"All I was told is that I'm not clean, I'm impure": Understanding Muslim Women's Experience of Menstrual Education

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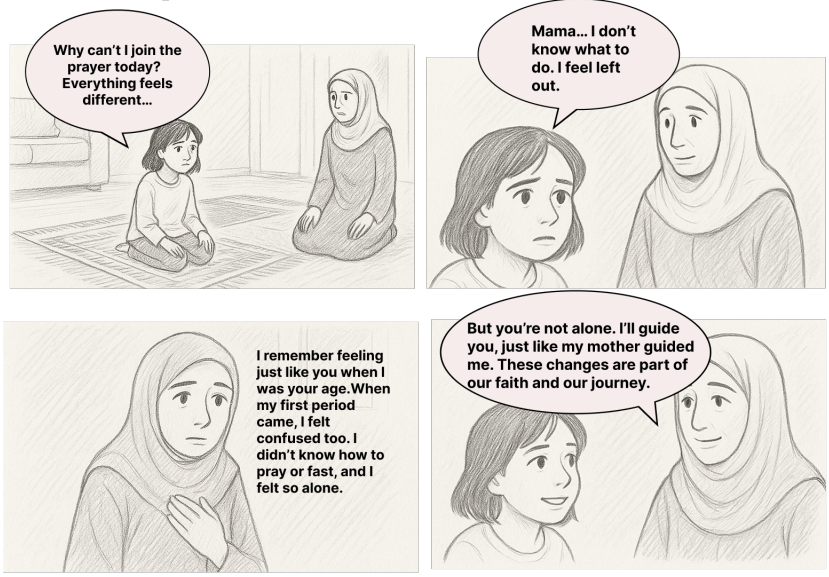

Figure 1: Amina, a 42-year-old mother, watched her 12-year-old daughter sitting on the living room carpet, staring at the prayer mats with uncertainty. It was the first evening her daughter had not joined the family in prayer, a change brought on by her first menstruation (menarche). The moment felt familiar to Amina. She remembered her own first period — a transition into womanhood marked by exclusion, confusion, and self-consciousness — as the comfort she once drew from daily routines of prayer and fasting during Ramadan was suddenly disrupted. Amina recognized that, just as her mother had done for her, she now needed to guide her daughter in understanding sacred rituals such as *ghusl* (the mandatory purification upon completion of menstruation) and in navigating menstrual practices and education within the bounds of faith. More than anything, Amina hoped her daughter would find reassurance in knowing that she was not alone in this journey (this is an AI-generated figure).

Abstract

While HCI scholarship has investigated how Muslim women navigate their menstruation experiences, there remains a limited understanding of how early menstrual education is sought and shaped by religious upbringing, rulings, and values. Drawing on empirical data from the Asynchronous Remote Communities (ARC) method, we investigate how 14 menstruating cisgender Muslim adults in the

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US constructed and navigated their understanding of menstrual education. Using menarche (first menstruation) as a probe, we unpack the information they received, the gaps that persisted, and the influence of religious upbringing and narratives on their learning. We found that Muslim women gradually refine their early knowledge of menstruation and rely on social and religious support networks to navigate its implications within religious practice. Building on these insights, we present design implications and opportunities to foster menarche education and contribute to the development of robust, supportive, and religiously aligned menstrual information ecosystems.

CCS Concepts

• **Human-centered computing → Empirical studies in HCI**.

Keywords

Menstruation, Menarche, Islamic Values, Lived Experience, Asynchronous Remote Communities

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1 Introduction

Religion profoundly shapes how practicing individuals experience and respond to life transitions (e.g., pregnancy [53] or menstruation [44]) and navigate health crises [11, 37, 55]). For billions of religious adherents [67], religious influences extend beyond personal beliefs, intertwining with broader health behaviors and practices, and playing a pivotal role in shaping communal and public health strategies. However, the intersection of religion and health is often overlooked in efforts to address health inequities. Faith-based interventions, in particular, have emerged as essential tools to address health inequities within these communities [46]. For example, in the United States, churches have long served as hubs for community-based health education, promotion initiatives, and interventions [46–48, 59]. Despite increasing attention to the role of faith-based perspectives in public health, the relationship between religious belief and intimate health practices, especially menstruation, has received only limited HCI scholarly engagement. This gap is particularly striking in the context of Islam, a tradition followed by approximately 1.7 billion people worldwide (23% of the global population) [67], where religious guidelines surrounding menstruation profoundly shape Muslim women's menstrual education and their lived experiences. For example, Muslim women are exempted from praying, fasting, sexual intercourse, and fulfilling religious pilgrimage rites when they are menstruating [26]. While prior HCI scholarship has examined the menstrual experiences of Muslim women [1, 25, 26, 44], this body of work has not investigated how these women acquire menstrual knowledge within the frameworks of their faith, how they are prepared for menarche (first menstruation), or how they subsequently negotiate, navigate, and integrate religious dimensions into their menstrual practices. Therefore, in this paper, we seek to understand Muslim women's experiences of menstrual education by providing empirical insights into how religious upbringing, principles, and values shape their learning. This understanding is critical for informing the design of menstrual technologies that are tailored to support the unique educational needs of Muslim women.

Within the health and HCI research communities, some studies have examined how religion and religious practices shape women's experiences of menstruation and sexual health [1, 25, 26, 44]. These investigations address various challenges, such as designing technologies that align with religious, non-secular beliefs and values to enhance intimate health practices among Muslim women [44], self-discovery regarding sex and women's intimate health among Arab women [1], Muslim women's engagement with menstrual tracking applications [26], and personal informatics tools for tracking menstruation while observing a religious fast (e.g. *Ramadan*) [25]. Despite these efforts, there remains a paucity of scholarship that specifically explores the research and design of technologies to support religious education and information-seeking practices surrounding menstruation. To address this gap, we investigate the following research questions: **(RQ1)** What were the ways through which practicing menstruating Muslim women acquired knowledge about menstruation, particularly at the onset of their menarche? and **(RQ2)** How do practicing menstruating Muslim women envision technology that could help support religiously aligned menstrual education and care?

To address these research questions, we adopted Macleod et al.'s Asynchronous Remote Communities (ARC) [35] method and created a private, closed Facebook group where 14 menstruating cisgender Muslim adults were invited to participate in a 10-week study. The study involved weekly activities, such as surveys, circle diagrams, scenario-based prompts, etc., to unpack Muslim women's menstrual education and experiences. We particularly investigated Muslim women living in the United States, a population characterized by significant diversity with varying cultural, ethnic, and national backgrounds. Despite this diversity, these women share common religious beliefs, laws, and guidelines concerning menstruation and their lived experiences as practicing women of faith. By studying this population, we gain broad and multifaceted perspectives on their experiences, enabling researchers and designers to accommodate diverse religious interpretations in menstrual technology design without privileging one perspective over another. In our findings we reveal that maternal figures play an essential role in transmitting foundational menstrual knowledge, frequently employing storytelling as a pedagogical medium. As individuals mature, they gradually refine their knowledge of menstruation, transitioning from passive recipients to active agents of their own learning through self-directed study, knowledge curation, and collective learning circles. Building on their lived experience of menarche and menstruation, participants re-conceptualize the design of menstrual technologies, envisioning interventions that advance menstrual education through an integrated framework of health and religion.

