
Islamic Principles and Pharmaceutical Innovation: Ethical Pathways Toward Sustainable Health Development

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Abstract

Objective: This study explores the integration of Islamic principles in the development of medicine and pharmaceuticals, emphasizing the significance of ethical and spiritual practices in pharmacy and healthcare. **Theoretical framework:** Grounded in Islamic values, particularly halal (permissible) and thayyib (wholesome), these principles serve as both moral foundations and quality benchmarks for pharmaceutical products, directly supporting SDG 3 (Good Health and Well-being) and SDG 12 (Responsible Consumption and Production). **Literature review:** The review covers the historical contributions of Islamic scholars to pharmacy, the importance of halal certification, and the need for ethical frameworks that align with Sharia in contemporary pharmaceutical practices. It also highlights the relevance of Islamic epistemology in addressing modern challenges such as biotechnology and artificial intelligence, which aligns with SDG 9 (Industry, Innovation, and Infrastructure). **Methods:** A Systematic Literature Review (SLR) was conducted using databases including Google Scholar, ResearchGate, ScienceDirect, and Scopus. From numerous results, 9 articles (2016–2025) were selected based on relevance to Islamic pharmaceutical ethics. **Results:** The findings reveal the pivotal role of Sharia compliance in pharmaceutical development and the urgency of collaboration between healthcare professionals, policymakers, educational institutions, and Islamic legal scholars. **Implications:** This study advocates for a holistic, interdisciplinary approach to pharmaceutical practices that integrate Islamic teachings with global health and sustainability agendas. Such efforts contribute not only to ethical and sustainable healthcare systems but also to broader SDG achievements, including SDG 4 (Quality Education) and SDG 17 (Partnerships for the Goals). **Novelty:** The novelty lies in its systematic synthesis of Islamic values within pharmaceutical development and its emphasis on aligning ethical healthcare innovation with the Sustainable Development Goals, an area still underexplored in current literature.

Keywords: islamic principles, pharmaceutical innovation, ethical healthcare, halal and thayyib, sdfs.

INTRODUCTION

The integration of Islamic principles, particularly halal (permissible) and *thayyib* (wholesome), into drug and pharmaceutical development is an emerging yet under-researched field. While some literature has addressed the theoretical compatibility between

Islamic ethics and medical practice, there remains a significant lack of comprehensive frameworks that systematically align pharmaceutical innovation with Shariah law. The review in the document highlights contributions from classical Islamic scholars like Ibn Sina and identifies contemporary discussions around halal certification and ethical concerns. However, existing research predominantly focuses on general discussions of halal products or isolated case studies, such as dental materials or food substances, without extending thoroughly into the broader pharmaceutical manufacturing process, biotechnology, AI integration, or global regulatory harmonization [1].

Moreover, few studies explore interdisciplinary collaborations between pharmaceutical scientists and Islamic legal scholars as a formalized methodology for Sharia-compliant innovation. The lack of robust educational curricula that merge Islamic ethics with modern pharmaceutical training also represents a critical research void. Consequently, there is a pressing need for empirical and theoretical studies that can bridge this divide and support the creation of Sharia-compliant pharmaceutical systems that are scalable and globally competitive. This theme is highly significant given the growing global Muslim population and the corresponding rise in demand for halal-certified medical products. Incorporating Islamic principles into the pharmaceutical industry is not only a matter of religious compliance but also a strategic pathway to ethical, sustainable, and culturally sensitive healthcare systems. It fosters consumer trust, ensures moral integrity in production chains, and upholds patient rights in line with religious teachings. Furthermore, as biotechnology, nanomedicine, and AI become increasingly central to drug development, grounding these innovations in Islamic ethical frameworks becomes essential to ensure they serve the public good without violating religious doctrines. Thus, addressing this gap is both a scholarly necessity and a practical imperative for inclusive healthcare development [2].

In the development of healthcare and pharmacy, integrating Islamic values is a strategic effort to ensure ethical and spiritual practices. Islam views health as a vital aspect of human life, encompassing both physical and spiritual dimensions. Therefore, an Islamic approach to pharmaceutical development focuses not only on drug safety but also on adherence to Sharia law. Principles such as halal (permissible) and thayyib (good) are fundamental to ensuring moral and quality standards in pharmaceutical products. This approach strengthens Islam's contribution to holistic pharmacy practice and aligns with the global pursuit of the Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) and SDG 12 (Responsible Consumption and Production), by promoting medicines that are safe, ethical, and environmentally responsible [2].

