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Leveraging on Experts' Psychological Strategies in Decision Making: A Case for Shariah-Compliant Medical Service for Medical Tourism via Analytical Hierarchical Process

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ABSTRACT

Previous research has revealed that expert decision makers possess the ability to overcome cognitive limitations, particularly in group decision making. This study aims to capitalize on these psychological cognitive complement strategies of experts in the development of a Shariah-compliant medical service framework, a growing need in the medical tourism industry. Twelve experts were selected to participate in the Analytical Hierarchy Process (AHP). This method involved breaking down the problem into its constituent elements and comparing their relative importance. This method involved breaking down the problem into its constituent elements and comparing their relative importance. By relying on expert opinions and following a structured decision-making process, the proposed framework provides healthcare professionals with guidelines for delivering exceptional and comprehensive care to Muslim patients and tourists globally, in accordance with the principles of Shariah.

Keywords: *Analytical Hierarchy Process (AHP), decision-making process, medical tourism, psychological complement strategies, shariah-compliant medical service.*

Psychological cognitive complement strategies are cognitive processes aimed at enhancing an individual's understanding and problem-solving ability. Research has consistently demonstrated the effectiveness of these strategies across diverse fields, including healthcare. Studies found that

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cognitive strategies such as problem-solving, decision-making, and goal setting improved the quality of healthcare delivery (Ahmady & Shahbazi 2020; Hughes 2008; Stewart et al. 2022). Likewise, another reported that the use of cognitive strategies reduced the likelihood of medical errors and improved patient outcomes (Alyahya et al. 2021). Experts' psychological strategies are cognitive processes that enhance an individual's understanding and problem-solving ability, which are critical for effective decision-making (Prezenski et al. 2017). Psychological strategies in decision-making have received considerable attention from scholars in psychology, management, and healthcare.

In group decision-making contexts, expert decision-makers possess several psychological advantages over novice decision-makers, as prior research indicates. These advantages include overcoming cognitive limitations associated with decision-making, relying on group feedback, demonstrating a willingness to make adjustments, and adopting a divide-and-conquer approach. Expert decision-makers have been found to possess superior cognitive abilities that enable them to process complex information, manage cognitive load, and handle uncertainty, all of which are critical aspects of group decision-making (Phillips-Wren & Adya 2020). They also tend to rely more on group feedback, which allows them to gather different perspectives and make more informed decisions (Mukherjee et al. 2016). Moreover, experts demonstrate a greater willingness to make adjustments based on new information or feedback, and they consider alternative solutions, leading to a more comprehensive decision-making process (Benner, Hughes & Sutphen 2008; Abubakar et al. 2019). Lastly, experts tend to adopt a divide-and-conquer approach by breaking down a complex problem into smaller, more manageable components that can be addressed individually, thus effectively managing cognitive load and making more informed decisions (Morera & Budescu 1998). These psychological advantages of expert decision-makers over novice decision-makers can significantly impact the quality of group decision-making outcomes.

One effective approach to leveraging experts' Psychological Strategies in Decision Making is the Analytical Hierarchical Process (AHP). AHP is a structured decision-making method that enables experts to evaluate and prioritize multiple criteria based on their importance (Canco, Kruja & Iancu 2021). The AHP approach enables experts to use their domain-specific knowledge to make informed decisions and provide valuable insights into the design of a Shariah-compliant medical service framework. The AHP approach has been used in various healthcare-related studies, including the development of healthcare service frameworks and the prioritization of healthcare interventions (Liberatore and Nydick 2008). The study has arrived at a conclusion that the Analytic Hierarchy Process (AHP) exhibits promising potential as a supportive instrument for facilitating shared decision-making processes between medical professionals and patients. Moreover, the AHP demonstrates considerable efficacy in the assessment and selection of therapeutic interventions and treatments, as well as the evaluation of healthcare technologies and policies (Liberatore & Nydick 2008). Furthermore, experts' Psychological Strategies such as problem-solving, critical thinking, goal setting, and decision-making have been extensively studied in the literature. These strategies can be effectively applied in the AHP approach to enable experts to prioritize Shariah-compliant medical service criteria and make informed decisions.

The medical tourism industry has been growing rapidly over the years, and with it, the need for Shariah-compliant medical services has emerged (Battour & Ismail 2016). The escalating demand is propelled by patients adhering to Shariah law and possessing particular necessities and expectations that traditional medical service models frequently neglect (Zawawi & Othman 2017a). These requisites encompass same-gender treatment, separate prayer rooms, and halal food alternatives (Zawawi & Othman 2017b). The absence of these provisions creates a void in the healthcare industry for providers capable of furnishing culturally appropriate and sensitive care that adheres to the religious convictions and practices of their patients (Attum, Waheed & Shamoon 2020). Despite the increasing demand, formal criteria or standards for these services remain absent, leading to misunderstandings and erroneous representations of Islam (Kamassi, Abdul Manaf & Omar 2021). This predicament has given rise to several impediments in the delivery of Shariah-compliant medical services, particularly considering the unique ethical considerations of Islamic medicine and the diverse personal and cultural needs of patients. There

exists a requirement to reconcile psychological, spiritual and physical needs to ensure that Muslim medical patients receive high-quality care that satisfies their religious and cultural requirements (Rahman, Zailani & Musa 2017; 2018a).

