



## Implementing the Jam'iyah Mudarasatil Qur'an Lil Ḥāfīzāt Program to Enhance Motivation and Qur'anic Memorization Quality

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**Abstract:** This study aims to examine the implementation of the Jam'iyah Mudarasatil Qur'an Lil Ḥāfīzāt (JMQH) program in enhancing motivation and the quality of Qur'anic memorization among female memorizers (ḥāfīzāt) in Jombang District. A qualitative research approach with a case study design was employed. Data were collected through in-depth interviews, participant observation, and documentation involving JMQH administrators and active members. Data analysis was conducted using an interactive model consisting of data reduction, data display, and conclusion drawing, supported by source and technique triangulation to ensure data credibility. The findings indicate that the JMQH program is implemented through well-structured routine activities, including monthly mudarasaḥ, tartil-based recitation, peer listening (simā'), and spiritual development sessions conducted alternately at members' residences. The program significantly enhances members' motivation by fostering peer support, collective commitment, and a supportive religious environment. Furthermore, improvements in memorization quality are evident in increased fluency, accuracy, and adherence to tajwīd rules. Key supporting factors include strong religious awareness, a sense of community belonging, and a positive social environment, while inhibiting factors involve domestic responsibilities and initial feelings of insecurity. This study concludes that community-based religious organizations such as JMQH play a vital role in sustaining Qur'anic memorization among adult female memorizers beyond formal educational institutions.

**Keywords:** Jam'iyah Mudarasatil Qur'an Lil Ḥāfīzāt; motivation; memorization quality; female Qur'an memorizers; qualitative study

**Abstrak :** Penelitian ini bertujuan untuk menganalisis implementasi Program Jam'iyah Mudarasatil Qur'an Lil Ḥāfīzāt (JMQH) dalam meningkatkan motivasi dan kualitas hafalan Al-Qur'an pada hafidzah di Kecamatan Jombang. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus. Data dikumpulkan melalui wawancara mendalam, observasi partisipatif, dan dokumentasi terhadap pengurus serta anggota aktif JMQH. Teknik analisis data dilakukan secara interaktif melalui reduksi data, penyajian data, dan penarikan kesimpulan, dengan triangulasi sumber dan teknik untuk menjaga keabsahan data. Hasil penelitian menunjukkan bahwa program JMQH diimplementasikan melalui kegiatan rutin yang terstruktur, seperti mudarasaḥ bulanan, pembacaan tartil, simak-simaan, dan pembinaan spiritual, yang dilaksanakan secara bergilir di kediaman

anggota. Program ini terbukti mampu meningkatkan motivasi hafidzah melalui dukungan sosial, interaksi sebaya, dan lingkungan religius yang kondusif. Selain itu, kualitas hafalan Al-Qur'an anggota mengalami peningkatan yang ditandai dengan perbaikan kelancaran, ketepatan bacaan, dan kepatuhan terhadap kaidah tajwid. Faktor pendukung utama program meliputi kesadaran religius, rasa memiliki komunitas, dan lingkungan yang saling mendukung, sedangkan faktor penghambat meliputi kesibukan domestik dan rasa tidak percaya diri. Penelitian ini menegaskan bahwa organisasi keagamaan berbasis komunitas seperti JMQH berperan strategis dalam menjaga keberlanjutan hafalan Al-Qur'an bagi hafidzah di luar lembaga pendidikan formal.

*Kata kunci: Jam'iyah Mudarasatil Qur'an Lil Hafizāt; motivasi; kualitas hafalan; hafidzah; studi kualitatif*

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## Introduction

Memorizing the Qur'an (ḥifẓ al-Qur'an) is regarded as one of the most noble religious practices in Islam and plays a fundamental role in preserving the authenticity of the Qur'anic text across generations. Classical Islamic scholarship classifies Qur'anic memorization as farḍ kifāyah, meaning a collective obligation that must be fulfilled by a sufficient number of individuals within a community so that the responsibility is lifted from others (Sholeha & Rabbanie, 2021). Beyond the act of memorization itself, Qur'anic memorizers (ḥuffāẓ) carry a lifelong responsibility to continuously maintain and safeguard their memorization through consistent revision (murāja'ah), accuracy of recitation, and adherence to the rules of tajwīd.