The Islamization of knowledge, including in the field of pharmacy, is a method of building a knowledge framework rooted in Islamic values. This process aims to integrate modern scientific knowledge with a strong religious foundation [3]. The philosophy of science plays a vital role in this process as it provides a framework to unify knowledge and Islamic ethical principles. In Islam, the philosophy of science encourages the development of knowledge that is both rational and moral. This ensures that pharmaceutical sciences progress without neglecting the core religious values essential to Muslim life [4]. Such integration directly supports SDG 4 (Quality Education), as it promotes curricula that balance scientific innovation with ethical and spiritual grounding.

The Islamic approach to pharmacy has a long history, starting from the Islamic Golden Age, when Muslim scholars were pioneers in health sciences. They focused not only on drug innovation but also on the ethics and social responsibilities tied to healthcare professions [5]. For example, during the 9th century, pharmacy developed rapidly with principles that combined science and morality. This contribution demonstrates that Islam has always emphasized advancing pharmaceutical knowledge for the benefit of humanity. Even today, this legacy remains relevant in promoting ethical and sustainable pharmacy practices [6], reinforcing global efforts to build strong institutions and partnerships in health innovation as encouraged by SDG 17 (Partnerships for the Goals).

Islamic philosophy of science teaches that knowledge must be directed toward human welfare while adhering to moral values. This is reflected in the Islamic principle of using knowledge to achieve benefit and prevent harm [7]. In the pharmaceutical field, this approach ensures that drug development prioritizes ethical considerations, such as halal ingredients and societal impact. Thus, the Islamic philosophy of science provides a strong ethical framework for shaping the direction of modern pharmacy. These values reinforce the importance of integrity and professional accountability in the pharmaceutical world [8], while also contributing to the realization of sustainable healthcare systems as envisioned in the SDGs.

The application of Islamic values in pharmacy also involves education and character-building for professionals. A Muslim pharmacist is expected not only to master pharmaceutical sciences but also to uphold high moral integrity [9]. Islamic-based pharmaceutical education emphasizes the balance between scientific knowledge and spirituality. This aims to produce pharmacists who are technically competent and exemplary in delivering healthcare services. Consequently, Islamic pharmaceutical education contributes to creating a more humane and sustainable healthcare system [10] and strengthens SDG 4 by cultivating a new generation of ethically aware health professionals.

Beyond education, the philosophy of Islamic science encourages innovation in drug development. Principles such as halal, safety, and efficacy form the core of pharmaceutical research. This aligns with Islam's objective of advancing sciences that provide broad benefits to humanity. Such innovation often involves multidisciplinary collaboration, including pharmacists, theologians, and scientists. This approach ensures that the pharmaceutical field continues to progress without losing its Islamic foundations. In conclusion, applying Islamic principles in pharmaceutical development is a crucial step toward creating an ethical and sustainable healthcare system. This not only provides practical benefits but also enriches the spiritual dimension of pharmaceutical practices. By adopting the philosophy of Islamic science, pharmaceutical development can deliver innovative solutions while adhering to Sharia law. Therefore, integrating Islamic values into pharmacy is an urgent necessity in modern healthcare. This demonstrates that Islam significantly contributes to building a morally grounded and welfare-oriented knowledge civilization [11].

The novelty of this study lies in its integrative and systematic approach to exploring the application of Islamic principles, particularly halal and thayyib, within the realm of pharmaceutical development. Unlike previous studies that tend to focus on isolated aspects such as halal food or medical products in specific contexts, this research offers a holistic framework that bridges Islamic ethical teachings with pharmaceutical science, education, regulation, and innovation. It emphasizes the role of Islamic philosophy of science in constructing an ethical foundation that supports both modern scientific advancement and religious observance [12].

