

## Between Text and Telescope: Fiqh-Science Dialectic in Determination of the Indonesian Hijri Calendar

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### Abstract

The determination of the beginning of the month in the Hijri calendar in Indonesia often raises debates, especially between large religious organizations such as NU and Muhammadiyah, as well as government agencies such as the Ministry of Religion. This difference in views arises due to the diversity of methods and standards applied in the observation of the new moon as a marker of the beginning of the Hijri month. This paper examines the relationship between fiqh (Islamic law) and astronomy in determining the beginning of the Hijri month in Indonesia. Through a literature study that combines scientific and religious approaches, this paper identifies three forms of relationship between fiqh and science. First, astronomy plays a role in translating fiqh concepts into scientifically measurable criteria to determine the beginning of the Hijri month. This shows the interdependence between the two disciplines in making decisions based on religious values and empirical evidence. Second, the dynamics of determining the beginning of the Hijri month in Indonesia show a complex relationship between fiqh and science, with diverse perspectives from scholars and scientists on the standard of lunar observation. Third, fiqh serves to give legitimacy to astronomy in the practice of rukyatul hilāl (crescent moon observation) through a testimony system, where fiqh experts set the conditions of witnesses and use oaths to validate empirical scientific data that support the appearance of the moon. This paper presents an in-depth understanding of the complex relationship between fiqh and science in determining the beginning of the Hijri month in Indonesia.

**Keywords:** Fiqh, Falak, Hilāl, Hijri Month.

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### INTRODUCTION

The issue of determining the beginning of the month in the Hijri calendar continues to be an ongoing debate in Indonesia (Alwi, 2020). For example, in 2023, when the Ministry of Religious Affairs together with Nahdlatul Ulama (NU) decided that 1 Shawwal 1444 H would fall on April 22, 2023, but this was different from the decision of Muhammadiyah which set it on April 21, 2023 (Sumitro, 2023). Similar differences of opinion also occurred in the previous year when determining the beginning of Ramadan 1443 H, where the Ministry of



Religion and NU agreed on April 3, 2022, while Muhammadiyah determined April 2, 2022 (Sudirman, 2022). It should be noted that the Ministry of Religious Affairs is the official government institution, while NU and Muhammadiyah are the two largest Islamic community organizations in Indonesia. The inconsistency in the determination of the beginning of the Hijri month has a considerable impact on the implementation of religious rituals of Muslims, such as the implementation of fasting, Eid prayers, Eid al-Adha prayers, and various other worships (Abidin, 2012).

The difference of opinion in determining the beginning of the Islamic month stems from the diversity of approaches and standards used to interpret the concept of “hilāl” (new crescent moon) (Jayusman, 2015), which is the foundation of the determination of the Hijri calendar. In the Qur’an, it is stated that a year includes 12 months with each having a specific manzilah or position of the month (as stated in Sūrat Yāsīn [36]:39 and Sūrat Yūnus [10]:5). The Qur’an also interprets hilāl as a marker of time (Sūrat al-Baqarah [2]: 189), but does not provide a detailed explanation of the specific parameters of the concept of hilāl (Hasan, 2015). Consequently, the implementation of various provisions of Islamic sharia depends on the emergence of a new hilāl. An accurate understanding of hilāl has great significance in the spiritual life of Muslims because it is closely related to the performance of their religious rituals (al-Asqalani, 1989). Furthermore, the existence of varied interpretations of hilāl and the emergence of new parameters in its determination add to the complexity in determining the months in the Hijri calendar in Indonesia.

A number of researchers have studied the dynamics in this regard. Wahidi conducted research on the implementation of MABIMS (Majelis Agama Brunei Darussalam, Indonesia, Malaysia, and Singapore) standards to determine the month in the Hijri calendar (Wahidi et al., 2021). At the same time, Zufriani analyzed procedures, obstacles, and discussions regarding effective hilāl observation (Zufriani et al., 2023). Subsequent research focused on the criteria of the hilāl from a scientific point of view, such as those done by Odeh (2004), Ilyas (1994), and Djamaluddin et al. (2010). Simultaneously, Royyani et al. (2023), Muhalling and Hasbi (2023), and Marpaung and Nurhayati (2019) seek to harmonize religious and scientific perspectives in determining the Hijri month. Chotban (2020) follows the same pattern by researching the incorporation of religious and scientific aspects.