Maintaining Qur'anic memorization, however, is widely acknowledged as a demanding and ongoing struggle. The challenge does not end upon completing the memorization of thirty juz', but rather intensifies after one is declared khatam, as daily routines and life responsibilities may gradually erode fluency and accuracy if not properly managed (Afidah & Anggraini, 2022; Najib, 2018). Human forgetfulness is a natural condition, while Qur'anic memorizers are religiously and morally obliged to resist this tendency through sustained discipline and commitment. Several studies have shown that without a structured environment and strong motivational support, the quality of memorization tends to decline over time (Rahman et al., 2020).

This challenge becomes more complex for female Qur'anic memorizers (ḥāfīzāt), particularly those who are married and assume the role of housewives. In many Indonesian Muslim communities, women are culturally expected to manage domestic responsibilities, childcare, and family well-being, often summarized in traditional expressions emphasizing household duties. Although Islamic jurisprudence does not strictly mandate these roles as absolute obligations for women, socio-cultural expectations—especially in Javanese society—continue to shape women's daily lives

and time allocation (Ananda et al., 2021; Prastiwi & Rahmadanik, 2020). As a result, female memorizers frequently face limited time, fatigue, reduced self-confidence, and declining motivation, all of which may negatively affect the consistency and quality of their Qur'anic memorization.

Previous research highlights that motivation and supportive learning environments are crucial determinants in sustaining Qur'anic memorization. Motivation functions as an internal drive that encourages individuals to engage in purposeful behavior and persist in achieving desired goals (Yusuf, 2024). In the context of Qur'anic memorization, motivation is closely linked to social interaction, peer support, and exposure to positive role models within a like-minded community (Rahma, 2023). Similarly, memorization quality is commonly assessed through indicators such as fluency, accuracy, adherence to tajwid, and clarity of articulation (faṣāḥah) (Hasan, 2019).

In response to these challenges, Jam'iyah Mudarasatil Qur'an Lil Hafizah (JMQH) emerges as a community-based religious organization designed to support female Qur'anic memorizers in maintaining and improving their memorization. Established initially in Pati in 1975 and later strengthened institutionally in 2011, JMQH has expanded across various regions in Indonesia, including Jombang. The organization provides structured programs such as mudarasaḥ (paired or group recitation), tartil reading movements, thematic Qur'anic discussions, and spiritual gatherings aimed at fostering discipline, motivation, and spiritual resilience among its members (Jam et al., 2023).

Despite the growing presence of JMQH, empirical studies examining how its programs are implemented at the grassroots level and how they influence motivation and memorization quality among ḥafizah, particularly those balancing domestic responsibilities, remain limited. Most existing studies focus on formal educational institutions such as Islamic boarding schools or tahfidz programs, leaving community-based religious organizations underexplored (Nawaz & Jahangir, 2015; Rustiana et al., 2022). This gap indicates the need for in-depth qualitative research that captures lived experiences, program dynamics, and contextual factors affecting Qur'anic memorization in non-formal settings.

Therefore, this study aims to examine the implementation of the Jam'iyah Mudarasatil Qur'an Lil Hafizah program in Jombang District and analyze its role in enhancing motivation and the quality of Qur'anic memorization among female memorizers. By employing a qualitative case study approach, this research seeks to contribute empirical insights into community-based Qur'anic memorization initiatives and offer practical implications for strengthening religious learning organizations that support ḥafizah amid contemporary social challenges.

## **Method**

This study employed a qualitative research design with a case study approach to explore the implementation of the Jam'iyah Mudarasatil Qur'an Lil Hafizāt (JMQH) program and its role in enhancing motivation and the quality of Qur'anic memorization among female memorizers in Jombang District. Qualitative research was chosen because it allows researchers to investigate social phenomena in their natural contexts and to understand participants' experiences, meanings, and perspectives in depth (Adlini et al., 2022; Waruwu et al., 2023).