This study also introduces a unique interdisciplinary lens by advocating for structured collaboration between Islamic legal scholars, pharmacists, and biotechnologists, which has not been comprehensively explored in existing literature. Furthermore, it highlights the urgency of incorporating Islamic ethics into modern healthcare technologies such as artificial intelligence, nanomedicine, and biotechnology fields that are rapidly shaping the future of medicine but often overlook spiritual and moral considerations. In addition, the research brings forward the Muhammadiyah perspective as a case model, showcasing how religious institutions can play a role in shaping health education and pharmaceutical practices aligned with Islamic values. By doing so, the study not only contributes to theoretical discourse but also proposes practical pathways for establishing ethical, Shariah-compliant pharmaceutical systems that are globally relevant, culturally grounded, and spiritually enriching. In this way, the integration of Islamic principles into pharmaceutical innovation provides not only a religiously guided framework but also a concrete contribution to the achievement of multiple SDGs, particularly SDG 3, SDG 4, SDG 12, and SDG 17 [13].

LITERATURE REVIEW

The principle of halal is a core aspect of drug development in the Islamic perspective. It encompasses the selection of active ingredients, excipients, and production processes that comply with Shariah law, as stipulated in the Halal Product Assurance Law No. 33 of 2014 [14]. Furthermore, the concept of *thayyib* ensuring products are of good quality and safe complements the halal principle by guaranteeing that pharmaceutical products not only adhere to religious standards but also provide optimal health benefits to Muslim consumers [15]. Together, halal and *thayyib* form a dual ethical foundation that aligns with SDG 3 (Good Health and Well-being) by ensuring access to safe and effective medicines, while also supporting SDG 12 (Responsible Consumption and Production) through sustainable and morally accountable production processes.

Islam promotes the integration of pharmaceutical sciences and religious values to deliver holistic healthcare services. Scholars like Ibn Sina developed approaches that combined scientific observation with moral values to create effective and ethical therapies [16]. In the modern context, this approach highlights the importance of pharmaceutical research rooted in halal principles and ethics, aiming not only to improve individual health but also to contribute to the advancement of dignified scientific knowledge [17]. Such integration resonates with SDG 9 (Industry, Innovation, and Infrastructure) by encouraging responsible scientific advancement that upholds cultural and ethical integrity.

Halal certification in pharmaceuticals has significant implications for both domestic and international markets, particularly in Muslim-majority countries like Indonesia. It reflects the growing consumer demand for products that meet both medical standards and Shariah compliance. In this regard, collaboration between certification bodies, manufacturers, and academics is crucial to ensure that pharmaceutical products are widely accepted by the Muslim community [18]. This multi-stakeholder collaboration directly reflects SDG 17 (Partnerships for the Goals), underscoring the importance of building institutional and cross-disciplinary networks to advance inclusive and ethical healthcare innovation.

In sum, the literature suggests that integrating Islamic principles into pharmaceutical innovation provides not only religiously compliant healthcare solutions but also supports broader global agendas of sustainability, ethics, and equity. By embedding halal and *thayyib* principles into research, certification, and industry practice, pharmaceutical sciences can significantly contribute to achieving multiple SDGs, positioning Islamic ethics as both a moral compass and a driver of sustainable health development.

The Application of Islamic Principles in the Development of Medicine and Pharmacy

The application of Islamic principles in the development of medicine and pharmacy emphasizes the integration of ethical and moral values derived from Islamic teachings. Health is considered a gift from Allah, and Muslims are obligated to protect and preserve it [19]. This concept is rooted in the Qur'an, such as in Surah Al-Baqarah: 195, which commands, "And do not throw yourselves into destruction," highlighting the importance of safeguarding life through safe and effective healthcare [20]. By grounding healthcare practices in such values, Islamic principles directly support SDG 3 (Good Health and Well-being) by ensuring that medical and pharmaceutical services prioritize safety, accessibility, and the preservation of human life.

During the Islamic golden age, pharmacy emerged as a distinct field, with significant advancements in drug preparation and distribution. The establishment of the first drugstores in Baghdad during the 8th century marked the separation of pharmacy from medicine [21]. Muslim pharmacists innovated by developing techniques like distillation and extraction, and creating new forms of medicine such as syrups, pills, and elixirs. These advancements were paired with strict ethical practices, including licensing requirements and an emphasis on patient-centered care [22]. Such historical contributions demonstrate Islam's longstanding

commitment to innovation rooted in morality, resonating with SDG 9 (Industry, Innovation, and Infrastructure) and SDG 12 (Responsible Consumption and Production), which call for responsible scientific and industrial progress.