In our research we make the following contributions to the HCI and health literature: **First**, we provide an empirical understanding, drawn from the reflective experiences of adult Muslim women, of how religious teachings, family dynamics, and early education

shaped their preparation for and education about menarche. **Second**, we provide insights into how Muslim women navigate their complex menstrual experiences within religious guidelines. **Third**, we present we present design concepts envisioned by our participants that foregrounds Muslim women's key needs and values around religiously aligned menstrual education and care, highlighting the importance of collaboration between medical professionals and Islamic scholars, cultivation of community support, and development of AI-powered tools for holistic health and religious guidance. **Lastly**, we discuss design opportunities and recommendations to enhance menarche education and to foster an information ecosystem that facilitates the integration of religious knowledge and health information for navigating the complexities of menstrual education and care. These contributions advance HCI and health scholarship on the design of educational tools that support menstrual experiences, particularly within religious contexts.

2 Related Work

2.1 Menarche, Menstruation, and HCI

Menarche - the first menstruation is a bodily-rooted and socially-experienced life transition that can affect individuals' sense of normalcy and how they perceive themselves or engage in social activities, such as participation in sporting activities [42, 51, 56, 56]. Within HCI and health scholarship, menarche research has mostly explored the potential of educational tools to support menarche experience [28, 32, 63, 64]. For instance, *menarche bit* - a prototyping kit for young adolescents to create body-worn technologies that support their experiences of menarche [56]. Tuli et al. introduce *Menstrupedia* - a digital platform for menstrual health education designed for the Indian community [64]. In addition to fostering menarche education, another body of literature has explored how inadequate health education can lead to a negative perception of menstruation [29]. In their research exploring how parents support children for menarche and the use of technology for this support, Rai et al. unpack that mothers play an influential role in providing initial menstrual guidance, and the accuracy of information is often dependent on parental education level [51]. They further identify key values, such as appreciation for a holistic approach to menstrual education, which are prioritized by parents when sharing information with their children at the onset of menarche. However, they also recognize the necessity for further investigation into how differences in parents' needs and preferences—shaped by factors such as gender and cultural background—might influence a holistic approach to menstrual education and the effectiveness of communication during this critical period [51]. Technology has the potential to support holistic menstrual health education while addressing gaps in parental knowledge about menstruation and helping individuals be better prepared for both menarche and menstruation. Against this backdrop, there is still a need for a more thorough investigation of menarche education within different contexts, such as parents who value religious teaching and upbringing in their children. Our research aims to expand understanding of menarche preparation and holistic menstrual health education within HCI, particularly in contexts where religious beliefs and values play a significant role in child-rearing and everyday life.

Although menarche remains an area requiring further scholarly attention, menstruation has been extensively examined within the field of HCI and health. Researchers in this domain have investigated a broad spectrum of issues, highlighting the multifaceted role of menstruation in everyday life. Central themes include information-seeking practices and educational interventions, which illuminate how individuals acquire, access, and utilize knowledge about menstrual health [28, 64, 65]. The privacy practices associated with menstrual apps have also been scrutinized, emphasizing the importance of protecting sensitive personal data in the digital age [58]. Moreover, the development of technologies specifically designed for the menstruating body has been a growing area of interest, focusing on innovations that address the unique needs and challenges faced by individuals during menstruation [12, 19, 26].

Other literature have focused on tracking practices that examined how individuals monitor and manage their menstrual cycles through digital technologies. Additionally, they explored how menstrual tracking technologies might be designed to embed users' religious values [1, 25, 26], incorporate privacy protections within operational and regulatory frameworks [22, 34, 57, 58], and foster period-positive ecologies in contexts where menstruation is stigmatized [18, 66]. A further salient dimension of this scholarship concerns the analysis of menstrual data itself. Studies have explored how data generated through tracking practices can reveal recurring patterns and yield insights into potential health implications [20, 33]. For example, [27] demonstrates how the interpretation of menstrual tracking data can promote self-knowledge and enhance personal health awareness, while Woytuk et al., advances this line of inquiry by designing sensors that facilitate embodied engagement with menstrual fluids, thereby offering novel forms of experiential knowledge about the cycle [13].

Furthermore, researchers have also examined menstrual experiences, tracking, and data-sharing practices among individuals with minimal menstrual education [34, 60]. This line of research has highlighted the role that cultural foundations play in shaping how individuals engage with menstrual education and care. Factors such as cultural backgrounds, access to menstrual health education and care, menstrual stigma in both school and home environments, income, and education levels all contribute to how individuals approach menstrual tracking and management. Lin et al. [34] emphasize that these cultural perspectives can profoundly impact the mechanisms and technologies participants use for tracking their menstrual cycles. In a similar vein, Ibrahim et.al posits that religious foundations influence Muslim women's choices for engaging with menstrual tracking applications [26] and how faith practices impact intimate health [1, 44]. These studies emphasize the importance of considering and integrating cultural and religious values into menstrual experiences and education to foster more holistic health care. To inform the design of technologies that support menstrual education and care within religious contexts, this paper explores the intersection of menstruation and the identity of being a practicing Muslim, using menarche experiences as a probe. Our work contributes to the growing body of knowledge on menstruation by offering insights into how religious upbringings, rules, and beliefs intersect with personal health management. In the subsequent section, we reflect on the complex relationship between menstruation and religion.

2.2 Menstruation and Religion

Many religions around the world, including Islam, Judaism, Christianity, Buddhism, and Hinduism, impose specific restrictions, exemptions, or guidelines on menstruating individuals, with Sikhism being a notable exception [6, 16]. These religious practices often reflect firmly established cultural beliefs and vary widely across traditions. In particular, Islam and Judaism have well-defined rituals that menstruating individuals must observe [6]. For instance, both religions require a purification process, such as a mandatory ritual bath (Ghusl in Islam and Mikveh in Judaism), to be performed upon completion of menstrual bleeding. This ritual purification is essential before the individual can resume participation in religious activities, such as prayer, fasting, or entering places of worship [26]. These practices illustrate how religious values and guidelines shape the everyday behaviors of menstruating individuals. Understanding these religious practices is essential to unpack how menstruation is integrated into the broader fabric of religious life and how these practices influence the menstrual education, care, and overall lived experiences of individuals within these religious communities.

