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# The Role of Islamic Religious Education Teachers in Teaching Prayer Times: A Figh and Astronomical Perspective

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#### **ABSTRACT**

This research aimed to analyze the role of Islamic Religious Education in exploring how fiqh and falak contribute to determining the precise timing of prayers. Prayer is one of the fundamental pillars of Islam and must be performed according to its prescribed times. In the Qur'an and Hadith, the times for prayer are mentioned based on the movement of sunlight as seen from the earth (Ru'yah Methode). However, due to changes in natural phenomena, sunlight is not always visible from the earth because of clouds or other factors. Therefore, it needs to be compared with the science of astronomy or astronomy, which has proven to be accurate and valid (Hisab Methode). Thus, in this case, there is a mutualistic symbiosis, where what is done by the ru'yah methode can be used as empirical evidence of the results of the hisab Methode, and vice versa. Islamic Religious Education teachers play an important role in guiding students to understand prayer times from the perspective of fiqh and astronomy.

**Keywords:** *Islamic Religious Education; Prayer; Figh; Astronomy.* 

## **INTRODUCTION**

Indonesia, as a country with the largest Muslim population in the world, the understanding of prayer times remains a significant issue, especially in rural and remote areas where access to accurate astronomical data and proper religious education is limited. Many students and even community members rely solely on traditional methods or local customs to determine prayer times, which sometimes leads to inaccuracies and confusion. This issue is further compounded by the lack of integration between religious knowledge (fiqh) and scientific understanding (astronomy) in the teaching process. Islamic Religious Education teachers play a vital role in bridging this gap, yet many still face challenges in effectively conveying the concept of prayer times using both fiqh and astronomical perspectives. Strengthening this integration in the school curriculum is crucial to ensure students not only understand the religious obligations but also appreciate the scientific basis behind them.

Salat, according to language, comes from the arabic word *shalla*, *yusholly*, *Salatan*, which means prayer. Whereas, in terms of terminology, salat means a form of worship that includes recitation and actions, beginning with the *takbiratul ihram* and ending

with the *salam*, under certain conditions (Al-Qalyubi & Umairah, n.d.). Prayer holds a special and fundamental place, as it is one of the pillars of Islam that must be upheld. However, in fulfilling the obligation of prayer, Muslims are bound by the predetermined times. Therefore, prayer cannot be performed at any time, but must follow or be based on evidence from both the Qur'an and Hadith. In Surah An-Nisa, verse 103, it is explained that 'Indeed, prayer is enjoined upon the believers at specified times' (Al-Qur'an, 2023). Additionally, it is explained in Sahih Muslim hadith number 966 that 'The time for Zuhr is when the sun has passed its zenith until a person's shadow is equal to their height, which is until the time for Asr arrives.' The time for Asr is as long as the sun has not turned yellow, and the time for Maghrib is as long as the red twilight has not disappeared. The time for Isha lasts until midnight. The time for Shubuh begins at dawn until the sun rises (Muslim, 2025).

Before humans discovered calculations or astronomical calculations, during the time of the Prophet Muhammad, prayer times were determined based on observations of natural phenomena by directly observing the sun. Then it developed with the creation of the Sundial or Solar Clock and the Istiwa Clock, often referred to as the Istiwa Stick, which in Javanese is called *bencet*, a simple tool to determine time based on the shadow of the sun. With the advancement of human civilization, various conveniences have been created to make humans more practical in all aspects, including in worship, especially in performing obligatory prayers. Currently, we know that many prayer schedules have been published by various institutions and organizations, including the Ministry of Religious Affairs, Muhammadiyah, Persis, Nahdlatul Ulama (NU), and others. However, all of this cannot be separated from the principle that is actually used to determine prayer times, which is the movement of the sun as seen from the earth (Faiz, 2021).

In the context of education, Islamic Religious Education teachers play an important role in guiding students to understand prayer times with a comprehensive approach, both from the perspective of fiqh and astronomy. In fiqh, the time for prayer is determined based on natural signs mentioned in the Qur'an and Hadith, such as the position of the sun and the shadow of objects. Meanwhile, astronomy provides a scientific method for calculating prayer times more accurately using astronomical calculations. The integration of these two approaches becomes crucial in education so that students not only understand prayer times textually but also scientifically. However, in practice, there are still challenges in teaching prayer times in schools. The lack of student understanding of astronomy and the limited resources for teaching astronomical aspects pose challenges for Islamic Riligious Education teachers. Therefore, this research aims to analyze the methods of teaching prayer times used by Islamic Riligious Education teachers and to explore how fiqh and astronomy contribute to determining prayer times accurately.