From the Muhammadiyah perspective, Islamic values guide the development of health and pharmaceutical services. Muhammadiyah has established educational and health institutions that incorporate Islamic ethics in pharmaceutical practices [23]. These institutions aim to improve public health while promoting sustainable and morally upright practices in line with Islamic principles. Such efforts ensure that the development of medicines prioritizes community welfare and aligns with Sharia values [24]. This approach aligns with SDG 4 (Quality Education) by nurturing healthcare professionals with strong ethical foundations, and with SDG 17 (Partnerships for the Goals) by fostering collaboration between religious institutions, academia, and healthcare providers to achieve sustainable health outcomes.

Islamic principles also guide the integration of modern innovations like artificial intelligence and biotechnology into medicine. These technologies must be implemented with strict adherence to Islamic ethics, ensuring transparency, accountability, and benefits for humanity. By maintaining this ethical framework, the development of pharmaceuticals can uphold the values of justice, compassion, and responsibility while addressing contemporary healthcare challenges [25]. In this way, Islamic principles not only safeguard moral integrity but also advance the global agenda of sustainable and equitable healthcare systems, thereby reinforcing multiple SDGs.

METHODOLOGY

This scientific article was compiled using the Systematic Literature Review (SLR) method. In Indonesian, known as tinjauan pustaka sistematis, it is a literature review method that identifies, examines, evaluates, and interprets all available research. Through this method, the researcher systematically reviews and identifies journals, adhering to predetermined steps at each stage [26]. To complete this study, the researcher collected journal articles from Google Scholar, ResearchGate, ScienceDirect, and Scopus. The keywords used include Islamic principles in pharmacy, Islamic ethics in drug development, philosophy of health sciences, Sharia compliance in healthcare, Muslim pharmacists' roles, and integration of Islamic values in health innovation [27]. The collected articles were limited to those published between 2016 and 2025. Among the numerous articles, the researcher selected 9 articles that closely matched the specified keywords. The next step involved grouping these articles based on their primary focus, particularly those discussing Islamic principles in pharmacy [28].

Table 1. Research Methodology

Component	Description
Research Method	Systematic Literature Review (SLR)
Definition	A structured method to identify, examine, evaluate, and interpret all available and relevant research in a specific area.
Data Sources	Google Scholar, ResearchGate, ScienceDirect, and Scopus
Keywords Used	Islamic principles in pharmacy, Islamic ethics in drug development, philosophy of health sciences, Sharia compliance in healthcare, Muslim pharmacists' roles, integration of Islamic values in health innovation
Publication Year Range	2016–2025
Article Selection	From numerous search results, 9 articles were selected based on relevance to keywords and research objectives.
Inclusion Criteria	Articles that specifically focus on the application of Islamic principles in pharmacy and healthcare innovation
Grouping Criteria	Selected articles were categorized based on their main discussion focus

related to Islamic pharmaceutical ethics and principles.

RESULTS AND DISCUSSION

Based on the filtering of exclusion and inclusion criteria, two journals were identified for discussion in this paper, as shown in Figure 1 and Table 1. These journals are still relevant to the main topics of this literature review.