There has been ongoing discourse among HCI scholars on the intersection of religion and technology design, highlighting the importance of incorporating religious considerations into HCI practices [1, 15, 24, 26, 31, 70]. Within this broader discourse, researchers have particularly emphasized the need to integrate religious needs and values into health-related HCI design [1, 25, 31, 44, 53, 55]. This body of work argues that menstrual health tools can become more relevant and effective for diverse user groups by understanding and embedding religious beliefs and practices into them. For example, researchers [1, 25, 61] advocate for leveraging Islamic concepts into the design of technologies that support Muslim women's health, thereby promoting religious wellness and overall well-being.

However, much of the existing literature on religious women's intimate health technologies overlooks the role of religious values in shaping early knowledge acquisition in the preparation for menarche and menstruation. Religious upbringing, religious laws, and values can influence how individuals navigate the menstrual experience, how education around menstruation is sought, and how support structures are built to navigate the menstrual experience. Our work contributes to this gap and expands upon designing for Muslim women's menstrual education. Our research further explores how Muslim women navigate menarche education and self-learn to accommodate menstruation as part of daily life. Muslim women are underrepresented in research; although often overlooked, this minority group is highly diverse, encompassing a wide range of ethnic, national, and educational backgrounds. By exploring the experiences of practicing Muslim women, we aim to reveal how religious and social contexts intricately shape educational approaches to menarche and menstruation. Also, we identify ways technology can better support these women. Our research seeks to contribute to a more inclusive understanding of menstrual education and care within HCI, recognizing the importance of this intersectionality in shaping health behaviors and experiences.

2.3 Research Context: The Significance of Menarche and Menstruation in Islam

Menarche is a particularly pivotal event for Muslim women, signifying not only the onset of bodily changes as they transition into puberty but also the point at which Islamic law prescribes certain religious obligations. For instance, the observance of modesty, which includes the wearing of the hijab. According to Islamic teachings, the hijab becomes obligatory at puberty, marking a critical transition in a Muslim woman's life as she begins to adhere to these religious practices [4, 14]. Although in some cultures, these mandatory aspects may be delayed to ease the child into these obligations. Therefore, menarche and puberty are a period of transition that is fraught with both personal and communal significance, as it aligns with broader expectations within the Muslim community regarding modesty, religious duty, and the external expression of faith (wearing a head covering). Menarche is a life-changing event for any individual, but for Muslim women, its impact extends beyond health and physical changes to social and religious aspects as well. As a result, the experience is often deeply memorable. Therefore, we use this key moment as a probe to unpack Muslim women's experiences of menstrual education, particularly how early learning is sought and shaped by religious upbringing, rulings, and values.

Menarche, menstruation, and their intersection with religious lived experiences are an emerging area of scholarship that remains relatively understudied in the HCI domain. Our research aims to expand on the existing body of literature to include a deeper understanding of how religious contexts influence these health experiences and education. In our research, we focus on Muslim women who menstruate. These participants bring a wealth of lived experience, both from their own menstruation stories and from the process of guiding their daughters, sisters, and/or nieces through this significant life stage. As such, our work contributes to and expands upon existing work on intimate health, menstruation, and religious contexts in HCI.

3 Methods

We employed the Asynchronous Remote Communities (ARC) research method [35, 72] to unpack how US Muslim women's menstruation experiences and education have been shaped by religious values, practices, and attitudes. The research was approved by the Indiana University Institutional Review Boards (IRB) and executed from March 4th through May 12th 2024.

3.1 Asynchronous Remote Communities (ARC) Deployment

Prior research using the ARC method has established that ARC is an effective way to remotely study the lived experiences and challenges of groups who are marginalized or stigmatized [36, 72], living with chronic illness [35], vulnerable [40], or are hard-to-reach populations [35, 49]. Because Muslim women are geographically dispersed across the United States, we sought to capture a diverse range of experiences and perspectives. The study required a level of depth and nuance that traditional interview methods could not adequately provide. For these reasons, we selected the ARC Method as the most effective approach to engage participants and generate rich insights. The ARC method helped us to overcome barriers

to access and recruitment by allowing individuals to participate remotely regardless of location or time zone [35]. The ARC method afforded the research team the ability to interact with participants in a convenient and low-burden manner, allowing the participants time to reflect on prompts posed by the research team. We were able to gather participant perspectives and feedback in a way that suited their convenience, enabling them to provide reflective and in-depth responses to various activities.

3.1.1 Platform Selection. The ARC method was deployed in a closed Facebook group. We opted to use Facebook for several reasons. First, Facebook's built-in private group feature and its widespread familiarity among individuals made it a convenient choice. It allowed us to engage with a broader range of participants, overcoming geographical limitations, and facilitating asynchronous study activities. Second, Facebook provided the participants with the ability to easily join the group, navigate activities, contribute to discussions, and post photos. However, Facebook has drawbacks and challenges, including privacy concerns and the risk of data breaches. We communicated these challenges to our participants and explained how we addressed them to the best of our ability as researchers. Importantly, we highlighted to participants our lack of control over how Facebook utilizes the data on its platform. The first two authors actively commented on and liked posts to encourage open dialogue and reduce potential influence among participants in the group-based Facebook setting. During onboarding, researchers emphasized thoughtful, respectful, and kind engagement, informed participants that their posts would be visible to others, introduced the research team, and invited participants to report any discomfort. These steps fostered trust and mutual respect, enabling participants to share openly, including personal milestones such as childbirth, marriage, pilgrimage, and loss. Although complete openness cannot be guaranteed, we took deliberate measures to facilitate and support open dialogue over the course of the 10-week study (see *Building Rapport* of Section 6).

3.1.2 Recruitment and Onboarding. Recruitment of participants took place throughout February 2024. We contacted individuals who had participated in our earlier studies and had given permission to be reached for future research. We also recruited through various social media platforms, such as Facebook groups, Slack channels, Instagram stories, WhatsApp groups, and GroupMe groups. Additionally, we relied on a snowball sampling strategy to reach out to more potential participants. Individuals who were interested in joining the study either responded to members of the research team via e-mail or completed the short survey used in the social media call. The survey asked participants to provide their names, email addresses, and indicate whether they already used Facebook or, if not, whether they would be willing to create an account for the study. We emailed the informed consent document to interested participants and invited them to an onboarding video call over Zoom. The onboarding session lasted for about 30 minutes, where we discussed the study details and answered participants' queries. We also outlined rules for engagement, emphasizing the significance of participants providing thoughtful responses to researcher prompts or each other rather than merely liking a response or commenting with a few words. We reminded them to engage respectfully, acknowledging diverse perspectives and experiences. We added participants who had signed the informed consent document to the Facebook group during the session. Those who had not submitted a signed form were reminded again to send the signed document to the research team.