Catering to the needs of Muslim patients seeking medical treatment requires designing a medical service framework that is compliant with Shariah laws while also meeting patient needs and ensuring high-quality care. In this regard, experts' psychological strategies in decision-making can play a critical role in designing a Shariah-compliant medical service framework. However, there is a lack of research on how experts can leverage these strategies to design such a framework. Therefore, this study aims to explore how experts can use their psychological strategies in decision-making to design a Shariah-compliant medical service framework for medical tourism via Analytical Hierarchical Process (AHP). The study will contribute to the literature by providing insights into the role of experts' psychological strategies in designing a Shariah-compliant medical service framework and the effectiveness of AHP in decision-making in this context. The application of this approach can ensure the creation of a culturally sensitive and appropriate medical service model that caters to the specific needs and demands of Muslim patients, thereby meeting the challenges faced by the medical tourism industry. This approach provides a systematic method of understanding the psychological and cognitive factors that influence an individual's decision-making process (Prezenski et al. 2017). By incorporating this evidence-based approach into the development of a Shariah-compliant medical service framework, healthcare providers can better understand and meet the needs of their patients. The framework will be designed to take into account the cultural, religious, and psychological needs of medical tourists who follow Shariah law. By doing so, healthcare providers will be equipped with a comprehensive guide that will help them to better understand and meet the needs of their patients. This, in turn, will lead to increased patient satisfaction and loyalty, and ultimately, the growth and success of the medical tourism industry.

Theory Underpinning the Study

This study is grounded in several psychological theories related to decision-making, including cognitive decision-making theory and social cognitive theory. According to cognitive decision-making theory, decision-making is a complex process that involves multiple cognitive processes, including perception, attention, memory, and reasoning (Prezenski et al. 2017). This theory emphasizes that decision-making is a sequence of mental processes that can be influenced by various factors such as cognitive load, cognitive biases, and heuristics (Padilla et al. 2018). In the context of this study, the application of Analytical Hierarchical Process (AHP) as a decision-making tool acknowledges the complexity of decision-making and allows experts to integrate multiple criteria and assess alternatives based on their relative importance.

Furthermore, the study also incorporates the Parallel Constraint Satisfaction Theory, another cognitive theory, to address the complexity of decision-making. This theory posits that individuals generate constraints that the solution must satisfy, including internal and external factors such as cognitive and social factors (Glöckner & Hodges 2011). In decision-making, individuals balance competing constraints to arrive at a satisfactory solution. The Parallel Constraint Satisfaction Theory, as discussed, is relevant to the study as it helps to address the complexity of decision-making (Read, Vanman & Miller 1997). In the context of the study, decision-making involves balancing various constraints, including ethical, legal, and religious considerations, as well as cultural sensitivities. By incorporating the Parallel Constraint Satisfaction Theory, the study can account for these various constraints and help experts in developing an effective and culturally sensitive framework that aligns with the principles of Shariah-compliant medical services. This approach can promote better decision-making processes, resulting in improved patient care and outcomes.

Social cognitive theory also plays a crucial role in this study by highlighting the impact of social factors on decision-making. This theory suggests that people's decisions and behaviors are influenced by their social environment, including the social norms, values, and expectations of their social group (Frith & Singer 2008). Thus, by considering expert and stakeholders'

perspectives and preferences, AHP can reflect the social context and ensure that the framework aligns with the needs and expectations of patients and their families (Lee and Harris 2013). This approach promotes inclusivity and shared ownership of the decision-making process, leading to better outcomes and improved patient care. Overall, this study employs psychological theories related to decision-making to develop a framework for Shariah-compliant medical services for medical tourism. By taking into account the complexity of decision-making and the social and cultural factors that influence it, the study aims to create an effective and inclusive framework that aligns with the needs and expectations of patients and their families.

Materials and Methods

The objective of this study is to utilize the cognitive complement strategies of experts in psychology to design a Shariah-compliant medical service framework. In order to achieve this goal, the study has employed Analytical Hierarchical Process (AHP) to incorporate experts' decision-making strategies in the development of the framework. Cognitive decision-making science is an interdisciplinary field that brings together various fields of study to understand and improve the decision-making process (Borges, Marques & Castro 2021). In the context of developing a framework for Shariah-compliant medical services, cognitive decision-making science is applicable because it provides a systematic and structured approach to address complex decision-making problems (Russo & Camanho 2015)The development of a framework for Shariah-compliant medical services involves considering multiple factors, including the opinions and views of experts, the ethical and moral principles of Shariah law, and the cultural and religious diversity of patients. The Analytical Hierarchical Process (AHP) help to gather information, opinions, and ideas from experts, to prioritize different elements, and to make informed decisions. These approaches provide a way to involve a diverse group of experts, to reduce bias, and to improve the quality of decision-making (Saaty 2002a; Saaty 1994). By using these approaches, this study provides a scientifically-based solution to the challenges facing the development of Shariah-compliant medical services, offering a set of guidelines for delivering exceptional and comprehensive care to Muslim patients and tourists globally.

Study Design

Prior to the development of the framework for shariah-compliant medical services, this study engaged in a systematic review and discussion process aimed at identifying key elements and sub-elements relevant to the field. The study identified ten key elements and 33 sub-elements that are crucial in establishing a Shariah-compliant medical services framework (Table 1).

Through this comprehensive review of existing literature and consultation with experts in the field, the study was able to gain a thorough understanding of the complexities involved in the delivery of shariah-compliant medical services. However, despite the efforts made through the systematic review and discussion, the study recognized the limitations of relying solely on these methods. Traditional decision-making approaches are known to be susceptible to cognitive limitations such as inaccuracies, unreliability, biases, and a lack of self-insight (Fischhoff & Broomell 2020). These limitations can hinder the development of a robust and comprehensive framework for shariah-compliant medical services. To overcome these limitations and produce a more robust framework, this study leveraged the power of cognitive decision-making science through the use of the Analytical Hierarchy Process (AHP). By using a structured decision-making approach, the study aimed to produce a comprehensive framework that takes into consideration the complexities involved in the delivery of shariah-compliant medical services and provides healthcare professionals with guidelines for delivering exceptional and culturally sensitive care to Muslim patients. This approach not only helps to overcome the limitations of traditional decision-making methods but also demonstrates the potential of cognitive decision-making science in advancing the field of shariah-compliant medical services (Saaty 2004).

