, when the length of the shadow was double. Although it can be concluded that asar time begins when the length of the shadow is the same as the height of its object, some different interpretations occur since the phenomenon is dependent upon seasons or yearly positions of the sun. In winter, the same occurrence may or may not be reached at Zuhur time since the shadow will always be longer than its height.

The idea of considering the length of shadow at Zuhur time or twice the height of the object (in some European countries) is meant to anticipate the shadow's length in winter (Depag RI, 1997:29). The other takes Asar time as precisely in the middle between Zuhur and Magrib times regardless the distance of zenith of the sun as mentioned in the holy Quran QS Al-Baqarah verse 238 *as-Salati al-Wusta* (praying is in the middle). Some interpreters interpret it as Asar prayer. Based on this interpretation, Asar time is earlier than that in the existing schedule.



Magrib time in islamic astronomy means the sunset (*ghurub*), where the whole solar disc cannot be observed by the viewer. The diameter of the solar disc is 32 arc minutes, half of it, 16 arc minutes. Besides, there is a refraction (*inkisar al-Jawwi*) of light near the horizon, causing the sun looks higher than it actually is, which is assumed as 34 arc minutes. Correction of pseudodiameter (*nishfu al-Quthr*) of the sun and the refraction against the zenith distance of the sun when arising as well as setting is 50 arc minutes. Therefore, sunrise and sunset, astronomically, are defined as the zenith distance of the sun reaches  $Z_m = 90^\circ 50'$ . The definition goes well at sea level or at a place where the zenith distance of the sun is  $Z_m = 91$  degree when the level of horizon is included due to the observer's position 30 meters above sea level. In addition, Magrib time is two minutes after the sun sets since praying at sunset, sunrise, and top culmination is forbidden.

Isyak time begins when the western sky turns to reddish in colour (*asy-Syafaq al-Ahmar*) showing the beginning of the dark night (QS. Al-Isra' verse 78). This phenomenon is known as astronomical twilight. At this time the sun is  $18^\circ$  below the west horizon or the zenith distance reaches  $108^\circ$  (Saadoe'ddin Jambek, 1974:11).

Meanwhile, in the fiqh literature most ulamas agree that subuh prayer begins at true dawn and ends at sunrise (*min tulu'i al-fajri as-sadiq ila tulu'i asy-syams*). In practice, the concept of true dawn draws

different opinions. In one occasion the fellow men were unable to recognize one another as they finished praying Subuh. It indicated that it was too dark to see clearly (*ghalas*). In another occasion, however, recognizing other's faces was possible which indicated the presence of sun light (*isfar*). Relating these occasions with Imamah Jibril hadith, we can easily understand that Imamah Jibril hadith is 'am while *ghalas* and *isfar* are special in nature. To cope with the problems, 'Am al-Makhsus or 'Am Yuradu Bihi al-Khusus theories may be applied in spite of potential implication occurrence.

The 5-time prayer a day was given after the prophet's Isra' and Mi'raj in 621 AD. Through the event and verses on prayers in the holy Quran, it can be inferred that Subuh prayer had been ordered during Mecca era. Mecca is at 21°25'NL and 39°49'EL. Surrounded by mountains, Mecca was a narrow valley with a very special building called Kakbah in the center. In the past, flood was a serious threat in raining season. The town has two seasons; winter from September to March reaching the coldest from December to February and summer from April with its peak in August. The temperature reaches as high as 55°C accompanied with hot wind in the day time. It is already bright after praying Subuh in summer, which contradicts that in winter. It indicates that *ghalas* occurs in winter and *isfar* in summer. The outlook is supported by Subuh praying timetable issued by Ummul Qurra calender as follows:

Table 1. Mecca Praying Time Table in Winter and in Summer

Winter		Summer	
Month	Time	Month	Time
September	4.45 – 4.54	April	4.55 – 4.27
October	4.54 – 5.04	May	4.27 – 4.10
November	5.05 – 5.19	June	4.09 – 4.12
December	5.19 – 5.25	July	4.12 – 4.28
January	5.25 – 5.38	August	4.29 – 4.44
February	5.38 – 5.22		
March	5.21 – 4.56		

(Source: Taqwim Ummul Qurra)

In the perspective of Islamic astronomy the position of the sun at dawn is somewhat a problem. True *fajr* in the astronomy (*falak ilmy*) is believed as astronomical twilight where light starts to be seen in the East horizon just before the sun rises at  $18^\circ$  below the horizon (zenith distance of the sun =  $108^\circ$ ). This is followed by at-Tabataba'i (At-Tabataba'i, tt, II:48), Mohammad Ilyas (Ilyas, 1984:144 – 145), Salih Muhammad al-Ujairy, Muhammad Ahmad Sulaiman, Muslim World League, and University of Science Karachi. Another opinion says that true *fajr* begins when the sun is  $19^\circ$  or  $20^\circ$  below horizon or the zenith distance of the sun is  $109^\circ$  or  $110^\circ$ . The theory is supported by Ummul Qurra Committee and Al-Marrakushi (d. 660 H/1261AD).