3.1.3 Participants. By the end of the onboarding period, 18 participants agreed to enroll in the study. Of the 18 enrolled, 14 of these participants completed the study. Participants ranged in age from 19 to 39 years old (mean age 27.7 years, std dev 7.1 years). All but one participant was born into a Muslim family; one participant converted to Islam later in life. All 14 participants tracked their menstrual cycles. In addition to tracking the menstrual cycle, 35.7% (5 participants) reported that they monitored their fertility, while 28.6% (4 participants) tracked hormonal changes. 50% of participants were born in the U.S., while a smaller percentage (22%) migrated to the U.S. An equal percentage (14%) either have lived in the U.S. for the most part or fall under the 'Other' category. Those in the 'Other' category include an International student studying in the U.S. and individuals born in Canada who have lived in the U.S. for the last 4 years. Table 1 shows our participants' demographics.

3.1.4 Activities. We conducted the study from March through April 2024. Initially, our study was designed to be 16 activities over 8 weeks, where researchers posted activities at the start of the week (Sunday) and mid-week (Wednesday). However, since the study coincided with religious obligations (Ramadan, when participants fasted from dawn to sunset) and religious holidays (Eid-ul-Fitr), we used Facebook's poll feature to determine whether to continue or pause the activities. Participants voted to take a two-week pause through the study, extending the study length to 10 weeks. Each week, we posted two activities (sample Facebook post in Figure 8): Activity A on Sunday and Activity B on Wednesday. An exception was week 8, which included only one activity (6A), giving participants a full week to complete it. In week 10, Activities 8A and 8B were posted together[1]. Following the posting of each activity, we sent a reminder email approximately 24 hours later, containing unique links to the corresponding Facebook posts referencing the activity.

We prepared a set of activities that were adaptations of traditional HCI methods and were inspired by prior research adopting ARC [72]. The activity types included a survey, scenario-based questions, role-playing, design tasks, a circle diagram exercise, and an app prototype test. All activities were designed to be independent, following MacLeod et al.'s recommendation [35] and to reduce pressure on participants. Some participants had to grapple with life events during the study, such as childbirth, pilgrimage trips, loss of loved ones, marriage, and relocation, which caused them to finish an activity with some delay. With dependent activities, participants who could not complete the activity on time might have felt excluded from others, which could have potentially affected

[1]A key advantage of ARC is its flexibility, which allows researchers to adjust activities based on participants' needs. Because Week 9 depended on the completion of Week 8, and participants required additional time for Activity 6A, we canceled Activity 6B to support timely completion. This adjustment was effective. In Week 10, researchers were traveling for conference presentations, so Activities 8A and 8B were combined. These activities were excluded from analysis, as they served primarily as reflective exercises to inform future implementation of ARC with similar populations.

PID	Age	Ethnicity	# of Completed Activities (N=15)
P1	25	Black or African American	15 (100%)
P2	37	Asian	3 (20%)
P3	23	Asian	15(100%)
P4	22	White/Caucasian	13 (86.7%)
P5	29	Asian	11 (73.3%)
P6	39	Asian	11 (73.3%)
P7	28	White/Caucasian	15 (100%)
P8	33	Black or African American	11 (73.3%)
P9	19	Black or African American	14 (93.3%)
P10	20	White/Caucasian,Asian	2 (13.3%)
P11	39	Asian	11 (73.3%)
P12	21	Black or African American	2 (13.3%)
P13	36	Multiracial*	15 (100%)
P14	25	Black or African American	13 (86.7%)

*American Indian or Alaskan Native, Black or African American

Table 1: Participants' demographics in ARC Study where all participants identified themselves as cisgender women.

their retention. Table 2 describes the weekly activities participants were asked to complete throughout the study [2].

Participants were compensated $5 for each completed activity. However, given that in week 8, we canceled the second activity to give participants more time to complete Design Activity I, we offered every participant a bonus of $5 for the canceled activity. With a total of 15 activities, participants had the potential to earn up to $80 ($75 for completing all 15 activities and $5 extra for the canceled activity) for full engagement in the study.

3.2 Analysis

Our dataset included survey data, activity responses, follow-up comments, and sketches. We did descriptive analysis for survey-based activities (Activities 1B, 7B, and 8B). A summary of the analysis of survey data is attached in the supplementary material. In this paper, we focused on the qualitative findings from activity responses and follow-up comments. We analyzed the collected data using a reflective thematic analysis approach [7, 8]. We adopted an inductive coding approach. The first two authors divided the data from different activities into two halves for open coding. For one-half of the data, the first author served as the primary coder, while the second author acted as the secondary coder; for the other half of the data, their roles were reversed. They met weekly to discuss, iterate, and refine the initial code. The third author re-coded the design-based activities (Activities 6A and 7A). We used the open-source software Saturate app [3] to facilitate collaborative qualitative analysis. After completion of the initial coding, the researchers conceptualized themes by organizing similar codes into high-level categories. We combined themes from all activities into one codebook. Initial themes were iteratively reviewed, revised, and refined through several synchronous meetings within the research team. Our analysis revealed themes related to participants' practices, the tensions surrounding menstrual education, and the strategies they use to navigate and reconcile menstruation within the religious context.

[2]The appendix section includes detailed weekly activity prompts. The supplementary material includes Facebook posts of study activities and an analysis of survey data.
[3]http://www.saturateapp.com/

3.3 Positionality

Except for one cisgender white male, the research team comprises cisgender women from diverse religious backgrounds, including Islam, Hinduism, and Christianity. Team members have lived in a variety of developing and developed regions and have different lengths of residency in the United States. The authors who identify as practicing Muslims come from very different backgrounds, with one growing up in Africa and the other in Asia. These experiences, allow them to discuss and reflect on what is common, fundamental aspects of Islam and what is different in their ways of practicing Islam. This diversity in lived experiences, religious affiliations, and upbringings allows the authors to critically examine the findings and uncover nuanced perspectives in their analysis of the work. During the design of activity prompts and data analysis, the cisgender women researchers of this work discussed and acknowledged their individual menarche experiences. They emphasized that these experiences are not forgettable, as each researcher reflected on their menarche experience and the impact this formative moment had on their teenage years and beyond.