The case study approach was considered appropriate as this research focused intensively on a single bounded system, namely the JMQH organization at the district level, including its programs, activities, and member interactions. Case studies enable researchers to examine real-life events comprehensively and holistically, particularly when the boundaries between the phenomenon and its context are not clearly evident (Munthe, 2015).

The research was conducted in Jombang District, East Java, Indonesia, where JMQH has been actively operating and attracting female Qur'anic memorizers from diverse educational and social backgrounds. Data collection took place from May 2025 onward, coinciding with the regular implementation of JMQH monthly activities. The research subjects consisted of JMQH administrators and active members (hafizāt) who participated consistently in the organization's programs. Participants were selected using purposive sampling, with the criteria that they were registered JMQH members, actively involved in routine activities, and willing to provide in-depth information relevant to the research focus.

Data were collected through three primary techniques: in-depth interviews, participant observation, and documentation. In-depth interviews were conducted with the head of JMQH at the district level, selected administrators, and several active members to obtain detailed insights into program objectives, implementation processes, motivational dynamics, and perceived impacts on memorization quality. Participant observation was carried out by attending monthly JMQH routines, allowing the researcher to directly observe recitation practices, interaction patterns, and the learning atmosphere within the group. Documentation included organizational records, schedules, written guidelines, and photographs related to JMQH activities, which served as supporting data to strengthen the analysis.

To ensure data credibility and trustworthiness, triangulation of data sources and techniques was applied by comparing information obtained from interviews, observations, and documentation. This strategy is widely recommended in qualitative research to minimize bias and enhance the validity of findings (Adlini et al., 2022). Data analysis followed an interactive model involving data reduction, data display, and conclusion drawing. During data reduction, relevant information was selected and organized according to research themes. The reduced data were then presented in

narrative form, enabling systematic interpretation and pattern identification, before drawing conclusions grounded in empirical evidence (Waruwu et al., 2023).

Ethical considerations were observed throughout the research process. Participants were informed about the purpose of the study, and their consent was obtained prior to data collection. Anonymity and confidentiality were maintained to protect participants' identities and ensure the ethical integrity of the research.

## **Results and Discussion**

### **Results**

The findings of this study reveal that the implementation of the Jam'iyah Mudarasatil Qur'an Lil Hafizāt (JMQH) program in Jombang District plays a significant role in supporting female Qur'anic memorizers in maintaining motivation and improving the quality of their memorization. The results are presented based on empirical data obtained through interviews, observations, and documentation during JMQH activities.

The JMQH program in Jombang is implemented through structured and routine activities conducted once a month. These activities are held alternately at the homes of JMQH members according to a predetermined schedule. Prior to each monthly meeting, the organizers announce the specific juz' to be recited, usually two weeks in advance, allowing members to prepare through intensive murāja'ah. This preparation process was consistently highlighted by participants as an important mechanism for maintaining discipline and readiness.

An interview with the head of JMQH at the district level indicated that the core purpose of the program is to create a supportive space for female memorizers who face various domestic and social responsibilities. She stated:

“JMQH is a place for female Qur'an memorizers to maintain and improve their memorization. Through programs such as tartil reading and mudarasaḥ, members are encouraged to keep revising their memorization even though they are busy with household duties.”

Participant observation showed that each monthly routine begins with a collective prayer, followed by group formation consisting of two or three members. In pairs, one member recites while the other listens attentively and corrects errors; in groups of three, roles rotate between reciting, listening, and preparing the next recitation. Each group is required to complete three juz' in one session. This structured interaction fosters mutual responsibility and active engagement among members.

The results also indicate that participation in JMQH significantly enhances members' motivation to maintain their memorization. Many participants expressed

that prior to joining JMQH, they felt isolated in their efforts to preserve their memorization. One member described this experience as follows:

“Before joining JMQH, maintaining memorization felt like a personal struggle. After joining, I realized that I was not alone. Seeing other members recite fluently motivates me to improve my own memorization.”

Another participant emphasized the emotional and psychological impact of collective recitation, stating:

“When my memorization is listened to by others during the monthly routine, I feel nervous and sometimes insecure. However, listening to others who are more fluent encourages me to practice harder and prepare better for the next meeting.”