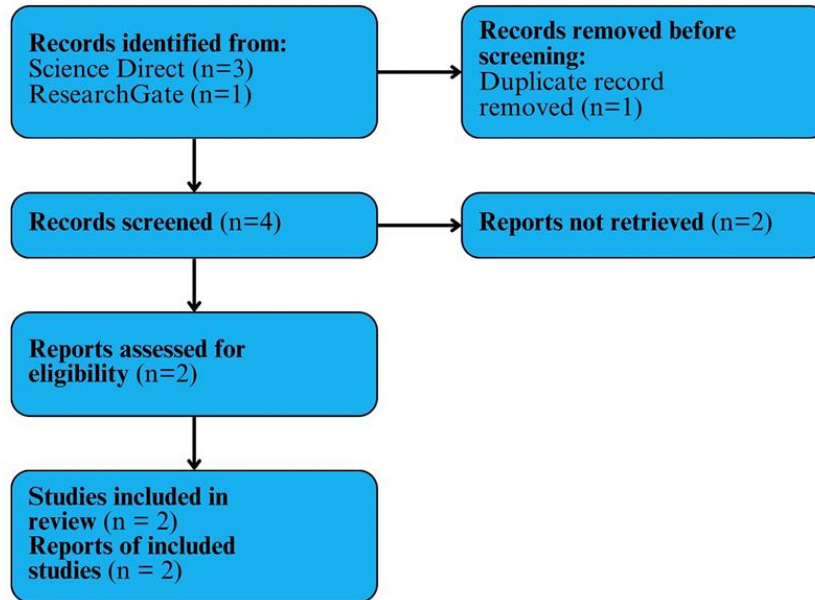


Figure 1. Article Selection Flow Chart

Based on Figure 1: Article Selection Flow Chart, the process of article identification, screening, and selection in this systematic literature review (SLR) is carefully structured to ensure the relevance and quality of the included sources. The flow chart visualizes how the researchers followed a clear and logical procedure to identify studies suitable for the review on the integration of Islamic principles in pharmaceutical development. Initially, a total of four records were identified from two major databases: ScienceDirect (n=3) and ResearchGate (n=1). These databases are well-known for hosting academic and peer-reviewed publications, making them credible sources for scholarly research.

Before proceeding to the screening phase, one duplicate record was removed, reducing the number of records to four (n=4) for screening. During the screening process, two reports could not be retrieved, likely due to access restrictions or incomplete availability of full texts, which left two records for further eligibility assessment. The two remaining articles were evaluated based on pre-established inclusion and exclusion criteria, which likely focused on the relevance of the articles to the themes of halal pharmaceuticals, Islamic ethics, and Shariah-compliant drug development. After this eligibility check, both articles were included in the final review, as indicated by the last box in the flowchart: “Studies included in review (n=2)”. This structured process ensures transparency and reproducibility, two essential features of any robust literature review. It also highlights the limited number of available studies that precisely address the topic, emphasizing a research gap and the need for more empirical and theoretical work in the field. The flow chart serves as evidence of methodological rigor, reinforcing the credibility of the findings discussed in the paper.

Table 2. Summary of Article Selection

Authors	Title of Research	Place of Research	Sample/Method of Research	Results of Research
Nadia et al., 2016 [29]	Islam and technological development in Malaysia's health care: An Islamic legal basis analysis of dental materials used in periodontal therapy	Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia. The research aims to analyze the guidelines used in the application of drugs and medical devices made from non-halal materials in dental care, as well as to prepare fiqh guidelines to address issues related to dental treatment.	The research employs an analytical approach to the Quran, Sunnah, the views of scholars, and contemporary fatwa analysis.	The findings indicate that the use of non-halal devices in dental care is prohibited except in emergencies, and the use of non-halal materials is also forbidden if medical recovery is uncertain. Consultation with a righteous Muslim doctor is also necessary before proceeding with treatment.
Syaripudin et al., 2024 [30]	Optimizing Halal Product Development by Sharia Principles	Not specified in the provided information. This research aims to explore business actors' understanding of Sharia principles and how this understanding can be optimized for the development of halal products that meet the needs of the Muslim market, as well as to enhance the competitiveness of Indonesian halal products in the global market	This study employs a qualitative research method based on case studies, involving data collection through descriptive and interpretative analysis of internal company documents, product specifications, halal certificates, and employee training materials	The findings indicate that many producers have not fully understood and applied sharia principles in the development of halal products, which can lead to products that do not meet halal criteria and create doubts among Muslim consumers

The journal article authored by Nadia et al. discusses the relationship between Islamic law and the use of dental materials in Malaysia's healthcare system, focusing on the halal (permissible) and haram (forbidden) status of certain dental materials used in periodontal therapy [31].

The objective of this study is to analyze various dental materials that may contain non-halal components and to highlight the need for clear Islamic legal (fiqh) guidelines to address these issues in dental practice. The research aims to provide an initial framework for addressing concerns related to the use of non-halal materials in dental care [32]. The methods employed in this study include an analysis of various dental materials such as Biogide®, Emdogain®, and Bio-Oss®, as well as a review of scholarly opinions regarding the use of non-halal materials in medical treatments. The study also examines the decisions

made during the 87th Fatwa Muzakarah in Malaysia concerning the use of non-halal materials in emergencies [33].