4 Findings

We present the findings in three parts. In the first part, we draw on participants' reflective experiences of preparing for menarche to unpack the pivotal roles of female figures (e.g., mothers, elder sisters, aunts, and grandmothers) in shaping foundational menstrual knowledge through Islamic teachings within the family (Section 4.1). Participants' reflective experiences are important for understanding broader menstrual experiences in adulthood and for informing supportive design solutions. In the second part, we highlight the tensions associated with early menarche education and we examine how Muslim women gradually refine their foundational menstrual knowledge through social and religious support networks while integrating menstruation and religious practices into their daily lives (Section 4.2). Finally, in the third part, we present design ideas that the participants envisioned could be used to support their unique needs and values for religiously aligned menstrual education and care (Section 4.3). Table 3 provides descriptions or

Wks	Activity Type	Activity Description	Engagement (N=14)*
1	[1A] Ice-breaker	Participants were asked to introduce themselves to the group.	13 (92.9%)
	[1B] Survey	Participants were asked to complete a survey that gathered their demographic information, menstrual tracking practices, and religious experiences.	13 (100%)
2	[2A]Scenario	Participants were given a scenario about menarche and asked to discuss menarche education, care, and sources of support from a religious perspective while sharing their own experiences and challenges.	13 (85.7%)
	[2A] Scenario	Participants were given a scenario about menarche and asked to discuss menarche education, care, and sources of support from a menstrual health perspective while sharing their own experiences and challenges.	8 (57.1%)
3	[3A] Scenario	Participants were given a scenario about irregular menstruation and asked to discuss ways to navigate extended menstrual cycles within the context of religious guidelines and considerations.	10 (71.4%)
	[3B] Scenario	Participants were given a scenario about irregular menstruation and asked to discuss ways to navigate extended menstrual cycles within the context of health guidelines and considerations.	9 (64.3%)
4	[4A] Question-Based	Participants were asked to list the types of religious information they sought regarding menstruation.	11 (78.6%)
	[4B] Circle Diagram	Participants were given a circle diagram template consisting of a set of concentric circles and were asked to list the support sources they would seek for religious information about menstruation. The closer a source was placed to the center of all circles, the more helpful it was considered for religiously aligned menstrual education. Participants were then instructed to upload their completed circle diagrams.	8 (57.1%)
5 & 6	Break	**Ramadan & Eid Holidays**	-
7	[5A] Advice Columnist	Participants were presented with a fictitious character, a migrant mother living in the US and raising US-born children, and were asked to advise the mother on how to embed religious values into menstrual education while addressing value clashes around sensitive issues, such as contraception, birth control, and abortion.	11 (78.6%)
	[5B] Advice Columnist	Participants were presented with a fictitious character, a U.S.-born young Muslim woman with a migrant mother, and were asked to advise her on ways to learn religious perspectives on menstruation and women's health more broadly.	10 (71.4%)
8	[6A] Design Activity I	Participants were asked to write a letter imagining futuristic technologies, systems, or solutions to support their menstrual education and care from both religious and health perspectives.	11 (78.6%)
	[6B] Voting	**Activity was canceled to allow for extra time for [6A]**	-
9	[7A] Design Activity II	Participants were asked to choose a design direction from a list and write design ideas for technologies to support religiously aligned menstrual education and care. They were then asked to revise their ideas through the lenses of privacy, ethics, trust, and religious values.	10 (71.4%)
	[7B] Usability Testing	Participants were asked to interact with Muslimah, a mobile application prototype. They then completed an online survey that captured detailed feedback on their impressions of the prototype's design and features.	10 (71.4%)
10	[8A] Reflection	Participants were asked to respond to reflective questions, sharing their thoughts about the study as well as what they learned about themselves.	7 (50.0%)
	[8B] Survey	Participants were asked to complete a survey that gathered feedback about the study.	7 (50.0%)

*Engagement refers to how many of 14 participants completed each activity

Table 2: A summary of weekly activities used in the study

meanings of various Arabic terminologies used throughout this paper.

4.1 Reflective Experiences of Preparing for Menarche

Participants highlighted that early education about menarche through the lens of religious beliefs, values, and rulings was crucial in preparing them for the transition to adulthood. They discussed three approaches to facilitate religiously guided menarche education within

Arabic Terms	Meaning
Alhamdullilah	Praises to God
Eid	Islamic Festival/Holiday
Ghusl	Purification done after Menstruation
Imam	A religious leader, typically one who leads prayers at a mosque
Hadith	The collective body of traditions relating to Prophet Muhammad and his companions.
Halaqa	A religious gathering for studying religious text, e.g., Quran
Iman	Belief in God
Khutbah	Sermons. These are typically done before Friday congregational prayers
Masjid	Islamic term for Mosque
Muslimahs	A term describing a group of Muslim women
Salam	A greeting of "Peace" typically used by muslims
Seerah	Historical biographies (typically of the Prophet), but sometimes of significant people in Islamic history
(SW) Sallallahu alaihi wasallam	Salutations typically said whenever Prophet Muhammad translates to, Peace be Upon Him
Ustadha	A title for a female graduate from a higher Islamic institute of learning

Table 3: A summary of various Arabic terms and their meanings. Several of these terms emerged in the findings and participants' quotations, and we have retained them to preserve the authenticity of the original participant texts.

the family context: (1) creating a welcoming environment for open discussion within the family, (2) illustrating contrasting experiences between Muslims and non-Muslims, and (3) sharing stories from Islamic history. The findings presented in this section are from the analysis of Activity 5A (See Table 2).

Participants discussed receiving menarche education from religious perspectives at an early stage. They highlighted that mothers and other female figures, such as elder sisters, aunts, and grandmothers, traditionally were responsible for preparing and educating them for menarche. These women played a crucial role in conveying menarche information within religious contexts. For instance, P3 described initiating discussions about menstruation within the family at a young age to foster a better understanding of both the menstrual experience and appropriate Islamic etiquette to make an informed decision. She emphasized the roles a mother can play in providing the necessary information about menstruation:

> "*I learned about menstruation before I started menstruating myself. I think daughters are mature and you can have these discussions with them when they are young (but still old enough to understand), teach daughters about menstruation- what it is and the appropriate Islamic etiquette. [...] Mothers need to give them the information they need to make an informed decision that is best for them.*" -P3

Participants noted that creating a welcoming environment where mothers and daughters can freely express themselves and engage in meaningful conversations to foster discussions about menstruation that are both informative and aligned with Islamic values. For instance, P14 described engaging in conversations to foster a deeper understanding and create a long-lasting impact, rather than approaching religious education through a set of directives:

> "*I advise (mothers) to refrain from turning the discussion into a series of commands. So, instead of saying "you have to do this" or "you have to do that because Islam says so", she (mother) should approach the topic as "did you know that..." or "what do you think about this Islamic ruling about....". I believe this will help foster deep and engaging conversations between the parent and children in a way that will stick with everyone.*" -P14

In addition, participants discussed navigating menarche conversations by contrasting their experiences with those of non-Muslim women. They noted that such a comparison could foster the installation and reinforcement of Islamic values by highlighting distinct practices and encouraging the respectful adoption of religious values in the context of menstruation. For instance, P7 shared that her mother taught her about Islamic values around menstruation through a *'us vs. them'* comparison, which emphasizes what she should do as a Muslim compared to what non-Muslims might do in similar situations. She also expressed her desire to adopt a similar parenting style with her daughters to help them establish and reinforce their identity within a religious context.