Table 2. The Angular height of the sun at Subuh and Isyak time by Several Organizations

No	Organizations	Countries of origin	Depression angle of the sun	
			Subuh	Isyak
1	Egyptian General Authority of Survey (Mesir)	Afrika, Syria, Irak, Lebanon	$-19,5^\circ$	$-17,5^\circ$
2	Islamic Society of North America (ISNA)	Canada, part of America	$-15^\circ$	$-15^\circ$
3	Muslim World League	Europe, Far East, Part of the United States	$-18^\circ$	$-17^\circ$
4	Islamic University of Karachi	Pakistan, Bangladesh, India, Afghanistan, and part of Europe	$-18^\circ$	$-18^\circ$
5	Taqwim Um`mul Quro (Saudi Arabia)	Arabian Peninsula	$-19^\circ$	90 minutes after maghrib
6	Syekh Taher Jalaluddin	Indonesia, Singapore, Malaysia, and Brunai Darussalam	$-20^\circ$	$-18^\circ$

Table 3. The Zenith Distance of the Sun at Subuh and Isyak

Astronomers	Isyak	Subuh
Abu Raihan al-Biruni	16-18	15-18
Al-Qaini	17	17
Ibnu Yunus, Al-Khalili, Ibn Syatir, Tusi, Mardeni, Al-Muwaqqit di Syiria, Magrib, Mesir, dan Turkey	17	19
Habash, Muadh, Ibn Haithim	18	18
Al-Marrakushi, Tunis, dan Yaman	16	20
Abu Abdullah al-Sayyid al-Moeti	18	19
Abu Abdullah ibn Ibrahim ibn Riqam	19	19
Chagmini, Barjandi, Kamili	15	15

The tables and other literatures reveal that the beginning of Subuh time is when the sun is  $18^\circ$  high in the East horizon or when the zenith distance is  $108^\circ$  (Ayyad, 1988:75 – 77). In Indonesia in the 2000s, most people or the majority take Subuh time when the sun is  $20^\circ$  below the true horizon like what is stated by the well-known Indonesian astronomer Saadoe'ddin Djambek, the so-called *mujaddid al-hisab* (the hisab thought revolusiner) of Indonesia. He stated that Subuh time began as the sunlight was seen below horizon in the East and ended as it rose. His opinion refers to astronomy that defines morning twilight as the position of the sun  $20^\circ$  below the horizon in the East.

Another expert Abdur Rachim said that Subuh time was signaled by true dawn where the sun was  $20^\circ$  below the horizon meaning the zenith distance of the sun was  $110^\circ$  ( $90+20$ ) (read Rachim, 1983:39-40) and was ended at *Syuruq* (raise) i.e.  $-01^\circ$ . The two experts' thought seems to be influenced by Syaikh Taher Djalaluddin Azhari who wrote "*Nakhbatu at-Taqrirati fi Hisabi al-Auqati*". Syaikh Taher mentioned that Subuh time started when the sun was at  $20^\circ$  below east horizon.

The theories mentioned above when being utilized result in different timetable. See the following table.

Table 4. Praying Timetable of December 1, 2017 According to Current Theories for Jakarta

	DATA/THEORI BEING UTILIZED						
	Karachi	ISNA	MWL	U Qurra	Egyptian	Ministry of Religion (Indonesia)	ISRN
<b>Zuhur</b>	11.42	11.42	11.42	11.42	11.42	11.42	11.42
<b>Asar</b>	15.08	15.08	15.08	15.08	15.08	15.08	15.08
<b>Magrib</b>	17.56	17.56	17.56	17.56	17.56	17.56	17.56
<b>Isyak</b>	19.11	18.58	19.07	19.26	19.09	19.11	18.42
<b>Subuh</b>	04.13	04.27	04.13	04.09	04.07	04.04	04.34

The table shows 30 minutes difference between the earliest Subuh time 04.04 (Ministry of Religion) and the latest 04.34 (ISRN).