#### **METHOD**

This research is a non-field qualitative study that uses library research methods. This research aims to analyze the role of Islamic Religious Education teachers in

teaching prayer times based on the perspectives of fiqh and astronomy, by referring to relevant written sources. A descriptive qualitative approach is used to illustrate the concepts and theories related to teaching prayer times from the perspectives of fiqh and astronomy. This research does not involve direct data collection from the field but focuses on the analysis of literature obtained from relevant written sources, such as fiqh books discussing prayer times, scientific journals on astronomy explaining methods for calculating prayer times astronomically, and Islamic religious education curricula related to teaching prayer.

## FINDINGS AND DISCUSSION

## Prayer Times from the Perspective of Figh and Astronomy

The scholars of fiqh set the boundaries of prayer times using various methods or techniques that they assume to determine those prayer times. Some of them assume that the method of determining prayer times is by directly observing natural signs as mentioned textually in the Prophet's hadiths, such as using tools like the istiwa stick, miqyas, or hemispherium. This is the method or approach used by the "madzhab" rukyah in determining the prayer times. Thus, the determined prayer times are referred to as visible times (*al-Auqat al-Mar'iyyah*). Meanwhile, some others have a contextual understanding, in accordance with the intent of those texts, where the beginning and end of prayer times are determined by the position of the sun as seen from a specific location on Earth, so the method or approach used is calculation (determining prayer times). Where the essence of calculating prayer times is to determine when the sun will occupy the positions mentioned in the texts of prayer times. Thus, this understanding is used by the hisab school in the matter of determining prayer times, which they refer to as Riyadhy time (Novegar et al., 2023).

Throughout the author's research, it was found that the texts used as the basis for determining the start time of prayers are interpretative in nature. As an implication, differences arise in determining the start times of prayers. The first group believes that the beginning times for prayer are three. Meanwhile, the second group states that the beginning of prayer times is five. In Indonesia, the more prevalent opinion is the second one. This is based on the understanding of the Qur'an, Surah An-Nisa' verse 103, Al-Isra' verse 78, and Taha verse 130, which is also supported by the hadith from Jabir bin Abdullah narrated by Ahmad, Nasa'i, and Tirmidhi. Based on the understanding of the Quranic verses and hadiths, the timings for the prayers are detailed as stated in the fiqh books as follows: (1) Zuhr, The time for Zuhr begins when the sun has passed its zenith, which is just after the sun reaches its culmination in its daily orbit, until the time for Asr. (2) Asr, the time for Asr begins when the length of the shadow of an object is equal to the object itself plus the length of the shadow when the sun is at its zenith, until the time for Maghrib. (3) Maghrib, the time for Maghrib begins at sunset until the time for Isha, (4) Isha, the time for Isha begins when the red twilight disappears until midnight (some also state that the end of Isha prayer is at

dawn), and (5) Fajr, the time for Fajr begins at dawn until sunrise. These formulations still leave room for discussion (Bashori, 2015).

From the provisions contained in the Qur'an and Hadith, it can be understood that the rules of prayer are related to the position of the sun in the celestial sphere. Therefore, in determining the initial time for prayer, the most important astronomical data (zij) is the position of the sun, especially its altitude, h, or zenith distance (bu'du as-sumti), Zm = 90 — h. The phenomena of early dawn (morning twilight), sunrise, solar noon (culmination), sunset, and late dusk (evening twilight) are related to the solar zenith distance (Raharto, 2001).

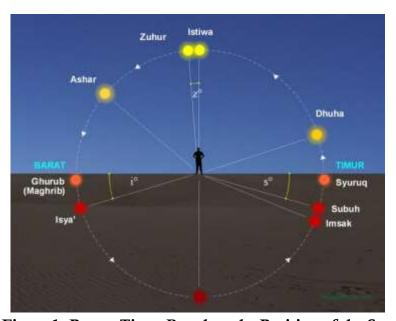


Figure 1. Prayer Times Based on the Position of the Sun

**Zuhr time,** also known as Istiwa (*zawaal*), occurs when the sun reaches its highest point in the sky, known as the culmination point. This moment is also referred to as midday (noon). At Istiwa, performing any prayer, whether obligatory or voluntary, is prohibited, except for Friday prayer. Zuhr time begins immediately after Istiwa, when the sun starts to decline towards the west. Astronomically, this happens when the edge of the sun's disk moves out of the zenith line, which is the vertical line connecting the observer to the sun at its highest point. At the moment of upper culmination, the center of the sun's disk is positioned on the meridian. In practical terms, midday can be estimated by taking the midpoint between sunrise and sunset. This method provides a convenient approximation for determining prayer times. Midday time can be found in astronomical almanacs or calculated using specific algorithms. For precise prayer times in a specific location, one can refer to astronomy software, prayer time applications, or official schedules provided by religious institutions. (Qorib & Rakhmadi, 2023).