These statements reflect that motivation among JMQH members is not only driven by personal religious commitment but also reinforced by peer interaction, shared experiences, and a sense of belonging within the group.

In terms of memorization quality, the findings demonstrate noticeable improvements in members' recitation accuracy, fluency, and adherence to tajwīd. The JMQH program strongly emphasizes tartil recitation, requiring members to read slowly, clearly, and correctly. Several participants acknowledged that this approach initially posed challenges, particularly for those accustomed to rapid recitation. One participant explained:

“I was used to reciting very quickly, so when I was asked to read slowly and clearly, I often forgot parts of the verses. Over time, because everyone reads in tartil, I gradually adapted and now I feel that my recitation is more enjoyable and accurate.”

Observational data further confirmed that repeated exposure to tartil recitation and corrective feedback during mudarasa sessions contributed to better articulation, clearer pronunciation, and reduced errors. Members demonstrated increased confidence in being listened to by others, indicating improved memorization stability.

The findings also identify several supporting and inhibiting factors influencing the effectiveness of the JMQH program. Supporting factors include members' intrinsic desire to preserve their memorization, the availability of a structured forum for regular revision, and a positive social environment characterized by mutual encouragement. Conversely, inhibiting factors include domestic responsibilities, work obligations, and feelings of insecurity among less fluent members. One administrator noted:

“Many female memorizers hesitate to join JMQH activities because they feel their memorization is not fluent enough. They are afraid of being compared to others who are already more advanced.”

Despite these challenges, the data indicate that members who actively participate over time experience reduced insecurity and increased confidence, suggesting that sustained involvement in JMQH contributes positively to both motivation and memorization quality.

### **Discussion**

The findings of this study demonstrate that the Jam'iyah Mudarasatil Qur'an Lil Hafizāt (JMQH) program functions not merely as a routine religious gathering, but as a structured social and spiritual learning environment that strengthens both motivation and the quality of Qur'anic memorization among female memorizers. These results align with previous studies emphasizing the importance of systematic revision, peer interaction, and supportive environments in sustaining long-term Qur'anic memorization (Afidah & Anggraini, 2022; Najib, 2018).

From a motivational perspective, the results indicate that participation in JMQH significantly enhances intrinsic motivation among members. Motivation, as defined by Yusuf (2024), refers to an internal drive that initiates, directs, and sustains behavior toward achieving specific goals. In the context of Qur'anic memorization, motivation is closely associated with persistence in murāja'ah, emotional resilience, and willingness to face evaluative situations such as public recitation. The present findings show that the collective mudarasa and scheduled monthly routines encourage members to prepare their memorization consistently, thereby strengthening self-discipline and commitment. This supports Rahma's (2023) assertion that peer-based social circles (circles of practice) play a crucial role in reinforcing motivation through shared goals and emotional support.

Moreover, the social dimension of JMQH appears to mitigate feelings of isolation commonly experienced by female Qur'anic memorizers, particularly housewives. Previous research has highlighted that women with dual domestic and religious responsibilities often experience decreased self-efficacy and motivation due to time constraints and social pressure (Ananda et al., 2021; Prastiwi & Rahmadanik, 2020). The findings of this study extend these insights by demonstrating that community-based religious organizations such as JMQH provide a psychologically safe space where members can share struggles, normalize difficulties, and gradually rebuild confidence. This finding is consistent with social motivation theory, which

emphasizes that motivation is strengthened when individuals perceive acceptance and recognition within a group (Yusuf, 2024).

In terms of memorization quality, this study confirms that JMQH's emphasis on tartil recitation and reciprocal listening (*simā'*) contributes positively to accuracy, fluency, and adherence to *tajwīd*. Hasan (2019) argues that memorization quality is not solely measured by quantity (*ḥifẓ* completion), but by the precision of pronunciation (*faṣāḥah*), compliance with *tajwīd*, and stability of recall. The structured *mudrasah* model implemented by JMQH—where members alternate between reciting and listening—facilitates immediate correction and reflective learning. This finding supports Rahman et al. (2020), who found that time management and structured revision significantly enhance both the quality and retention of Qur'anic memorization.