> "*I was born and raised in North America with a set of parents who were born and raised in the Middle East. [...] when I become a mother, [...] I would start telling them [my daughters] about the mercy that Allah has bestowed upon women religiously and how to perform ghusl (purification after menstruation). [...] and tell them what I do vs what they [non-Muslims] do. This is something my mom taught me at a young age- "us vs them". [...] Establishing this at a young age makes it easier to have this kind of conversation.*" -P7

Additionally, participants highlighted how historical Islamic stories ('Seerah') that have been preserved through the years could help navigate the menarche education through an Islamic lens. For instance, P14 discussed how informative YouTube or TikTok videos

featuring Islamic stories about historical female figures, such as the Wife of Prophet Mohammad, could be valuable tools for shaping perspectives on women's health at an early age:

> *"Islam has so many Seerah. One of the best ways to teach children about concepts and rulings in Islam is through these stories and Seerah. I know there aren't many regarding women's health, but there are some about Aisha (the wife of Prophet Mohammad), so she can be a role model. [...] Many kids nowadays enjoy funny videos on YouTube or TikTok [...] so maybe finding a video (an informative video on Prominent Muslim Women in History) to discuss the implications of the video and what it means for the daughters' womanhood and religion could be beneficial."*-P14 (Activity 5A)

In summary, our findings suggest that menarche education in Muslim families is not simply a transfer of information but a significant identity-shaping process. Participants described early religious framing through storytelling as a foundational tool for instilling a sense of modesty, duty, and belonging well before the onset of menstruation. Through three primary strategies—open dialogue, contrast with non-Muslim practices, and reliance on Islamic historical narratives—families position menarche as a juncture where religious identity is solidified. These practices do more than prepare girls for physiological changes; they socialize them into distinct concepts of Muslim womanhood, defining the parameters of acceptable and valued conduct. By re-framing menarche as an arena where religious, cultural, and familial norms converge, these findings highlight how menstrual education becomes a site of both empowerment and boundary-setting within Muslim communities.

4.2 Experiences of Muslim Women in Navigating Religious Menstrual Education

Participants reflected on a range of tensions surrounding menarche education, noting how social constructs, including gender norms, taboo topics, and cross-cultural perspectives, shape the way menstruation is framed and taught within religious contexts. Amid these complexities, they also emphasized the importance of cultivating a strong religious foundation through comprehensive education and fostering social and religious support networks to navigate the complexities of menstruation and menstrual education within a religious context. The findings presented in this section are from the analysis of activities 4A, 4B, 5A, and 5B (Table 2).

4.2.1 Tensions Around Menarche Education. Participants discussed encountering challenges and tensions around menarche education when it intersected with religious beliefs and values. They shared that social constructs, such as gender norms and taboo topics, affect how menstruation is taught, understood, and experienced in the religious context. They also expressed that menstruation is often considered to be a private matter, dictated by gender roles and expectations, and not to be discussed openly with male family members. For instance in P7 below:

> "*Since it (menses) was a taboo topic, I was not properly introduced to the science behind menses. [...] This is a delicate topic, and it becomes harder to open up. I was not allowed to discuss it with my father, even though I told him most of my life (he is my best friend) but, it is taboo to talk about it*" -P7

P7's reflection highlights two critical interpretive perspectives. First, the taboo acts as a form of epistemic gatekeeping; by moralizing the subject of menstruation, her environment unintentionally limited her access to basic knowledge on menarche and menstruation. Second, the data reveal a poignant relational dissonance. Despite describing her father as her "best friend," the participant was forced to compartmentalize her life, suggesting that constructed gender norms possess the power to override even the most intimate of familial bonds. Additionally, participants shared that menarche education often became challenging due to the differing perspectives between secular and Islamic views. They emphasized using their native language as a medium to preserve and reinforce the Islamic perspectives. For instance, P4 shared that Muslim families living in the US often deliberately enforce their native language as a means of communication in the homes to preserve religious values:

> "*I know so many girls who were born here (in the USA) and some whose moms were raised here who speak fluent Arabic. Their (Islamic) ideologies are not influenced by the West at all. One thing I noticed about this is that their parents didn't conform to society. They did this by instilling practices of cultural preservation and Islamic education. The simplest thing is by only Arabic, or in non-Arab cases, their mother tongue at home.*" -P4

This observation indicates that, within these families, language acts as a kind of protective barrier. Parents build a cultural stronghold around Islamic narrations on menarche and women's health by prioritizing the mother tongue. This ensures that menarche is understood through a lens of religious tradition and modesty. In summary, participants discussed ways for early menarche education to help individuals prepare for and navigate their menarche transition. These accounts show how menarche education is entangled with gendered expectations and cross-cultural pressures, constraining what can be openly discussed and who is permitted to participate in these conversations. These tensions reveal how religious menstrual learning is shaped as much by social norms and cultural boundaries as by Islamic teachings themselves. They highlighted how various social constructs can create tensions around the framing and delivery of religiously aligned menarche education.

4.2.2 Self-learning, Curating, and Refining Knowledge. Though our participants attributed the receipt of a strong early Islamic education as a key factor that enabled them to prepare and better manage their monthly cycle, they also noted that their early education was not comprehensive and often lacked context and depth, leaving them with unanswered questions about menstruation. For instance, P14 shared her struggle in fully grasping the details and nuances of religious guidelines related to menstruation, which she received from her mother during her younger years:

> "*What she (mother) told me wasn't sufficient for 2 reasons. The first is that I didn't understand why everything was necessary. All I was told is that I'm not clean, I'm impure, so that's why I had to do everything she told me to. [...] The other reason I felt [...] there were other questions that came up over time that weren't properly*

> *answered. For instance, what constitutes a period? Even to this day, I still struggle to know when my period officially (Islamically) ends. Everywhere I go, I'm told that it ends when there is no longer a tinge of color or after a certain number of days. So, I do my best to follow that general rule.*" -P14

Participants sought a comprehensive understanding and recognized the importance of considering the various factors that shape the meaning and significance of Islamic practices and rulings around menstruation. They discussed the importance of self-learning and explained how they curated and refined their understanding of the rationale behind religious practices to feel more connected to their faith while respecting their menstrual cycle. Many participants relied on various online resources, i.e., Google searches, YouTube videos, Islamic forums, online courses, etc., to seek and build their understanding of religious information. For instance, P1 mentioned using online forums and Google searches to look for Quran verses, Hadiths (Islamic traditions from the Prophet Mohammad), and their Islamic interpretations about female hygiene:

> "*I was not taught a lot about (religious) rulings on feminine hygiene. [...] A lot of my knowledge is from Google searches. If I wanted information on ghusl, I would use the step-by-step instructions given on IslamQA or WikiHow. [...] In a Google search, I'm specifically looking to see for any Hadiths or Quran verses that are easily accessible. [...] they come directly from Allah and the Prophet, and (search results) have credible sources attached so I'd feel comfortable following through on that information.*" -P1

Another participant, P11 talked about taking online courses to build and refine her understanding of religious guidelines for various aspects and scenarios of mensuration:

> "*I took a course from Mizan Institute* [4] *that solely focuses on the worship rules around menstruation. They went over various case scenarios that deal with menstruation. This is the course I took. I ended up watching it a couple of times so that I could understand the material [...] They also provide access to female scholars by appointment (I like the fact that I can pay them for their time and expertise).*" -P11

By leveraging diverse information channels—including Google, online courses, and scholarly videos—participants demonstrate a transition from static adherence to active inquiry. This self-directed learning illustrates a robust form of religious agency, characterized by the participants' drive to cultivate their own spiritual literacy. The process involves more than consumption; it is an act of curation, requiring the comparison of sources and the deliberate selection of scholarly and authoritative interpretations. Consequently, this reliance on digital tools highlights the evolving role of online spaces as critical infrastructures for the production and validation of religious knowledge.