The difference in determining the position of the sun during true *fajr* lures experts to conduct researches. A doctor candidate at Kulliyatul 'Ulum (Faculty of Science) Al-Azhar University Kairo-Egypt 1407H/1988 AD Nabil Yusuf Hasanain wrote his dissertation entitled *Dirasah al-Syafaq litabqiq Auqat as-Salah wa ru'yati al-Hilal*. In it he concluded Subuh time began as the sun reached  $-14.5^\circ$  in average. Unfortunately his thesis is unreliable academically since it had never been examined due to his death before examination. For the sake of science and technology, Madinah al-Malik Abdul Aziz together with 7 scientists went to a remote area, about 150 kms from Riyadh, for the whole year (1426 H/2005 AD) to conduct a research. The conclusion suggests that true dawn is at  $-14.6^\circ$  (Syaiikh Mamduh Farhan al-Buhairi, 2010:217-218).

Khalid Shawkat participated by going to six countries (the US, Pakistan, the UK, Caribia, Australia, and New Zealand) and concluded that the angular time of *fajr* is between  $-13.5^\circ$  and  $-14^\circ$ . With little factor safety 1o to 1.5o, it became  $-15o$ . This theory is then adopted by Islamic Society North America (ISNA) in determining the angle of the sun in relation with the beginning of Subuh and Isyak times (Syaiikh Mamduh Farhan al-Buhairi, 2010:216-217) before it was changed to  $-18^\circ$ . Abed Alqader Aabid and Hani Dalee also did a study in Jordan and concluded  $-16.5^\circ$  was the *fajr* angular time.

In Iran on February 17, 2008, true *fajr* was reported at 04:56:57 local time with the sun at  $-18^\circ$  as recorded in the CCD. It coincides with

the study by Abdul Haq (-18.9<sup>o</sup>) and Nihayatur Rohmah (-18.10<sup>o</sup>). From early April of 2013 till today, a discussion on angular true *fajr* occurs through a mailing list of the member of Islamic Crescent' Observation Project (ICOP). The discussion was stimulated by the statement of Sani Mustafa, a member of ICOP from Nigeria. Sani Mustafa cited al-Ghazali's opinion in his book *Ihya' Ulumuddin* (1989), vol. 1:227. Al-Ghazali wrote "dawn occurred when the moon rose on the 26/27 of each month in lunar calender".

In the discussion, the majority deny the authenticity of al-Ghazali's statement. According to Usman Dukku neither al-Quran nor as-Sunnah determines dawn based on a certain date. Despite the denial from the majority, Sani Mustafa insists on studying al-Ghazali's opinion comprehensively by putting *syar'i* and science aspects into consideration. Al-Ghazali admitted that his father had spent years observing dawn. Apart from the pros and cons, the study on dawn involving a number of parties, particularly in Indonesia, is still relevant.

When making subuh praying timetable, most Islam countries employ an idea the sun is at -18 degree high with the exception of Indonesia, Malaysia, Singapore, and Brunei Darussalam that use -20 degree. Look at the following table.

Table 5. Praying Timetable in Several Countries on November 12, 2017

No	Country	Subuh	Dawn	Zuhur	Asar	Magrib	Isyak
1	Indonesia	04.06	-	11.40	15.00	17.51	19.04
2	Singapore	05.25	06.47	12.50	16.12	18.51	20.03
3	Malaysia	05.40	06.57	13.00	16.22	18.58	20.10
4	Brunai	04.47	06.07	12.04	15.27	18.02	19.14
5	Quwait	04.47	06.09	11.32	14.33	16.55	18.17
6	Saudi	05.14	06.32	12.08	15.20	17.44	19.12
7	Qatar	04.23	-	11.18	14.25	16.47	18.17
8	Bahrain	04.35	-	11.22	14.28	16.50	18.20
9	UEA	05.18	06.34	12.10	15.17	17.39	18.56
10	Iraq	05.05	06.31	11.46	14.41	17.02	18.32
11	Iran	05.09	06.37	11.48	14.39	16.59	18.22

(Source: adapted from various media and personal data)



## Conclusion

It can be summarized that different concept of *fajr* in the world of Islam arises for two reasons. Imamah Jibril hadith is considered too general in nature. Another reason is the existence of different interpretation on “*ghalas*” and “*isfar*” hadith due to the absence of reconstruction of the condition and weather in place of speaking. In addition, when interpreting the concept, moslem astronomers focus on the position of the sun. It is, therefore, time to study the beginning of subuh praying time by applying interdisciplinary approach to meet the demand from syar’i and modern science to reach a more valid and trustworthy result. In responding the polemic of on the beginning of dawn, it is good to consider what Syaikh Ridha Ahmad Shamadi al-Tailandi said. “.....man kind is not supposed to hurry blaming what experts are working on and are looking for the right answers. What he has to do is studying, discussing, and filtering it thoroughly to give the best result that does not provoke chaos in the moslem society.”[]

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