Table 1: Identified Elements and Sub-Elements for Shariah-Compliant Medical Services

No	ELEMENTS	ASSESSMENT ELEMENTS
1	Ibadah Facilities	• Basic facilities (e.g. musolla, washroom, kiblat direction, tayammum equipment (dust), bottle, guidebook-manual, flexible bed and etc). • To provide clear guideline (e.g. guide books, posters, apps, system etc). • Ease of accessibility.
2	Governance	• Management commitment to conform to shariah principles (e.g. supporting policy). • Organization framework consists of shariah panel. • Taskforce committee/executive for implementation and conformity to shariah • Maqasid Shariah based governance. • Clear SOP on Islamic medical services.
3	Medical Ethics	• Provide medical services that comply to shariah and medical ethics. • Protection and preservation of clients' confidentiality, safety and security.
4	Medicine and Drugs	• To prescribe shariah compliant medicine. • Establish SOP in procurement of medicine and drugs.
5	Spiritual Care Support	• Provide spiritual support services (e.g., patients' spiritual health management-thru guidance, advice). • Management department for patient spiritual care (e.g., Spiritual section, spiritual care provider). • Training for staffs in spiritual care.
6	Human Resource and Professional Development	• Ensure qualified and competent healthcare professionals. • Provide systematic and on-going training and up-skilling among healthcare workers. • Provide continuous/periodical awareness training in Shariah-compliant medical services among employees. • Execution of shariah-compliant services policy for employees. • Staff welfare care and protection (e.g., part subsidized haj, weddings, etc.). • Shariah compliance rulings and policy among staffs/employees (attire).
7	Islamic Environment	• Practice of Islamic social atmosphere (e.g., Quranic recitation, azan, prayers, salam greetings etc.). • Provide continuous/periodical awareness programme in Islamic environment. (e.g., tazkirah, usrah). • Inculcation of Islamic practices (e.g., congregation prayers, zakat payment, sadaqah etc.).
8	Affordability and Accessibility	• Reasonable cost of medical treatment • Transparent policy on medical costing for patients. • Establish collaboration with Islamic funding agencies (e.g., wakaf, zakat, baitulmal) to assist medical cost burden.
9	Patient Care	• Good standard of medical care (encompasses all healthcare professionals). • Doctor/healthcare professional relationship with patients and family (muamalah). • Patient's dignity (e.g., gender sensitivity, patient's privacy).
10	End of Life Care (Husnul Khatimah)	• Task force committee. • Talqin. • Informed consent for Do Not Resuscitate (DNR). • Management of brain death and organ donation.

Analytical Hierarchical Process (AHP)

Analytical Hierarchy Process is a multicriteria decision-making method that helps to prioritize different elements based on their relative importance. It involves breaking down complex decision-making problems into smaller and more manageable subproblems and then prioritizing them based on their relative importance (Jagoda, Schuldt, and Hoisington 2020). The Analytical Hierarchy Process (AHP) were used to aggregate expert opinions and determine the weightage of elements and sub-elements in constructing the shariah-compliant medical services framework. AHP is a multi-criteria decision-making method that integrates qualitative expert judgments and quantitative data to provide a comprehensive and transparent evaluation. The process involves constructing a hierarchy of elements, evaluating the relationships between them, calculating their relative importance, and ensuring consistency (Waris et al. 2019). AHP has been widely applied

in various fields due to its ability to handle complex decision problems and incorporate both qualitative and quantitative aspects. The AHP process involves several steps, including specifying the research problem, constructing a hierarchy of elements, evaluating the relative significance through pairwise comparisons, and calculating the consistency ratio (Russo & Camanho 2015). The results are then used to make informed decisions or recommendations. Regular assessments and adjustments to the hierarchy are important to maintain its accuracy and relevance.

The first step in AHP is defining the problem and objectives of the study (Kil et al. 2016). This involves a clear and concise statement of the research problem, which in the present study aims to construct a framework for Shariah-compliant medical services. The objectives of the study include identifying key components of Shariah compliance, evaluating their relative significance, and providing recommendations for the development of a comprehensive framework. In order to ensure systematic and organized examination of elements required for the framework, the study adopts a top-down approach by creating a hierarchical structure consisting of three levels (Bagheri et al. 2021). Level 1 represents the goal of developing a framework for Shariah-compliant medical services, while Level 2 and Level 3 encompass the elements and sub-elements required for implementation, respectively.

The fundamental aspect of the AHP is pairwise comparison, where two elements are compared at a time to determine their relative significance and scores (Kahraman, Cebeci & Ulukan 2003; Darko et al. 2019). In this study, a comprehensive framework for Shariah-compliant medical services was constructed using the AHP, with the help of pairwise comparisons. The pairwise comparisons were conducted using questionnaires designed for this purpose and were answered by the expert participants. The Saaty Scale was used to measure the relative importance of different elements in the hierarchy, and the data obtained from the questionnaires was entered into the AHP software (Expert Choice version 11) to calculate the pairwise comparisons and priority vector for each level of the hierarchy Saaty 2004; 1994; 2001)