This paper complements previous research by exploring the relationship between fiqh (Islamic law) and scientific knowledge in determining the beginning of the months of Ramadan and Shawwal in Indonesia. The author argues that there is a complicated relationship between Islamic fiqh and science in the context of determining Islamic months.

## METHOD

This study adopts a literature research method using two approaches, namely scientific and doctrinal approaches (Ali, 1991). Both approaches integrate religious teachings with empirical-scientific studies (Trisnani & Awaludin, 2022). In this literature research, the author examines the main data in the form of a decision to determine the beginning of the Hijri month issued by the Hisab and Rukyat Agency (BHR) during the 2010-2023 period, as well as the decision of the Ministry of Religion for the 2022-2023 period.

This research also uses various secondary sources, including fiqh works from both classical and modern times, scientific publications, research results, and websites related to research topics. The purpose is to examine the policies taken by the Ministry of Religious Affairs, NU, and Muhammadiyah in determining the beginning of the month, and relate it to the perspective of fiqh experts on the concept of hilāl. The data that has been collected is then analyzed using a qualitative analysis method.

## RESULT AND DISCUSSION

### Translating the Term Hilāl into Astronomical Language

In terms of the origin of the word, “hilāl” is an Arabic term that refers to the crescent moon or moon phase in the first two days of the new moon (Munawir, 1997). In the sense of the term, hilāl describes some of the white rays of the moon that can be observed when entering the beginning of the month in the Hijri calendar. According to the view of Ibn Manẓūr (n.d.), the term hilāl only applies to the crescent moon that appears on the first two nights of each month. However, some scholars have a different view that the hilāl period lasts for three nights, and after that it is called qomar (moon). The majority of scholars believe that the hilāl period is only two nights because the intensity of the light becomes brighter on the third night. Based on this understanding, hilāl is the part of the white light of the moon that appears, especially on the first day of its appearance. Thus, the determination of the new moon depends on the ability to see or observe the hilāl directly. Therefore, even though the moon is above the horizon, if it cannot be seen at sunset, it cannot be established as a sign of the start of a new moon.

The Qur’an uses two terminologies to refer to the Moon, namely “hilāl” and “qomar”. The word “hilāl” is mentioned only once in this holy book, namely in Surah al-Baqarah verse 189. In this verse, the plural form ‘ahillah’ is used which indicates that this event takes place repeatedly. Al-Zuhaylī (1411 AH) explains that the Moon appears in various forms, starting from the crescent phase, increasing in size until it reaches a perfect shape, and then shrinking again until it is invisible. The terminology of hilāl was chosen because of its appearance after a closed or hidden period. Therefore, hilāl can be observed on the first nights, namely the first, second, and third nights, while after that it is called qomar. Hasan (2015) makes a distinction between these two terms even though they refer to the same Moon. “Qomar” specifically refers to the phase of the full Moon, this interpretation is based on Surah al-Insyiqāq verse 18 which connects qomar with the perfect Moon conditions. In the Qur’an, qomar is always written in the singular, which indicates the peculiarity of the phase of the full moon which only occurs once in a month.

Based on the interpretation of al-Qurthūbī (1967), the verse in question was revealed in response to a question from the Jewish community submitted to Mu‘ādh bin Jabal regarding hilāl (crescent moon). This question was then forwarded by Mu‘ādh to the Messenger of Allah, which ultimately resulted in the revelation being revealed. The main focus of this verse is to explain the wisdom behind the phases of the moon’s changes, not to discuss its orbital trajectory. The verse illustrates the change of the crescent moon from the weakest state to the strongest state. According to Ibn Kasīr (n.d.), this transformation cycle serves as a benchmark

for determining various important periods, such as the period of women's *iddah*, the time of the Hajj pilgrimage, and the determination of the beginning and end of the month of Ramadan.