Asr time, according to the Shafi'i, Maliki, and Hanbali schools of thought, Asr time begins when the length of an object's shadow exceeds the length of the object itself. Meanwhile, the Hanafi school defines Asr time as starting when the shadow is twice the length of the object. Based on these different interpretations in Islamic jurisprudence, there is no unanimous agreement on the exact beginning of Asr time.

This discrepancy arises because the phenomenon used as a reference is not entirely clear. In a hadith, the Prophet Muhammad was invited by Angel Jibril to perform Asr prayer when the shadow was equal to the height of the object. On the following day, Jibril invited him when the shadow was twice the height of the object. While this suggests that Asr begins when the shadow equals the object's height, it still leads to various interpretations. This is because such a phenomenon cannot be generalized, as it depends on seasonal variations and the annual position of the sun. During winter, this condition might occur around Zuhr time, or in some cases, it may never happen at all, as shadows tend to remain longer than the actual object throughout the day. This seasonal dependency makes the determination of Asr time more complex, requiring careful observation and adjustment based on geographical location and time of year (Al Zuhaili, 2006). The opinion that considers the length of the shadow at Zuhr or uses the two-times shadow length rule (as applied in some European countries) is intended to address the issue of long shadows during winter. Another perspective suggests that As r prayer time is simply the midpoint between Zuhr and Maghrib, without needing to account for the sun's zenith distance. This view is supported by the phrase "as-Salati al-Wustha" (the middle prayer) in Surah Al-Baqarah, verse 238, which some scholars interpret as referring to Asr prayer. If this interpretation is followed, Asr time would be earlier than the commonly accepted prayer schedules. As time can be calculated using specific algorithms that apply three-dimensional trigonometry. Astronomically, the sun's altitude at the beginning of Asr varies depending on the annual movement of the sun and seasonal changes. In Indonesia, the Ministry of Religious Affairs follows the criterion that Asr time begins when the shadow length equals the object's length plus the shadow length at Istiwa (solar culmination). As a result, the solar altitude angle at Asr (ao) varies from day to day, adapting to the shifting position of the sun throughout the year (Ismail & Husnaini, 2021).

Maghrib time, it begins when the sun sets on the horizon and lasts until the red twilight disappears in the western sky. Astronomically, Maghrib starts when the entire solar disk has descended below the visible horizon (ufuk Mar'i) and continues until Isha time, which is defined by the sun's position  $i_0$  degrees below the western horizon. In Indonesia, the Ministry of Religious Affairs adopts the criterion that Isha begins when the sun is 18 degrees below the horizon. In Islamic astronomy (Falak), Maghrib is marked by sunset (ghurub), when the entire solar disk is no longer visible to the observer. The sun's disk has a diameter of 32 arc minutes, meaning half of it measures 16 arc minutes. Additionally, near the horizon, atmospheric refraction (inkisar aljawwi) causes the sun to appear higher than its actual position, with an assumed correction of 34 arc minutes. The combined correction for solar semidiameter (nishfu al-Quthr) and refraction results in a zenith distance correction of 50 arc minutes at sunrise and sunset. Therefore, in astronomical calculations, sunrise and sunset are defined when the solar zenith distance (Zm) reaches 90 degrees for locations at sea level. If the observer is 30 meters above sea level, the zenith distance is adjusted to 91 degrees to account for the lower horizon due to elevation. For Maghrib prayer timing, sunset is typically extended by 2 minutes due to the prohibition of performing prayers exactly at sunrise, sunset, or solar culmination. This precaution ensures that Maghrib prayer is performed after the sun has fully set, avoiding the times considered Makruh (discouraged) for prayer. (Zainal et al., 2022).