The consistency of expert input was also evaluated to ensure that the assigned priorities were consistent with one another (Kil et al. 2016; Bagheri et al. 2021). The Consistency Index (CI) was used to measure the deviation of the consistency ratio from its ideal value of 0, and the Consistency Ratio (CR) was calculated to indicate the degree of consistency in the pairwise comparisons. A CR value of less than 0.1 was considered acceptable, while a high CR value indicated that the pairwise comparisons were inconsistent and needed to be re-evaluated. The calculation of consistency ratio involved finding the relative weights and eigenvalue, the consistency index and the consistency ratio. The calculation of consistency ratio involves the following three steps:

1.Find the relative weights and λ_{Max} (Eigenvalue) for each pairwise comparison matrix of order n.
2.Find the consistency index for each matrix of order n by the formula:
$Consistency\ Index, CI = \frac{(\lambda_{Max} - n)}{(n-1)}$, where *n* is the matrix size
3.Finally, calculate the consistency ratio using the formula:

$$Consistency\ Ratio, CR = \frac{Consistency\ Index\ (CI)}{Random\ Consistency\ Index\ (RCI)}$$

***RCI were refered to Saaty RCI*

In accordance with the findings of Ishizaka and Labib (2009), the final step in the weightage determination process involves synthesizing the local weightage across all elements and sub-elements to arrive at the global weightage (Ishizaka & Labib 2009). This calculation is performed by multiplying the local weightage of the sub-elements with the corresponding local weightage of the elements (Waris et al. 2019) It is important to note that the sum of all weightages of elements and sub-elements must equal 1.00.

The weightage system is classified into two types, local weightage and global weightage. The value of local weightage is determined using the AHP result for each individual elements and sub-elements. On the other hand, the value of global weightage is obtained by multiplying the local weightage of the sub-elements by the local weightage of the elements (Kil et al. 2016)In

essence, the local weightage represents the relative weightages within a specific group, comprised of elements and sub-elements, while the global weightage represents the weightage for all sub-elements taken together.

Data Collection

The population sample for the present study consisted of experts from diverse backgrounds, whose expertise was relevant to the study's context. The sample comprised 12 expert participants, who were selected using purposive sampling. On average, the experts were found to be 50 years of age, with a mean work experience of 24 years. Regarding their educational qualifications, most of the participants held a Ph. D degree (75%), while the remaining participants possessed a Master's degree (25%). The expert participants were drawn from diverse backgrounds, including policy making (16.6%), academicians (41.7%), and healthcare management and administration (41.7%). Furthermore, the academicians represented a range of disciplines, such as medicine, health sciences, law and ethics, Islamic thought, and finance.

The data collection for this study was carried out through a workshop, which spanned over three days and two nights, and involved the participation of the expert panel in the Analytic Hierarchy Process (AHP). In this study, the expert participants were asked to respond to a set of Analytic Hierarchy Process (AHP) questionnaires that were developed to elicit their views on the key factors involved in the development of a framework for Sariah compliant medical services. The AHP questionnaires were designed using the Saaty Scale, which is a numerical scale that is commonly employed in AHP to measure the relative importance of different elements in a hierarchy. The Saaty Scale ranges from 1 to 7 and is structured to offer a systematic and impartial method for comparing the relative significance of elements, thereby enabling a more precise evaluation of decision-making criteria. By assigning relative weights to the various elements in the hierarchy, the Saaty Scale enables the calculation of the overall priority of different options, leading to more accurate and informed decision-making.

Data Analysis

The data collected in this study were subjected to analysis using Expert Choice software version 11, which is a widely used software program for data entry and analysis in the Analytic Hierarchy Process (AHP). The AHP questionnaires, which were designed using the Saaty Scale, were entered into the software, and the responses of the expert participants were evaluated based on the relative weights assigned to the different elements in the hierarchy. The software performed the necessary calculations to produce the final results, which were then used to develop the framework for Shariah compliant medical services.

Ethical Consideration

Informed consent was obtained from the expert participants prior to data collection. The process of obtaining informed consent involved providing detailed information about the study's purpose, procedures, and potential risks and benefits, and allowing the expert participants to ask any questions they had before deciding whether or not to participate. The participants were informed that their participation was voluntary and that they could withdraw from the study at any time without penalty. Moreover, the participants were assured that their personal information and data would be kept confidential and anonymous, with access restricted only to the research team. The informed consent process ensured that the expert participants were fully informed about the study and had given their explicit consent to participate, thus upholding the principles of ethical research practice.

Results

To gain a better understanding of the relative weight of each element and sub-element, the Analytic Hierarchy Process was utilized. AHP questionnaires were distributed among the experts to gather their opinions on the weight of each element and sub-element. The questionnaire employed pairwise comparisons to assess the relative importance of one element in comparison to another. A total of 84 pairs of questions were evaluated individually by the experts using Saaty scale. The consistency of expert input was also evaluated to ensure that the assigned priorities were consistent with one another. To assess the consistency of the pairwise comparisons, the Consistency Index (CI) was employed for quantifying the deviation of the consistency ratio from the optimal value of 0. Subsequently, the Consistency Ratio (CR) was calculated using Expert Choice Software to indicate the level of consistency within the pairwise comparisons. An elevated CR value was suggestive of incongruence among the pairwise comparisons, thereby necessitating re-evaluation, while a CR value of less than 0.1 was deemed acceptable in accordance with established guidelines. Table 2 displays the results of the pairwise comparison and consistency ratio (CR) analysis. The CR values for each element were found to be less than 0.1, indicating that all elements were accepted.