Meanwhile, Ibn Taymiyyah emphasized that the validity of *hilāl* is determined by two factors: it can be seen with the naked eye and the presence of the reports of one or two witnesses. If a person observes *hilāl* but does not report it, then the *hilāl* is not considered valid. According to Ibn Taymiyyah, the valid criterion of *hilāl* is its manifest appearance (*al-zhahūr*) and clearly announced (*rafā'a al-shaut*). In other words, *hilāl* that is in the sky but is not visible from Earth cannot be accepted as a valid *hilāl*. And vice versa, if *hilāl* can be seen from the Earth but no one reports it, then its status is not recognized (Ibn Taymiyyah, n.d.).

In the Indonesian context, scholars provide an explanation of *hilāl* with an astronomical approach through the observation of the shape of the crescent moon. This explanation emerged from an in-depth discussion and comprehensive research on the concept of *hilāl* in *fiqh* (Hasan, 2012), which includes MABIMS and Neo MABIMS standards. For example, Raharto has grouped the concept of *hilāl* into four different categories based on the meaning of *hilāl* and testimony in Indonesia. *Fiqh* scholars agree with the understanding of *hilāl* put forward by Raharto.

Furthermore, the standard for determining the crescent moon has been compiled based on the definition of the new moon and data obtained through direct observation. In 2009, Djamaluddin stated that in order for *hilāl* to be valid, the angle of the distance between the Moon and the Sun must exceed  $6.4^\circ$ , and the distance between the two must be more than  $4^\circ$ . The criteria proposed by Djamaluddin were then refined in 2013. Based on the data of observation of rukyah al-*hilāl* over a long period of time, Djamaluddin stated that these special criteria determine the existence of *hilāl* (Djamaluddin, 2010).

Indonesian astronomy researchers have formulated the meaning of *hilāl* based on a scientific perspective by referring to the results of lunar observations. This formulation was born from an in-depth study and intensive discussion on the interpretation of Islamic law on *hilāl*, including the development of MABIMS and Neo MABIMS standards. Raharto, for example, developed four different conceptions of *hilāl*. The first concept explains that the crescent moon that appears after the conjunction or when the sun sets after the conjunction must remain above the horizon, provided that the new moon fraction is  $F > 0^\circ$  and the height of the  $h_{\text{moon}}$  moon is  $> 0^\circ$  at sunset. The second concept stipulates that a crescent moon that can be observed for the first time with the naked eye after the conjunction must have  $F > F_{\text{critical}}$  (with  $F_{\text{critical}} > 0.7\% - 1\%$ ) and  $h_{\text{critical}} > h_{\text{critical}}$  when  $h_{\text{critical}} > 0^\circ$  at the time of observation  $t = t_0 + \Delta t$ , where  $t_0$  is the time of sunset and  $\Delta t$  is the time interval between observation and sunset (Raharto, 2009).

The third concept requires that the crescent moon meet mutually agreed-upon criteria, such as an altitude of at least  $2^\circ$  at sunset. The fourth concept discusses the phenomenon of "pseudo-sighting" or pseudo-observation of the crescent moon, which is a condition in which the moon is reported to be visible even though the observation situation is not favorable or even before the conjunction actually takes place. This last category is related to inaccurate reports of new moon sightings, such as when the weather is cloudy, the moon has set before

the sun, or the conjunction has not yet taken place (Raharto, 2009). The formulation developed by Raharto is based on the definition of hilāl and evidence of testimony from Indonesian territory, and is in line with the agreement of Islamic legal experts (*fuqaha*).

The criteria for determining hilāl (crescent moon) have been compiled based on the meaning of hilāl itself and the results of empirical observations. Djamaluddin in 2009 formulated two conditions that hilāl-Sun must meet: first, the distance of the hilāl-Sun angle must exceed  $6.4^\circ$ , and second, the hilāl-Sun distance must be more than  $4^\circ$ . This criterion was then corrected by Djamaluddin in 2013 by changing the second condition to a minimum distance of  $3^\circ$  from the Moon-Sun, while the first condition remained above  $6.4^\circ$  (Djamaluddin, 2010). Through the analysis of hilāl observation data over a long period, Djamaluddin concluded that the presence of hilāl can be determined through several parameters of astronomical calculations, namely: the minimum altitude in units  $^\circ$  at a certain distance from the Sun, the time interval between the setting of the Moon and the Sun measured in  $^\circ$  and minutes, and the level of lunar illumination in percentages.