Additionally, the requirement to prepare specific *juz'* in advance aligns with cognitive reinforcement theory, which suggests that repeated exposure and retrieval practice improve memory consolidation (Nawaz & Jahangir, 2015). Members' testimonies regarding initial difficulty in adapting to slower tartil recitation further indicate a process of behavioral adjustment shaped by environmental norms. Over time, immersion in a tartil-oriented environment led to improved recitation quality, confirming Rustiana et al.'s (2022) findings that consistent exposure to quality-focused memorization practices yields measurable improvement.

The study also highlights the dual role of insecurity (*insecurity*) as both an inhibiting and transformative factor. Initially, feelings of shame and fear of negative evaluation discouraged some *ḥāfizāt* from participating. Similar findings were reported by Afidah and Anggraini (2022), who noted that fear of making mistakes often prevents memorizers from engaging in public recitation. However, sustained participation in JMQH gradually reduced these insecurities as members experienced constructive feedback rather than judgment. This process reflects the concept of adaptive learning environments, where psychological safety enables learners to transform anxiety into motivation (Waruwu et al., 2023).

Compared to prior studies that primarily focus on formal institutions such as Islamic boarding schools or *tahfidz* programs (Najib, 2018; Hasan, 2019), this study contributes new insights by examining a non-formal, community-based organization. The findings suggest that JMQH effectively bridges the gap between institutional memorization training and real-life challenges faced by adult female memorizers. This confirms Jam et al.'s (2023) assertion that community-based Qur'anic organizations can function as sustainable support systems for lifelong memorization maintenance.

Overall, the discussion indicates that the effectiveness of the JMQH program lies in its integration of spiritual discipline, social motivation, and structured memorization practices. By fostering a supportive circle grounded in shared religious commitment, JMQH enables female memorizers to maintain both motivation and memorization quality despite domestic and social constraints. These findings reinforce the argument that Qur'anic memorization is not merely an individual endeavor but a socially embedded practice requiring continuous communal reinforcement.

### **Conclusion**

This study concludes that the implementation of the Jam'iyah Mudarasatil Qur'an Lil Hafizāt (JMQH) program in Jombang District plays a significant role in enhancing both motivation and the quality of Qur'anic memorization among female memorizers. Through structured routines such as monthly mudarasaḥ, tartil-based recitation, and peer listening practices, JMQH provides a supportive learning environment that enables ḥafizāt to consistently maintain their memorization despite domestic and social responsibilities. The findings indicate that motivation among JMQH members is strengthened by collective engagement, shared religious commitment, and emotional support within the group. Regular interaction with peers facing similar challenges fosters a sense of belonging and reduces feelings of isolation and insecurity. As a result, members demonstrate increased discipline in murāja'ah and greater confidence in being evaluated by others. This confirms that motivation in Qur'anic memorization is not solely an individual attribute but is socially constructed and reinforced through community-based practices.

In terms of memorization quality, the emphasis on tartil recitation and reciprocal correction significantly contributes to improved accuracy, fluency, and adherence to tajwīd. Continuous exposure to quality-oriented recitation practices encourages behavioral adaptation and gradual improvement, particularly for members previously accustomed to rapid recitation. These findings highlight the importance of structured revision systems and psychologically safe environments in sustaining long-term Qur'anic memorization. This study contributes empirically by extending Qur'anic memorization research beyond formal educational institutions to a non-formal, community-based organizational context. Practically, the findings suggest that religious organizations such as JMQH can serve as effective models for supporting lifelong Qur'anic memorization among adult female memorizers. Future research is recommended to explore comparative models across regions or to incorporate quantitative measures to further assess the impact of community-based memorization programs on memorization stability and spiritual well-being..