Table 2: Pairwise Comparison of the Sub-elements

No.	Elements & Sub-elements	Pairwise-Comparison of the Sub-elements				
	IBADAH FACILITIES (IB)	**IB1**		**IB2**		**IB3**
IB1	Basic facilities (e.g., *musolla, kiblat* direction, tayammum set, bottle, guidebook, flexible bed etc.).	0.000		2.414		4.291
IB2	To provide clear guideline (e.g., guidebooks, posters, apps, system etc.).			0.000		2.596
IB3	Ease of accessibility.					0.00
	Consistency ratio	**0.02**				
	GOVERNANCE (G)	**G1**	**G2**	**G3**	**G4**	**G5**
G1	Management commitment to conform to shariah principles (e.g., supporting policy).	0.000	3.002	2.472	1.136	2.458
G2	Organisation framework consists of a shariah panel.		0.000	1.421	1.901	1.372
G3	Taskforce committee/executive for implementation and conformity to shariah.			0.000	1.813	1.188
G4	Maqasid Shariah based governance.				0.000	1.879
G5	Clear SOP on Islamic medical services.					0.000
	Consistency ratio	**0.01**				
	MEDICAL ETHICS (ME)	**ME1**		**ME2**		
ME1	Provide medical services that comply with shariah and medical ethics (to be elaborated).	0.000		1.574		
ME2	Protection and preservation of clients' confidentiality, safety, and security.			0.000		
	Consistency ratio	**0.000**				
	MEDICINE AND DRUGS (MD)	**MD1**		**MD2**		
MD1	To prescribe shariah-compliant medicine.	0.000		1.129		
MD2	Establish SOP in the procurement of medicine and drugs.			0.000		
	Consistency ratio	**0.000**				

	SPIRITUAL CARE SUPPORT (SC)	SC1	SC2	SC3
SC1	Provide spiritual support services (e.g., patients' spiritual health management- through guidance, and advice).	0.000	2.083	1.374
SC2	Management department for patient spiritual care (e.g., Spiritual section, spiritual care provider).		0.000	1.077
SC3	Training for staffs in spiritual care.			0.000
	Consistency ratio	**0.10**		

	HUMAN RESOURCE AND PROFESSIONAL DEVELOPMENT (HR)	HR1	HR2	HR3	HR4	HR5
HR1	Ensure qualified and competent healthcare professionals.	0.000	2.367	1.953	2.736	2.888
HR2	Provide systematic and on-going training and up-skilling among healthcare workers.		0.000	1.616	1.329	1.058
HR3	Provide continuous/periodical awareness training in Shariah-compliant medical services among employees.			0.000	1.116	1.680
HR4	Execution of shariah-compliant services policy for employees.				0.000	1.692
HR5	Shariah compliance rulings and policy among staffs and employees (attire).					0.000
	Consistency ratio	**0.01**				

	ISLAMIC ENVIRONMENT (IE)	IE1	IE2	IE3
IE1	Practice of Islamic social atmosphere (e.g., qur'anic recitation, azan, prayers, *salam* greetings etc.)	0.000	1.128	1.1996
IE2	Provide continuous/periodical awareness programme in Islamic environment. (e.g., *tazkirah, usrah*).		0.000	1.954
IE3	Inculcation of Islamic practices (e.g., congregation prayers, zakat payment, *sadaqah* etc.).			0.000
	Consistency ratio	**0.01**		

	AFFORDABILITY AND ACCESSIBILITY (AA)	AA1	AA2	AA3
AA1	Reasonable cost of medical treatment.	0.000	1.584	1.707
AA2	Transparent policy on medical costing for patients.		0.000	1.1463
AA3	Establish collaboration with Islamic funding agencies (e.g., *wakaf, zakat, baitulmal*) to assist medical cost burden.			0.000
	Consistency ratio	**0.04**		

	PATIENT CARE (PC)	PC1	PC2	PC3
PC1	Good standard of medical care (encompasses all healthcare professionals).	0.000	1.908	1.204
PC2	Doctor/healthcare professional relationship with patients and family (*muamalah*).		0.000	1.469
PC3	Patient's dignity (e.g., gender sensitivity, patient's privacy).			0000
	Consistency ratio	**0.00**		

	END OF LIFE CARE (HUSNUL KHATIMAH) (EL)	EL1	EL2	EL3	EL4
EL1	Task force committee .	0.000	2.431	2.265	3.366
EL2	*Talqin* .		0.000	1.076	2.115
EL3	Informed consent for Do Not Resuscitate (DNR).			0.000	1.405
EL4	Management of brain death and organ donation.				0.000
	Consistency ratio	**0.01**			

Priority weights were then computed to determine the relative importance of elements and sub-elements with respect to the framework of shariah compliant medical service. During the calculation of priority weights, the global weightage and local weightage of each element and sub-element were taken into account by multiplying the pairwise comparison values by their corresponding consistency ratio and summing them up. The resulting values served as a measure of the relative importance of each element and sub-element. Table 3 shows the global weightage values assigned to each element, along with the local weightage values assigned to each respective sub-element.

Based on the results in the table, it can be said that the most important element with the highest value of global weightage (GW) in shariah-compliant medical services were governance (0.255), followed by medical ethics (0.162), patient care (0.146), human resources and professional development (0.121), spiritual care support (0.058), end of life care (0.057), Islamic environment (0.054), medicine and drug (0.050) and finally affordability & accessibility (0.038). The AHP result shows the experts' agreement on governance which gives the most impact (0.255) towards the value of index.