Isha time, it begins when the red twilight (asy-Syafaq al-Ahmar) in the western sky fades, marking the arrival of night darkness, as mentioned in Surah Al-Isra' (78). In astronomical terms, this phenomenon is known as the end of astronomical twilight. Astronomically, Isha time is the reverse of Fajr time. It starts when the sun reaches  $i_0$  degrees below the western horizon and lasts until just before the sun reaches  $s_0$  degrees below the eastern horizon. At this point, the sun is positioned 18 degrees below the western horizon, or when the solar zenith distance equals 108 degrees. This definition ensures that Isha prayer is performed when the sky is completely dark, distinguishing it from twilight phases where residual sunlight is still present (Butar-Butar, 2017).

**Subuh Time**, or Fair time begins at the appearance of true dawn (*Fajar Shiddiq*) and lasts until sunrise (Syuruq). Fajar Shiddiq is characterized by a white light stretching horizontally along the eastern horizon, caused by the reflection of sunlight by the atmosphere. Before true dawn, there is a faint vertical glow in the eastern sky known as false dawn (Fajar Kidzib or Fajar Semu). This phenomenon occurs due to sunlight scattering off interplanetary dust particles located between Earth and the Sun. After a few minutes, this light fades, and the sky darkens again. Shortly after, a horizontal spread of light appears across the horizon—this is Fajar Shiddiq, marking the beginning of Subuh prayer time. Astronomically, Fajar Shiddig is understood as the start of astronomical twilight, appearing when the sun is approximately 18 degrees below the eastern horizon (or when the solar zenith distance equals 108 degrees) until the upper edge of the sun touches the visible horizon (Ufuk Hakiki). Some scholars suggest that true dawn begins when the sun is 20 degrees below the horizon (solar zenith distance = 110 degrees), arguing that human eyes are more sensitive in the morning due to the transition from darkness to light. In Indonesia, the general practice follows this 20-degree criterion, meaning Subuh prayer begins when the sun is 20 degrees below the true horizon. (Ardi, 2020).

Sunnah prayers, it do not all have specific times, but some have designated periods based on the teachings of Prophet Muhammad. These times follow the prescribed prayer schedules and are influenced by astronomical factors. Among the sunnah prayers with specific times are: Duha Prayer, performed when the sun has risen slightly (according to some scholars, at a height of one spear-length or seven handspans), approximately 3.5 degrees above the horizon. Eid Prayer, conducted on the morning of the first day of Eid al-Fitr or Eid al-Adha, generally performed during Duha time, when the sun has just risen (following the same height criterion as Duha). Tarawih Prayer, performed during Isha time, typically after Isha prayer and before the pre-dawn (Imsak). Eclipse Prayer (Salat al-Kusuf and Salat al-Khusuf), performed during a solar or lunar eclipse. Due to the apparent movement of the sun, shifting 23.5 degrees north and south over the course of a year, these prayer times change daily. As a result, prayer schedules are compiled for an entire year and can be reused in

subsequent years. Additionally, geographical location and elevation influence these timings, requiring adjustments based on local conditions. Given these variations, it is essential to integrate contemporary research into prayer time calculations to ensure alignment with Islamic teachings and modern science. This approach enhances accuracy and ensures that prayer schedules remain valid and precise. (Khazin, 2004).

## The role of Islamic Religious Education Teachers in teaching prayer times

Islamic Religious Education Teachers play a crucial role in teaching prayer times using both Islamic jurisprudence (Figh) and astronomical sciences (Falak). Accurate understanding of prayer times not only enhances students' quality of worship but also strengthens their discipline in performing prayers on time. Therefore, innovative teaching strategies and technological support are essential to improve the effectiveness of prayer time education in schools. As educators, mentors, and facilitators, Islamic Education Teachers help students comprehend prayer times correctly. One of their key roles is explaining the concept of prayer times in Figh. Given that Islamic Religious Education teachers teach subjects included in the national curriculum, they have a broad opportunity to introduce this material at various educational levels, from Elementary School, Junior High School, Senior High School, to University . By integrating religious teachings with scientific knowledge, teachers can ensure that students develop a deep understanding of prayer times, fostering both spiritual awareness and practical application in their daily lives (Yani, 2021). Islamic Education Teachers play a vital role in teaching prayer times both theoretically and practically. They can explain the Qur'anic and Hadith-based foundations of prayer times during Islamic Education lessons, which are part of the mandatory curriculum in schools. Additionally, they can introduce natural signs used to determine prayer times, such as the sun's position and shadow length, through simulations and hands-on activities in the classroom.