The findings indicate that the use of non-halal materials in dental care is generally prohibited unless in emergencies or when no halal alternatives are available. The study emphasizes the importance of seeking advice from knowledgeable Muslim healthcare professionals before proceeding with treatment [34]. Additionally, there is a diversity of opinions among Islamic scholars regarding the use of non-halal substances, with some allowing it under specific conditions. The journal encourages collaboration between dental specialists and Islamic legal experts to address these issues and recommends further research and discussions on the topic [35].

The journal by Syaripudin et al. discusses the importance of understanding Sharia principles in the development of halal products [36]. This research highlights that adherence to these principles, such as the prohibition of *riba* (usury), *gharar* (uncertainty), and *maisir* (gambling), is crucial in ensuring that the products meet halal standards. With the growing global demand for halal products, a deep understanding of Sharia guidelines becomes increasingly relevant for producers aiming to meet market needs [37].

The objective of this study is to explore how a comprehensive understanding of Sharia principles can optimize the halal product development process [38]. The research aims to demonstrate that by following Sharia guidelines, companies can not only enhance consumer trust but also improve product differentiation and competitiveness in the market. Additionally, the study emphasizes the importance of strengthening human resources' understanding of Sharia principles within companies to achieve sustainable success in the halal industry [39]. The research method used in this study is a qualitative approach, utilizing case studies from companies in the halal industry. Data were collected through interviews, observations, and document reviews. This approach allowed the researchers to gain in-depth insights into how companies apply Sharia principles in their product development and the challenges they face in the process [40].

The results of the study show that a comprehensive understanding of Sharia principles can enhance the product development process, including the selection of raw materials, formulation, packaging, and marketing strategies. The research found that adherence to these principles not only increases consumer trust but also improves product differentiation and market competitiveness [41]. Furthermore, the study emphasizes the need for companies to strengthen their human resources' understanding of Sharia principles to achieve sustainable success in the halal industry.

Discussion and Analysis

The integration of Islamic principles into the development of drugs and pharmaceuticals provides a strong ethical, spiritual, and practical framework that addresses both religious and health needs of Muslim patients worldwide. Central to this framework are the concepts of *halal* (permissible) and *thayyib* (wholesome), which guide ingredient selection, production processes, distribution, and consumer education. Historically, contributions from scholars such as Ibn Sina (Avicenna) illustrate that Islamic thought has long emphasized harmony between science and faith, promoting ethical responsibility, precision, and human welfare. However, in the modern context, pharmaceutical development often prioritizes efficacy, safety, and profitability while overlooking religious and moral dimensions vital to Muslim communities. This imbalance signals the need to re-establish ethical integration, in line with SDG 3 (Good Health and Well-being) and SDG 12 (Responsible Consumption and Production).

A key challenge identified is the underdevelopment of halal certification systems in pharmaceuticals compared to the food sector. Although Indonesia's Halal Product Assurance Law No. 33 of 2014 provides a legal basis, gaps in producer knowledge and inconsistent application of Shariah principles create mistrust among consumers and limit global

competitiveness. Research shows that many pharmaceutical companies have yet to fully embrace halal standards, leading to fragmented certification and labeling practices. This issue highlights the need for greater interdisciplinary collaboration and regulatory enforcement, aligned with SDG 9 (Industry, Innovation, and Infrastructure) and SDG 17 (Partnerships for the Goals).

Pharmacists and health professionals also play a critical role as moral agents responsible for ensuring Shariah compliance. Their duties extend beyond dispensing medication to include transparency, compassion, and integrity qualities rooted in both professional ethics and Islamic teachings. Yet, Islamic-based pharmaceutical education remains limited, with insufficient integration between scientific training and ethical-spiritual guidance. Addressing this gap through curriculum reform and institutional support would directly contribute to SDG 4 (Quality Education) by preparing ethically grounded healthcare professionals.

The discussion further emphasizes the relevance of Islamic philosophy of science as a guide for modern pharmaceutical innovation. Islamic epistemology, grounded in *maslahah* (public benefit) and the principle of *la darar wa la dirar* (no harm), provides a framework to evaluate new technologies such as biotechnology, nanomedicine, and artificial intelligence. These innovations must be assessed not only for safety and efficacy but also for their long-term impact on human dignity and compliance with halal standards. This perspective aligns with global calls for sustainable and ethical innovation under the SDGs.