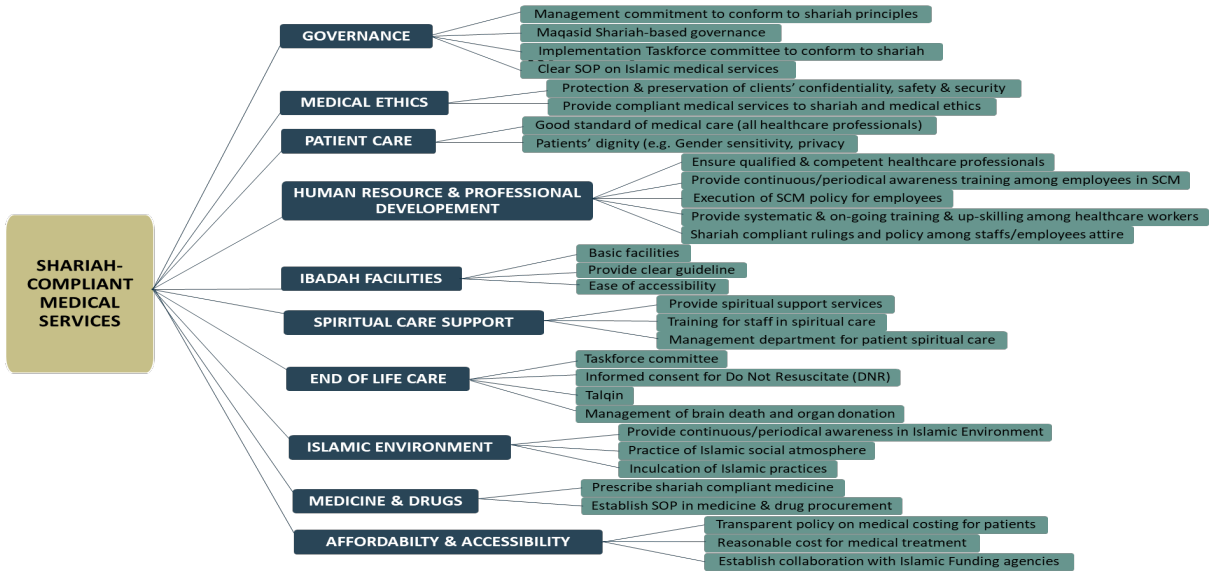
Table 3: Global Weightage for Each Element and Local Weightage for Each Sub-Element

No.	Elements & Sub-elements	Global Weigthage (GW)	Local Weigthage (LW)
	IBADAH FACILITIES	**0.058**	
1.	Basic facilities (e.g., musolla, washroom, kiblat direction, tayammum equipment (dust), bottle, guidebook-manual, flexible bed) etc).		0.597
2.	To provide clear guideline (e.g., guide books, posters, apps, system etc)		0.281
3.	Ease of accessibility		0.123
	GOVERNANCE	**0.255**	
4.	Management commitment to conform to shariah principles (e.g. supporting policy)		0.321
5.	Organisation framework consists of a shariah panel		0.114
6.	Taskforce committee/executive for implementation and conformity to shariah		0.151
7.	Maqasid Shariah based governance.		0.276
8.	Clear SOP on Islamic medical services		0.139
	MEDICAL ETHICS	**0.162**	
9.	Provide medical services that comply with shariah and medical ethics (to be elaborated)		0.611
10.	Protection and preservation of clients' confidentiality, safety, and security		0.389
	MEDICINE AND DRUGS	**0.050**	
11.	To prescribe shariah-compliant medicine.		0.470
12.	Establish SOP in the procurement of medicine and drugs.		0.530
	SPIRITUAL CARE SUPPORT	**0.058**	
13.	Provide spiritual support services (e.g., patients' spiritual health management- through guidance, and advice)		0.376
14.	Management department for patient spiritual care (e.g., Spiritual section, spiritual care provider)		0.250
15.	Training for staffs in spiritual care		0.373
	HUMAN RESOURCE AND PROFESSIONAL DEVELOPMENT	**0.121**	
16.	Ensure qualified and competent healthcare professionals		0.374
17.	Provide systematic and on-going training and up-skilling among healthcare workers.		0.151
18.	Provide continuous/periodical awareness training in Shariah-compliant medical services among employees		0.200
19.	Execution of shariah-compliant services policy for employees		0.156

20.	Shariah compliance rulings and policy among staffs/employees (attire)		0.119
	ISLAMIC ENVIRONMENT	**0.054**	
21.	Practice of Islamic social atmosphere (e.g., qur'anic recitation, azan, prayers, salam greetings etc)		0.332
22.	Provide continuous/periodical awareness programme in Islamic environment. (e.g., tazkirah, usrah)		0.423
23.	Inculcation of Islamic practices (e.g., congregation prayers, zakat payment, sadaqah etc)		0.245
	AFFORDABILITY & ACCESSIBILITY	**0.038**	
24.	Reasonable cost of medical treatment		0.332
25.	Transparent policy on medical costing for patients.		0.429
26.	Establish collaboration with Islamic funding agencies (e.g., wakaf, zakat, Baitulmal) to assist medical cost burden		0.239
	PATIENT CARE	**0.146**	
27.	Good standard of medical care (encompasses all healthcare professionals).		0.426
28.	Doctor/healthcare professional relationship with patients and family (MUAMALAH)		0.229
29.	Patient's dignity (e.g., gender sensitivity, patient's privacy)		0.345
	END OF LIFE CARE (HUSNUL KHATIMAH)	**0.057**	
30.	Task force committee		0.462
31.	Talqin		0.220
32.	Informed consent for Do Not Resuscitate (DNR)		0.193
33.	Management of brain death and organ donation		0.125
			10.00
	OVERALL	**1.00**	

The framework will be arranged according to the AHP analysis using the priority weights obtained. The framework encompasses critical elements and sub-elements for Shariah-compliant medical services, organized based on their weightage values, to facilitate a comparative evaluation among the elements. This framework serves as a comprehensive set of guidelines for delivering outstanding care to Muslim patients and tourists globally, in full alignment with the principles of Shariah. Figure 1 presents the proposed framework for Shariah-Compliant Medical Services.