Integrating Astronomy in Learning, Islamic Religious Education teachers can introduce prayer time calculations based on astronomy (Falak) using reference books and available tools. Since educational institutions have resources to support learning, teachers can utilize digital prayer schedules, astronomical clocks, and software applications to enhance students' understanding. Guiding Practical Prayer Time Determination, Teachers can encourage students to observe the sun's movement directly, providing simulations on how to use prayer schedules and astronomy-based applications such as Accurate Times, Athan Software, Prayer Times, Mawaqit, and Salat Time. Additionally, the Al-Falak 2025 software, published by the Badan Hisab Rukyat (BHR) of the Ministry of Religious Affairs, is widely distributed for national use. Instilling Awareness of Timely Worship, Islamic Religious Education teachers should motivate students to be disciplined in performing prayers on time, linking punctuality to spiritual and social values. However, it is essential for teachers to lead by example, as they are expected to demonstrate strong moral character and serve as role models for their students (Pujianti & Nugraha, 2024). By combining religious teachings, scientific knowledge, and practical experience, Islamic Education Teachers

ensure that students develop a deep understanding of prayer times, fostering both spiritual awareness and practical application in their daily lives.

Challenges in Teaching Prayer Times, Despite their crucial role, Islamic Education Teachers often face several challenges in teaching prayer times. One major issue is students' lack of understanding of astronomy (Falak), making it difficult for them to grasp scientific calculations of prayer times. Additionally, limited resources, such as the lack of teaching aids that support a scientific approach to prayer time determination, further complicate the learning process. Another challenge is the lack of training for Islamic Religious Education teachers, particularly in astronomical aspects related to prayer times.

Strategies to Improve Prayer Time Education, To overcome these challenges, several strategies can be implemented Providing training for Islamic Religious Education teachers to enhance their understanding of Falak and scientific methods for determining prayer times. Integrating technology into learning, such as using astronomy-based prayer schedule applications, applying interactive approaches, including direct observation of the sun's movement and simulations of prayer time calculations, and utilizing effective educational methods derived from the Qur'an, such as Discussion Method (Surah An-Nahl 16:125), Question-and-Answer Method (Surah As-Saffat 37:100-109), Lecture Method (Surah Yunus 10:23), Demonstration Method (Surah Al-Kahf 18:66-82) - Experimental Method (Surah Ar-Rahman 55:33), Role Model Method (Surah Al-Ahzab 33:21), Parable Method (Amtsal) (Surah Al-Bagarah 2:17), Encouragement and Warning Method (Targhib wa Tarhib) (Surah Al-Bayyinah 98:6-8), Repetition Method (Tikror) (Surah Al-Fatihah 1:6-7), by implementing these strategies, ISLAMIC RELIGIOUS EDUCATION teachers can enhance students' understanding of prayer times, ensuring that they grasp both religious principles and scientific accuracy in determining prayer schedules (Suyati et al., 2023).

#### **CONCLUSION**

Prayer times are a fundamental aspect of a Muslim's worship that must be understood accurately. Determining prayer times is not only based on fiqh evidence but also requires an understanding of astronomy to ensure the accuracy of the timing based on the movement of the sun. The determination of prayer times astronomically by experts now attempts to create a formula for prayer times based on the geographical location and altitude of a place on the Earth's surface in the form of a computer program that can produce an accurate data tabulation in a Prayer Time Schedule. Now, prayer time software continues to be created and developed, such as Accurate Times, Athan Software, Prayer Times, Mawaqit, Salat Time, and others. In addition, the software published by the Badan Hisab Rukyat (BHR) of the Ministry of Religious Affairs, which is disseminated nationally, is Al Falak 2025. In the context of education, Islamic Religious Education teachers play an important role in guiding students to understand prayer times with a comprehensive approach, both from the perspective of fiqh and astronomy. Research results show that Islamic Religious Education teachers teach prayer times using a fiqh approach through Quranic verses

and Hadiths, as well as using astronomy to understand the astronomical calculations of prayer times. The integration of these two approaches allows students to understand prayer times more accurately and scientifically. However, the main challenges in this teaching include the lack of student understanding of astronomical science and the limited resources for teaching the astronomical aspects of prayer times. By addressing these challenges through training, technological integration, and interactive learning methods, Islamic Religious Education teachers can ensure that students develop a precise and scientific understanding of prayer times, strengthening both their religious knowledge and practical application in daily worship

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