### **References**

Afidah, S. I., & Anggraini, F. S. (2022). Implementasi metode murāja'ah dalam peningkatan kualitas hafalan Al-Qur'an di Pondok Pesantren Amanatul Qur'an

- Pacet Mojokerto. *Al-Ibrah: Jurnal Pendidikan dan Keilmuan Islam*, 7(1), 114–132. <https://doi.org/10.61815/alibrah.v7i1.192>
- Ananda, S. A. W., Zayyan, W. A., & Arifin, I. (2021). Pandangan Islam tentang wanita karir dan ibu rumah tangga dalam bingkai keluarga dan masyarakat. *Profetika: Jurnal Studi Islam*, 22(2), 347–356. <https://doi.org/10.23917/profetika.v22i2.16700>
- Hasan, M. S. (2019). Metode qirā'ah muwaḥḥadah dalam membentuk keserasian bacaan Al-Qur'an (Studi kasus di Pondok Pesantren Madrasatul Qur'an Tebuireng Jombang). *Falasifa: Jurnal Studi Keislaman*, 10(2), 102–114. <https://doi.org/10.36835/falasifa.v10i2.200>
- Jam, D. I., Fatmah, F., & Kabibuloh, N. (2023). Manajemen pemberdayaan ḥāfiẓāt di Jam'iyah Mudarasatil Qur'an Lil Ḥāfiẓāt (JMQH). *Jurnal Manajemen Pendidikan Islam*, 8(1), 45–60. <https://doi.org/10.24014/jmpi.v8i1.18765>
- Najib, M. (2018). Implementasi metode takrīr dalam menghafalkan Al-Qur'an bagi santri Pondok Pesantren Punggul Nganjuk. *Jurnal Intelektual: Jurnal Pendidikan dan Studi Keislaman*, 8(3), 333–342. <https://doi.org/10.33367/intelektual.v8i3.727>
- Nawaz, N., & Jahangir, S. F. (2015). Effects of memorizing Quran by heart (ḥifz) on later academic achievement. *Journal of Islamic Studies and Culture*, 3(1), 1–10. <https://doi.org/10.15640/jisc.v3n1a8>
- Partono, P., Hamengkubuwono, H., & Fransiska, J. (2020). Model example non example dalam pembelajaran tajwid. *Belajea: Jurnal Pendidikan Islam*, 5(1), 23–36. <https://doi.org/10.29240/belajea.v5i1.1336>
- Prastiwi, I. L. R., & Rahmadanik, D. (2020). Polemik dalam karir perempuan Indonesia. *Jurnal Komunikasi dan Kajian Media*, 4(1), 1–11. <https://doi.org/10.31002/jkkm.v4i1.2453>
- Rahman, M. N. A. M. A., Kabibuloh, N., & Arrahmah, A. (2020). Peningkatan kualitas dan kuantitas hafalan Al-Qur'an melalui manajemen waktu. *Proceedings of Islamic Education Conference*, 63–73. <https://doi.org/10.4108/eai.1-10-2019.2291731>
- Rahma, T. A. (2023). Peran circle pertemanan terhadap tercapainya tugas perkembangan pada mahasiswa baru. *Prosiding Penguatan Karakter Menuju Konselor Multibudaya*, 3(1), 1372–1378. <https://doi.org/10.21009/pkmm.v3i1.27894>
- Rustiana, D., Hidayat, A., & Nurhadi, N. (2022). Manajemen program unggulan tahfidz Qur'an dalam meningkatkan kualitas hafalan siswa. *Jurnal Pendidikan Islam*, 11(1), 12–24. <https://doi.org/10.14421/jpi.2022.11102>

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Sholeha, A., & Rabbanie, M. D. (2021). Hafalan Al-Qur'an dan hubungannya dengan prestasi akademik siswa. *Tarbawi: Jurnal Pendidikan Islam*, 17(2), 1-10. <https://doi.org/10.34001/tarbawi.v17i2.1645>

Waruwu, M., Harefa, D., & Zega, A. (2023). Pendekatan penelitian pendidikan: Metode kualitatif, kuantitatif, dan mixed methods. *Jurnal Pendidikan*, 7(4), 2896-2910. <https://doi.org/10.31004/jptam.v7i4.10765>

Yusuf, M. A. (2024). Motivation in organizations: Concepts, theories, and applications. *International Journal of Management Studies*, 2(2), 1-24. <https://doi.org/10.5539/ijms.v2n2p1>