1 Figure 1: Framework for Shariah-compliant Medical Services



Based on previous research and the discussions throughout the study, the experts arrived at a definition of Shariah-Compliant Medical Services as medical services provided by healthcare facilities that align with the principles of Shariah and cater to the needs of patients. The establishment of these healthcare institutions must be rooted in the protection of the Maqasid al-Shariah, and the entire ecosystem of the healthcare institution must comply with Shariah principles. This study presents a comprehensive framework for the provision of Shariah-compliant medical services, which encompasses ten critical elements: governance, medical ethics, patient care, human resources and professional development, ibadah facility, spiritual care support, end of life care, Islamic environment, medicine and drugs, and affordability and accessibility. This comprehensive guide serves as a foundation for setting standards in Shariah-compliant medical services and ensuring that medical practices align with Islamic principles and values. The framework provides a thorough and systematic approach to addressing the needs of Muslim patients and ensuring that medical services are in line with shariah principle and beliefs.

Shariah-Compliant Medical Services Framework

The provision of Shariah-compliant medical services requires a governance system based on *Maqasid al-Shariah* and Islamic values, with the help of a task force and a Shariah advisor. Previous studies have recognized the importance of a strong governance system based on Islamic principles for Shariah-compliant healthcare services. For example, a study by Masud et al. (2021) emphasizes the need for a Shariah Advisory Board and a task force to ensure Shariah compliance and protect the five elements of *Maqasid al-Shariah* (Ishak et al. 2021). The study also highlights the importance of developing standard operating procedures that incorporate Islamic values and comply with *Maqasid Al-Shariah* and *Qawa`id al-Fiqhiyah*. However, it is important to note that Shariah compliance alone is not sufficient, and adherence to medical ethics and evidence-based medicine practices is also necessary. A study by Rahman Al-Azmi et al. (2022) underscores the importance of considering ethical concerns related to Shariah and Islamic medical ethics to ensure patient safety and well-being (Rahman Al-Azmi et al. 2022). Healthcare providers must provide genuine medical diagnosis, treatment, and care while adhering to Islamic medical ethics and avoiding negligence (Shariff, Mohtar & Jamaludin 2018).

A patient care, human resource management, provision of Ibadah facilities, spiritual care support, and end-of-life care are also key priorities that need to be addressed in establishing Shariah-compliant medical services (Zawawi & Othman 2017b; Aizat Jamaludin et al. 2019; Aisyah Ismail et al. 2018; Sunawari, Khalil & Mokhtar 2023). To ensure high-quality patient care, it is important to consider patient dignity and ensure gender sensitivity and privacy considerations. A study by Rahman et al. (2018) emphasizes the importance of providing high-quality medical care while preserving patient dignity, with a particular emphasis on gender sensitivity and privacy considerations (Rahman, Zailani & Musa 2018b). Hiring competent professionals and providing ongoing training in Islamic medical ethics is crucial (Ishak et al. 2021; Rahman Al-Azmi et al. 2022). Additionally, Ibadah facilities and spiritual care support can improve patient outcomes and satisfaction, as found in a study by Rahman et al (Rahman, Bhuiyan & Zailani 2021).

End-of-life care is often overlooked in conventional medical services, and a taskforce committee should be established to ensure it is provided according to Shariah principles. A study by Masud et al. (2021) emphasizes the importance of providing end-of-life care according to Shariah principles, including supporting patients during their terminal stage and assisting with funeral arrangements (Ishak et al. 2021). Besides, Incorporating Islamic design principles and meeting medical standards and regulations is also necessary to establish a Shariah-compliant medical service (Zakaria & Isa 2022). However, it is important to balance religious and cultural beliefs with medical standards. In addition, in order to align with Islamic values, Shariah-compliant medical services should prioritize providing affordable and accessible healthcare to all Muslims, in collaboration with Islamic funding institutions, which promotes social justice and philanthropy (Ishak et al. 2021; Mohammad Aizat et al. 2019; Shariff & Rahman 2016).

In recent years, medical tourism has gained popularity among patients from Muslim-majority countries seeking Shariah-compliant medical services abroad. To meet the growing demand for these services, healthcare providers must establish a comprehensive and holistic approach to providing Shariah-compliant medical services. This approach should consider various factors such as Shariah compliance, medical ethics, patient care, human resource management, Ibadah facilities, spiritual care support, end-of-life care, affordability, and accessibility. By ensuring that these factors are integrated into their medical tourism offerings, healthcare providers can provide high-quality care that aligns with Shariah principles and meets the needs of all patients, including those seeking medical tourism services. This will not only help in attracting medical tourists but will also improve the overall quality of healthcare services provided by the healthcare providers.

The Cognitive Decision-Making and The Developed Framework

The development of a robust and comprehensive framework for Shariah-compliant medical services in Malaysia has become imperative, in order to address concerns about justifiable Islamic practices in healthcare and to assure proper adherence to Islamic tenets. To achieve this goal, this study employed the cognitive desion making approach through Analytical Hierarchical Process (AHP). In this study, a panel of twelve experts with diverse backgrounds participated in a cognitive decision-making process to develop a framework for Shariah-compliant medical services. This approach allowed for the inclusion of a broad range of expertise and the collective wisdom of the group to arrive at a robust and comprehensive decision. However, the reliability and validity of expert judgment have been questioned in previous studies. One study contended that expert judgment could lack coherence and calibration (Bolger & Wright 1993), while another maintained that experts may rely excessively on their experiential knowledge, leading to the potential for systematic biases (Romberg 1990). Nonetheless, research in cognitive psychology suggests that experts generally perform better than non-experts across a range of cognitive functions (Robson, Tangen & Searston 2021; Campitelli et al. 2015). Furthermore, classical decision-making theories propose that decisions are made through the conscious processing of information, although individuals do not always use mathematical strategies or act rationally in decision-making (Li 2009; Maćkowiak, Matějka & Wiederholt 2018)Recent models suggest that individuals use a variety of complex and adaptive information integration strategies, taking into account the specific properties of each situation (Zha et al. 2019; Lynn et al. 2020).