A few participants discussed integrating the perspectives and opinions of medical professionals to make informed decisions and adhere to religious guidelines. For instance, P3 consulted her gynecologist to determine what counts as a period due to her irregular cycle from Polycystic Ovary Syndrome (PCOS) and then followed Islamic guidelines based on that advice:

> "*I grew up attending the masjid after-school program for nine years. In that, I learned about menstruation, what it is, and what it means in Islam. I learned about the rules, questions I had regarding spotting and ghusl (purification after menstruation), and how to perform ghusl. I do not seek (new) religious information about menstruation in this part of my life. [...] My period is irregular because I have polycystic ovarian syndrome (PCOS). I ask my gynecologist what is considered a period for spotting, etc., in my cycle. And then I follow the Islamic guidelines based on what is a period versus not a period.*" -P3

In summary, participants' experiences show that assembling religious menstrual knowledge is a self-directed journey rather than a process fully established in early instruction. To address gaps or uncertainties in their knowledge, they drew on a combination of digital resources, medical expertise, female scholarship, and primary religious texts. This hybrid information-seeking approach enabled them to reconcile embodied experiences with religious obligations and develop personalized yet religiously legitimate practices. In doing so, they transformed menstrual management from a source of confusion and uncertainty into a site of informed agency that enabled consistent religious participation.

4.2.3 Forming a Network of Support. Participants talked about building a strong social support network of other Muslim women with whom they can share their experiences, ask questions, and seek advice about menstruation and related religious guidelines. Such a support system fostered a sense of solidarity by making participants feel more comfortable discussing menstruation, navigating challenges, and addressing concerns within the framework of Islamic rulings. For instance, P8 shared that being part of an online support network, Rabata Islamic Center [5], helped her adopt a more positive approach toward menstruation and embrace femininity by emphasizing how women are valued and cherished in Islam:

> "*I am part of Rabata Islamic Center, an online platform that empowers Muslim women to learn about their deen (religion) and encourages women's scholarship with the various classes, lectures, [...] The more you learn about Islam, the more you will be proud of the status that women hold in Islam.*" -P8

Participants' support network consisted of both online and offline sources, such as peers, female family members, halaqa groups [6], Islamic scholars, and online communities (Figure 2). For instance, P14 shared that she relied on her primary support sources, i.e., Google and her closest Muslim friends, for informational, emotional, and

[4]Mizan Institute: A platform that offers Islamic education to Western Muslims through a simple and accessible manner, such as courses and modules. https://fiqh.mizaninstitute.org/

[5]Rabata Islamic Center: An organization that supports the growth of Muslim women as scholars, community leaders, and cultural change agents. https://www.rabata.org/

[6]Gathering or study circle where individuals come together to learn, discuss, and reflect on religious teachings, from their holy book (eg. the Quran) or other aspects of Islamic knowledge

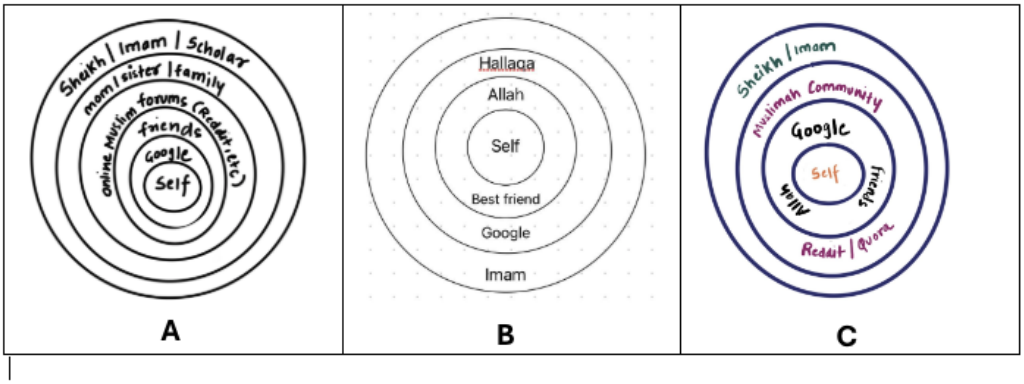

Figure 2: An Illustration of participants' support network. Here, (a) P1, (b) P7, and (c) P14 drew their social support network as a series of concentric circles, considering themselves at the center and placing people/online sources at different distances from the center based on their comfort level of seeking and receiving informational and emotional support.

spiritual support. However, she turned to the broader online Muslim community when she sought more in-depth and comprehensive guidance to better understand Islam:

> "*My go-to places/people to discuss religion first start with Google [...] and my closest Muslim friends (Fig. 2c). Whenever I have a question, I Google it to see what Islamic institutes online have to say. I also like to make dua (supplication) and pray to Allah to guide my behavior, my research, and my thoughts toward what is good and what is correct under the religion. Then, I have about 2-3 knowledgeable Muslimah friends that I can contact and who will answer my questions without judgment or at least guide me to those who can answer. However, sometimes my friends don't have the answer, or Google is showing me the 'clear, cut, and dry' response of the literal interpretation of the Quran. In those cases, I reach out to the larger Muslimah community that I am in, or I go to the Subreddit Muslimah forums online and ask my question sincerely in hopes that someone can expand upon the common knowledge to include examples from their personal experiences. This step usually helps me feel like I'm not alone in my journey of understanding Islam better, and it also clarifies my understanding of how to apply the religion to my own life.*" -P14

Although participants acknowledged the value of well-studied individuals or those with formal Islamic education (e.g., Islamic scholars) for providing in-depth, nuanced, and accurate interpretations of complex issues, they often hesitated to discuss their menstruation experiences and concerns directly with them. They attributed this hesitation partly to the predominance of male scholars. For instance, P4 shared that she relied on a female friend as an intermediary to consult an Islamic scholar:

> "*I don't really feel comfortable at all asking a local Imam in person about anything. It's awkward as a woman since there's no opportunity to do that, or at least I haven't looked/attempted to, to be honest. [..] One of my close friends has a brother who studied at Madinah University and is very knowledgeable, so I often ask her to ask him.*" -P4