The results of the study show that science acts as a bridge to translate the provisions of hilāl in Islamic law into astronomical terminology. This step includes the evaluation of the results of the observation of hilāl (*rukyah al-hilāl*) that has been approved by the government as meeting the provisions of the sharia, along with the observation of the condition of the new moon in the calculations of astronomers (Rupi'i, 2012). In setting the standard of hilāl, science refers to the principles of fiqh as the foundation. The standard serves as a way to determine the beginning of the month and validate the results of *rukyah al-hilāl* in the field. Thus, the determination of the beginning of the month in Indonesia has its roots in the fiqh tradition, but it is articulated using scientific terminology.

This approach is in line with Royyani's study which proposes that astronomical research combined with astronomical methods can deepen the interpretation of nash-nash fiqh through scientific foundations (Royyani et al, 2023). However, the results of Royyani's study are still at the conceptual level and have not adequately described the concrete implementation in the process of determining the beginning of the month. This study underlines the urgency of combining fiqh and astronomy in translating the concept of hilāl, both conceptually and implementatively.

### **The New Hilāl and the Dynamics of Determining the Beginning of the Hijri Month: Between Fiqh and Science**

The determination of the beginning of the month in the Hijri calendar in Indonesia has undergone a complex development, especially related to the newly emerging standards of moon observance. There are differing views among Islamic scholars about the conditions under which the hilāl can be seen, which include aspects of the height of the hilāl, the length of time it is above the horizon (*mukus*), and the state of the atmosphere at the time of observation. Three main views are developing regarding the standard height of the hilāl. The first view requires that the crescent moon reach an altitude of at least  $2/3$  of the *manzilah* (1 *manzilah* =  $13^\circ$ ), or about  $8^\circ 40$  minutes. The second view sets a minimum limit of  $7^\circ$ .

Meanwhile, the third view put forward by al-Baṭāwī (n.d.) determines the lowest altitude of 6°.

However, these three views are considered not to have provided comprehensive guidelines to determine the feasibility of the observation of the new moon, because they only consider the aspect of altitude. In fact, the appearance of the new moon is influenced by various factors, not only the position of the Sun when it sets, but also the distance between the Sun and the Moon and the elevation of the moon from the horizon surface. This combination of factors determines whether the crescent moon can be observed or not (Faid et al., 2022).

Al-Jailānī (n.d.) sets a more detailed standard for the determination of the hilāl. In his work, he reviews a variety of different views among Islamic scholars. In his opinion, the moon can be observed if three main conditions are met: the intensity of the crescent moon (*nūr al-hilāl*), which is one-fifth of the width of a human finger (*usbūʿ*), the angle of the moon's curve (*qaus al-muks*) at least 3°, and the position of the moon's height (*irtifāʿ*) at least 3°. Al-Jailānī argues that the moon will be difficult to observe if any of the three criteria are below 3°. However, there is no clarity on the impact if the initial two criteria are below 2°. As an illustration of the application of this criterion, Al-Jailānī gives examples of the case of the observation of the new moon in Indonesia, especially during the determination of the beginning of Shawwal 1958 in Batangkarang, as well as the determination of the month of Zulhijah in 1958 and 1970 carried out in Majalengka and Tangkuban Prah.