The Analytic Hierarchy Process (AHP) is a cognitive decision-making approach that is grounded in the belief that breaking down complex problems into smaller, more manageable components and then prioritizing these components based on their relative importance can lead to better decision-making (Sipahi & Timor 2010; Saaty 2001; 1994). The AHP approach is considered cognitive in nature because it seeks to capture the decision-maker's cognitive processes of reasoning, judgment, and preference formation (Saaty 2002b). Previous studies have supported the effectiveness of AHP as a cognitive decision-making approach and demonstrated that the AHP method can effectively capture the decision-makers' cognitive processes and preferences, leading to more informed and effective decisions (Waris et al. 2019; Maruthur et al. 2015a; 2015b). Moreover, studies demonstrated the superiority of AHP in comparison to other decision-making methods, such as simple additive weighting and the technique for order of preference by similarity to ideal solution (TOPSIS) (Supraja & Kousalya 2016; Saaty & Vargas 2012).

AHP is a multi-criteria decision-making method that involves hierarchical decision-making processes, and helps to prioritize different elements and rank them based on their relative importance (Russo & Camanho 2015). In this study, AHP was used to prioritize the ten essential elements for the development of the framework for Shariah-compliant medical services, offering a systematic and structured way to rank the elements and determine their priority. The application of AHP in this study, as a cognitive decision-making approach, presents a thorough and unbiased framework for the advancement of Shariah-compliant medical services (Saaty 2002b). By considering the perspectives and opinions of experts from varied backgrounds, the

approach offers a holistic evaluation that takes into account the diverse viewpoints and insights of the contributors (Canco, Kruja & Iancu 2021). This facilitates the creation of an objective and comprehensive system for the development of medical services that comply with Shariah principles. It also provides a systematic way to prioritize different elements and rank them based on their relative importance (Saaty & Vargas 2012). By using these approaches, this study provides a scientifically-based solution to the challenges facing the development of Shariah-compliant medical services, and offers a set of guidelines for delivering exceptional and comprehensive care to Muslim patients and tourists globally.

Furthermore, the development and implementation of a framework and standards for Shariah-compliant medical services is of great significance for several reasons. Firstly, the framework and standards promote ethical practice in the healthcare sector by aligning medical practices with the principles of Shariah law, which stresses the importance of moral and ethical values in all aspects of life, including healthcare (Greenfield et al. 2012; Davis 2014)Secondly, the framework and standards serve as a guide for healthcare providers, ensuring that their practices are consistent and meet the expectations set by Shariah law, thereby promoting quality and uniformity in medical services and enhancing patients' trust in these services (America et al. 2000). Thirdly, the framework and standards support cultural and religious diversity in healthcare by providing a means of accommodating the needs and beliefs of patients from diverse backgrounds, and promoting inclusivity and a better understanding of different cultures and religions (Swihart & Martin 2019). Lastly, the framework and standards facilitate informed decision-making for patients by providing a clear understanding of what is considered acceptable or unacceptable in medical practices, enhancing patients' confidence in the medical services provided (Davis 2014). The proposed framework for Shariah-compliant medical services is valuable in ensuring that medical practices are ethical, consistent, and in line with the principles of Shariah law. This ultimately promotes trust and confidence in medical services, and recognizes the importance of cultural and religious diversity in healthcare.

Limitations of the Study

The present study aims to capitalize the cognitive decision making approach in developing a framework for Shariah-compliant medical services in Malaysia. The focus of the study is exclusively on the conceptualization of this framework and does not delve into discussions on peripheral topics or elements that are not relevant to the main objective. The methodology adopted in this study is a key input approach that seeks to elicit the opinions of relevant experts to determine the critical elements required for the establishment of sustainable Shariah-compliant medical services. A purposive sampling technique was employed to select experts from diverse backgrounds with relevant knowledge and experience to participate in the study. The experts' opinions were collected through the the Analytical Hierarchical Process to arrive at a consensus regarding the proposed framework. It is imperative to acknowledge that the findings of this study are dependent on the opinions of the selected participants and the sampling technique used. Thus, the framework presented in this study should not be generalized to other industries outside of healthcare.

In summary, the present study has employed a cognitive decision-making approach, namely the Analytic Hierarchy Process (AHP), to establish a comprehensive framework for the development of Shariah-compliant medical services in Malaysia. The use of this approach has facilitated the incorporation of diverse perspectives and opinions from experts with varying backgrounds, which has resulted in an objective and comprehensive system that conforms to Shariah principles. The framework has the potential to serve as a guide for healthcare providers in Malaysia and other Muslim-majority nations in ensuring that their medical services comply with Shariah law. The study has demonstrated the effectiveness and importance of cognitive decision-making approaches in addressing complex problems, particularly in the context of healthcare services that require compliance with religious and cultural values. The findings of the study are reliable and robust, as they were generated through a rigorous and systematic process that utilized the AHP approach. The integration of multiple perspectives from experts in different

domains has ensured that the framework developed is inclusive and applicable in a wide range of contexts. The potential of the framework to aid healthcare providers underscores the significance of this study, and the effective use of cognitive decision-making approaches demonstrated in this research can offer valuable insights for developing similar solutions to multifaceted challenges in healthcare and other fields.

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