Institutional collaboration is also highlighted as a prerequisite for effective halal pharmaceutical practices. Partnerships among scholars, industry players, government authorities, and certification bodies are essential for harmonizing fatwas, developing compliance mechanisms, and raising public awareness. Case studies from Malaysia demonstrate the complexity of halal determinations in medical emergencies, underscoring the urgent need for standardized global guidelines. Such harmonization would strengthen consumer trust, expand market opportunities, and reinforce SDG 17 (Partnerships for the Goals).

The Muhammadiyah model offers a constructive example of how religious ethics can be institutionalized in healthcare through education and hospital services. While effective, its scalability requires systemic support, legal frameworks, educational reforms, and cultural adaptation to be replicated across diverse Muslim contexts. This highlights the importance of context-sensitive approaches in advancing ethical and sustainable healthcare systems.

From a global perspective, the demand for halal pharmaceuticals is rising in both Muslim-majority and minority countries. However, international supply chains face challenges in maintaining halal integrity, particularly in cross-border transactions where universal certification standards are absent. Developing internationally recognized halal pharmaceutical guidelines through cooperation between Islamic scholars, scientists, and policymakers would enhance access and competitiveness while contributing to global health equity.

Finally, incorporating Islamic values in marketing and consumer education offers practical benefits. Transparent communication regarding product ingredients, ethical sourcing, and Shariah compliance can build stronger consumer trust and loyalty. Awareness campaigns on halal and *thayyib* principles empower patients and providers to make informed decisions.

In conclusion, Islamic principles in pharmaceuticals are not limited to religious formality but represent a transformative paradigm for sustainable, ethical, and spiritually conscious healthcare. Aligning pharmaceutical practices with Islamic ethics enhances trust, public health outcomes, and scientific integrity. However, challenges remain in certification infrastructure, interdisciplinary collaboration, and educational integration. Future research should focus on empirical studies involving pharmaceutical companies, regulators, and religious authorities to identify best practices and propose globally recognized halal pharmaceutical policies. This approach ensures that innovation in medicine contributes not

only to scientific advancement but also to ethical responsibility and the achievement of the SDGs.

CONCLUSION

This study concludes that the integration of Islamic principles into pharmaceutical development provides a strong ethical and sustainable framework that addresses both the spiritual and health needs of Muslim communities while contributing to the achievement of the Sustainable Development Goals (SDGs). The findings from the two reviewed studies reveal that although Islamic jurisprudence offers clear guidance on the permissibility of medical materials and the importance of halal product assurance, significant gaps remain in producer understanding, certification systems, and the alignment of modern pharmaceutical innovation with Shariah principles. Key challenges include the underdevelopment of halal certification compared to the food sector, limited integration of Islamic ethics in pharmaceutical education, and fragmented collaboration between scholars, regulators, and industry. Addressing these challenges requires interdisciplinary partnerships, regulatory harmonization, and curriculum reform initiatives that directly support SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 9 (Industry, Innovation, and Infrastructure), SDG 12 (Responsible Consumption and Production), and SDG 17 (Partnerships for the Goals). Furthermore, Islamic philosophy of science, with its focus on *maslahah* (public benefit) and avoidance of harm, provides a valuable ethical compass to guide the application of advanced technologies such as biotechnology, nanomedicine, and artificial intelligence. Institutional models like Muhammadiyah's integration of ethics into healthcare demonstrate practical pathways for embedding Islamic values, though scalability remains a challenge. In conclusion, embracing Islamic principles in pharmaceutical development is not merely a matter of religious observance but a strategic framework for building ethical, culturally sensitive, and globally competitive healthcare systems. Future research should expand empirical studies on halal pharmaceuticals and foster international cooperation to establish universally recognized guidelines, ensuring that pharmaceutical innovation advances in harmony with ethical responsibility and the SDGs.

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Author Contribution

All authors equally contributed to the conceptualization, design, analysis, and manuscript preparation. Each played a significant role in ensuring academic quality and integrity, integrating Islamic principles with pharmaceutical innovation toward sustainable health development in contemporary contexts.

Conflicts of Interest

The authors declare no conflict of interest regarding this research. The study was independently conducted without external influence, ensuring impartiality and scholarly integrity in discussing Islamic ethical frameworks within pharmaceutical innovation and sustainable health development.

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