The two largest Islamic organizations in Indonesia, namely Nahdlatul Ulama and Muhammadiyah, have different approaches in determining the beginning of the Hijri month, as well as the government through the Ministry of Religious Affairs. NU implements the rukyah al-hilāl system with a minimum hilāl height standard of 2°, which was later updated to 3° in 2021. On the other hand, Muhammadiyah adopts the concept of wujūd al-hilāl with three main conditions related to *ijtimāʿ* between the Moon and the Sun: *ijtimāʿ* has already taken place, *ijtimāʿ* takes place before maghrib, and the setting time of the Moon is later than the Sun. The Ministry of Religion sets the standard for a height of 2°, an elongation of 3°, and a hilāl age of 8 hours (Ichtijanto, 1981), which in 2021 was revised to a height of 3° and an elongation of 6.4° (Director General of the Religious Justice Agency Number 2084/DJA/HM.00/3/2022). This difference in methodology has implications for the necessity of direct observation of the hilāl—NU emphasizes the importance of visual witnessing of the hilāl, while Muhammadiyah does not require it (Majlis Tarjih & Tajdid PP Muhammadiyah, n.d.).

The determination of the beginning of the month in the Hijri calendar in Indonesia has a history full of changes. This change is evident from the calculation method applied and its implementation in the field. The Islamic Union (Persis), since 1960, has used various calculation methods with periodic adjustments. From 1960 to 1995, Persis used the *ḥisāb ijtimāʿ qabla al-ghurūb* system. Then, in 1996-2001, this organization switched to using the *ḥisāb wujūd al-hilāl* method. Furthermore, from 2002-2012, Persis implemented the *imkān al-rukyah* system based on the MABIMS standard with the following criteria: hilāl height of 2°, angular distance of 3°, and month age of 8 hours. Starting in 2013, Persis used the *imkān al-*



rukyah method with updated criteria, namely the height of the hilāl of 3° and the angular distance of 6.4° (Wasilah, 2015).

It is different from NU and Muhammadiyah which apply a different approach in setting the beginning of the month. Initially, Muhammadiyah relied on the system of *ḥisāb ḥakiki imkān al-rukyah*. Then in 1937, the organization changed its methodology to *ijtimā' qabla al-ghurūb* by ignoring the position of the Moon above the horizon when the sun sets. A year later, in 1938, Muhammadiyah implemented the standard of *wujūd al-hilāl* (Azhari, 2012). Meanwhile, NU sets the standard of 2° month altitude as a benchmark for determining the beginning of the month in the Hijri calendar. The criteria were then revised in 2021 to a moon height of 3°, which shows the organization's adaptation to the development of contemporary scientific research (NU Online, 2024).

The criteria applied by the Ministry of Religion have developed over time. Initially, the government implemented the MABIMS standard—the result of a joint agreement between Brunei, Indonesia, Malaysia, and Singapore—with the parameters of moon altitude of at least 2°, elongation of at least 3°, and moon age of at least 8 hours. Then in 2021, the standard was updated by setting the lunar height at least 3° and the elongation at least 6.4°, which was later known as the updated MABIMS criteria (Anas et al., 2023; Hijriyati & Islam, 2023). Although this new criterion has been accepted by the government, the determination of the beginning of important months in the Islamic calendar such as Ramadan, Shawwal, and Dhul-Hijjah, is still officially determined through the process of isbat sessions coordinated by the Ministry of Religious Affairs.

The variation in the standard of determining the beginning of the month in the Hijri calendar has an impact on the implementation of Muslim worship, especially as seen in the difference in approach between NU and Muhammadiyah. In the case of Ramadan 2022, NU started fasting on April 3 because the crescent moon (hilāl) had not reached a minimum altitude of 3° that could be observed. On the other hand, Muhammadiyah decided to start Ramadan a day earlier, namely April 2, based on the observation of hilāl that had been seen even though it was only at an altitude of 1-2°. The Indonesian government, which implements the latest MABIMS standard with a height requirement of 3° and an angular distance of 6.4°, also set April 3 as the first day of Ramadan.

Similar disparities also appear in the determination of Eid al-Fitr. In 2023, NU sets 1 Shawwal to coincide with April 22 because on the 29th of Ramadan, the hilāl is still below 3° and cannot be observed. Muhammadiyah, using the concept of *wujūd al-hilāl* (astronomical existence of hilāl), set 1 Shawwal on April 21. The government, through the isbat session, also set April 22 as 1 Shawwal because hilāl has not met the updated MABIMS criteria (Hudayah & Amir, 2023). This difference in methodology resulted in a practical impact where Muhammadiyah pilgrims carried out fasting and celebrated Eid al-Fitr one day earlier than the official government decision.

The determination of the beginning of the months of Ramadan and Shawwal is influenced by the relationship between Islamic law (fiqh) and science. Although scholars and scientists have the same understanding of what hilāl is, they have different views in determining the standard of its determination. This condition shows that there is a mutually influential

relationship between aspects of Islamic law and science in determining the Hijri calendar in Indonesia. Fiqh provides legal interpretations and postulates, while science presents ways to understand and calculate the movement of the moon. When one of them experiences development, the others will adapt.

This study strengthens the interrelated relationship between religious and scientific aspects in the process of counting and observing the moon. Dynamic developments in the fields of fiqh and science also influenced the determination of the beginning of the month in the Islamic calendar. The results of this study differ from previous studies that focused on the combination of calculation methods and observations of the moon through the Kastner model (Utama & Zainon, 2022), the application of religious moderation in the use of *ḥisāb* and observation (Muhalling & Hasbi, 2023), and the concept of religious moderation as a whole. However, these findings are in line with some previous research results.

### **Fiqh as the Legitimacy of Science: Testimony in Rukyah al-Hilāl**

The tradition of using testimony with an oath to see *hilāl* (a new crescent) has existed since the time of the Prophet Muhammad PBUH. Based on the hadith narrated by Abū Hurayrah about fasting and celebrating Eid al-Fitr after witnessing the moon, the observation of the moon is an important need to establish the beginning of the month in the Islamic calendar (Imam Muslim, n.d.). Al-Aṣqalānī (n.d.) explained that the hadith does not require all Muslims to see the moon directly, but it is enough to observe a trusted person. This view is widely supported by Islamic scholars, in line with another hadith that tells of a Bedouin Arab who reported his observations of the moon to the Prophet (Abu Dawud, 1994). Upon hearing the report, the Prophet then told Bilāl to tell the Muslims to start fasting Ramadan the next day (al-Ṣanʿānī, vol. 2, n.d.). However, according to Ibn Rushd (1996), people should not immediately start their fast until there is additional testimony that corroborates the claims of Athāʾ.

All Islamic fiqh scholars have an agreement that the one who gives testimony about the appearance of the *hilāl* must be a Muslim. However, they differ on how many witnesses are needed. According to the Hanafi madhhab, the determination of the beginning of the month of Shawwal requires the testimony of two men or one man plus two women (al-Jazīrī, 1990). On the other hand, Imam Malik argues that the appearance of the new moon should be strengthened by the testimony of at least two people or the belief that they will not lie together (al-Ashbahī, n.d.). Meanwhile, Imam Shafiʿi and Imam Ahmad ibn Hanbal had different views. They argue that to start fasting, it is enough to have one witness, but to end the fast two witnesses are needed (al-Shāfiʿī, n.d.). According to Ibn Rushd (1996), the reason why Imam Shafiʿi required two witnesses to end Ramadan was because the impact of the mistake in ending the fast was riskier than the mistake in starting it.

The observation of the *hilāl* that raises the debate needs to be strengthened through the oath-taking process (al-Jazīrī, 1990). According to Islamic law, asking for an oath from a person who claims to have seen the *hilāl* is a justified action. This is especially true because the observers of the new moon are generally trusted individuals who have a good reputation in terms of faith and integrity. When there is a discrepancy between the results of the observation



of the moon and the calculations of astronomers, al-Subkī suggests that the testimony of such observations should be ignored. The reason for this is that mathematical calculations have a high level of certainty, while observations made by one or two people are speculative or uncertain (al-Subkī, 2004). A different view explains that if astronomers reach a consensus on the accuracy of their calculations and the information is conveyed by many people, then the testimony of the moon observation must be rejected. However, if these conditions are not met, the testimony of the observation of the hilāl is still acceptable (al-Dimyātī, vol. 2, 1342 H).

According to Ahmad (2006), in order for the observation of the hilāl (*rukyah al-hilāl*) to be used as a reference in determining the beginning of the month, the observation must have credibility that can be accounted for. Legally and scientifically credible rukyah—called muktabar rukyah—must meet five main conditions: first, observations are made at sunset on the 30th night or at the end of the 29th day; second, the weather should be sunny without obstructions; third, the position of the hilāl is above the horizon line; fourth, observations can be technically carried out; And fifth, the hilāl must be visible in the range of angles of  $-30^{\circ}$  to  $30^{\circ}$  from the west. The authors consider that these requirements are ideal conditions from a theoretical point of view, because observing the crescent moon outside these parameters is impossible.

The Ministry of Religious Affairs of the Republic of Indonesia applies the provisions of jurisprudence to determine the start of the months of Ramadan and Shawwal. Practically, judges in religious courts in their respective regions are obliged to supervise all hilāl observation activities (*rukyah al-hilāl*) for the two months. When an individual who testifies that he has witnessed the hilāl, the person must explain the location and existence of the hilāl that he saw to the judge. This testimony must be spoken under oath before a judge. Testimony submitted under oath is considered valid if it receives approval from the Ministry of Religion as data support in the isbat session. On the other hand, testimony about the new moon is not admissible unless the witness has been sworn by a religious judge (Asriyah, 2022).

The observation of the new moon or crescent moon in Indonesia is carried out through an empirical and scientific approach which is corroborated by sworn testimony. For example, in 2016, the hilāl of the month of Shawwal was successfully observed in various locations such as Bukit Condrodipo (Gresik), Tanjung Kodok (Lamongan), Bojonegoro, and the Thousand Islands. Five observers at Condrodipo Hill even managed to photograph the new moon, and their testimony was later confirmed under oath by a local religious court judge. A similar observation also occurred in 2011, when the hilāl met the minimum astronomical standards with altitudes ranging from  $4^{\circ} 25'$  to  $6^{\circ} 34'$ . Ahmad Azhari and H. Irwanuddin made observations at Bukit Condrodipo in that year (Minister of Religion of the Republic of Indonesia, 2011).

These facts show that although empirical observations have a crucial role, in the context of Islam, these observations need to be strengthened by sworn testimony according to the provisions of fiqh. This proves that the aspect of fiqh has a vital function in providing legitimacy to the practice of rukyah al-hilāl which is carried out scientifically. Previous studies tend to focus more on the astronomical dimension and scientific observations of the moon.

Meanwhile, this study emphasizes the urgency of the role of fiqh in the decision-making process related to the determination of the hilāl.

## CONCLUSION

The determination of the beginning of the month in the Hijri calendar in Indonesia is a complicated process that combines the understanding of Islamic law (fiqh) with observation-based scientific knowledge. This process includes three main dimensions: First, science plays a role in converting the principles of fiqh into an empirically measurable standard to ensure the beginning of the month of Hijri, showing the interdependence between religious interpretation and empirical knowledge in the decision-making process. Second, the process of determining the beginning of the Hijri month in Indonesia illustrates the complex interplay between Islamic law and science, which can be seen from the diversity of viewpoints among Muslim scholars and scholars regarding the standard of crescent moon observation (hilāl), although the fundamental understanding of hilāl remains uniform. Third, fiqh plays a role in giving legitimacy to scientific efforts through the rukyah al-hilāl testimony procedure, in which Islamic scholars set the criteria of testimony and use oaths as a way to validate empirical evidence supporting the emergence of the hilāl.

This study outlines the complexities related to the interconnectedness of fiqh and empirical knowledge in determining the beginning of the moon. Although the scope of data only covers the time range from 2010 to 2023, this review presents a very meaningful view of the function of BHR in building approaches and standards. Future research can expand the reach of data to achieve a more comprehensive understanding. Thus, this study contributes to a deeper appreciation of the fusion of fiqh and science in formulating the meaning of the hilāl. The merger requires further development through the unification of interconnected data between fiqh and the development of empirical science in Indonesia.

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