Participants often preferred to seek guidance and support from those who understood their experiences and shared similar experiences and perspectives on Islam. For instance, P7 shared that after she got married, she sought out *Halaqa* groups of newlyweds to gain knowledge on Islamic rulings for married women. Additionally, she preferred reaching out to Islamic scholars *(Imam)* based in the USA rather than those from her home country, as she believed they could provide more accurate, context-specific advice that considered her environment and community:

> "*What I seek these days (as a newlywed) is religious knowledge about spotting, ghusul, and intimacy. I have been trying to seek a halaqa for newlyweds or people who want to get married and would like to know all the information regarding menses and marriage (Fig. 2b). [..] When it comes to the Imam, I try to find a local imam or at least an imam in North America and not from the Middle East (which my family does not always agree on this point). Having an imam (a religious leader) who understands the nature of the environment and the people we surround ourselves with here (in the USA) makes the religious advice more accurate.*" -P7

P7's reflections reveal that menstrual literacy—both religious and medical—is not a one-time lesson but an evolving process. Participants' efforts to fill gaps in early education illustrate how religious menstrual knowledge is an ongoing, self-directed process that relies on navigating multiple sources—digital, medical, and scholarly. This active curation reflects a desire to reconcile bodily experience with faith commitments, especially when formal instruction is incomplete or inconsistent. Menstruation becomes a site of continuous religious negotiation, where women revisit, refine, and reinterpret earlier teachings as their bodies and life circumstances change. In this section we explored the strategies employed by participants to navigate and manage menstruation within their religious framework. Muslim women acquire and interpret religious menstrual

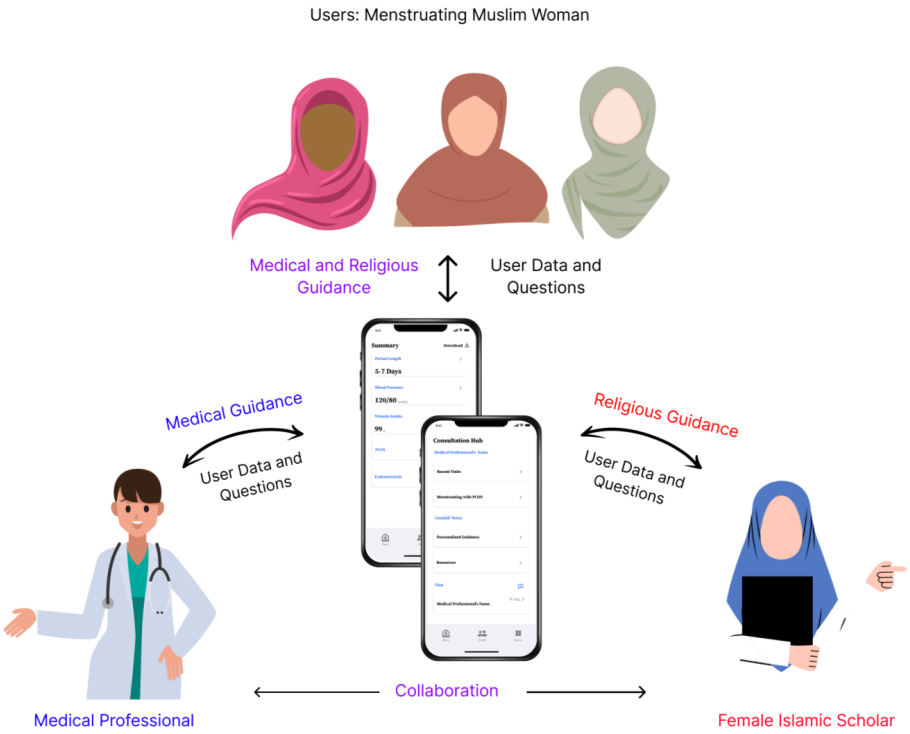

Figure 3: The diagram illustrates an information flow, conceptualized by participants, featuring a menstruating Muslim woman (user), a medical professional, and a female Islamic scholar, all connected via a mobile application. The user shares data and makes inquiries through the app, receiving integrated medical and religious guidance resulting from the collaborative team of the health provider and religious scholar.

education through a dynamic interplay of social constraints, self-guided learning, and trusted support networks. While early teachings provide a foundation, participants must continually interpret and refine their understanding in response to cultural tensions, bodily uncertainties, and gaps in available guidance. Their reliance on informal, community-based infrastructures—rather than formal religious authorities—demonstrates how menstrual knowledge is collaboratively produced and sustained. These findings show that religiously aligned menstrual education is not a singular event but an iterative, relational process shaped by social norms, technological resources, and the women's ongoing efforts to live their faith in contextually meaningful ways. Integrating religiously aligned menstrual education into daily routines requires a strong religious foundation, achieved through comprehensive education, self-directed engagement, and supportive social and religious networks.

4.3 Envisioned Solutions for Religiously Aligned Menstrual Education and Care

During design activities 6A and 7A (Table 2), participants brainstormed a variety of technological solutions that have the potential to support their menstrual education and care while addressing their unique health and religious needs. Their design concepts emphasized creating partnerships between medical providers and Islamic scholars, building support within the Muslim women's community, and promoting holistic health care. By "holistic," we refer to the physical, mental, and social dimensions of well-being as defined by Nurain et. al [45]. In the context of menstrual care, we further extend this definition to include religious well-being, an aspect not addressed by existing menstrual technologies. Participants envisioned design concepts that leveraged technologies such as mobile applications, portable virtual reality(VR) glasses, smartwatches, artificial intelligence (AI), and futuristic options like implanted microchips. The design concepts and images in this section represent an analysis and synthesis of ideas generated from design activities 6A and 7A, which the researchers translated into visual representations.

4.3.1 Collaboration Between Medical Professionals and Islamic Scholars. As participants envisioned technologies to support menstrual education, they emphasized the importance of grounding these tools in medical knowledge while ensuring they remain consistent with their religious beliefs and practices. With that goal in mind, they described the designs of a mobile application that would bring together and support the collaboration between medical providers and female religious scholars *(Ustadha)* to address both medical and religious needs in menstrual education. Fig. 3 illustrates their envisioned design idea. For instance, P14 discussed how such a collaborative technology would involve healthcare providers delivering medical care and information through private text messaging, while a female religious scholar would offer religious guidance tailored to an individual's daily needs:

> "*A single doctor may not give the best advice based on our religious beliefs, but they can collaborate with a female scholar (or religiously knowledgeable women) to give the best care that aligns with our beliefs and our specific health needs. The form factors that I believe would be most suitable are in-app text messages and smartwatches. [...] If something is wrong and it is affecting your overall health, the doctor has baseline values to work off of, and the religious scholar can gain insight through questionnaires that you answer about what's going on in your life to determine the next steps.*"-P14

From a health perspective, participants also advocated for engaging with integrative medical providers, such as lactation specialists and acupuncturists, to improve menstrual support as these types of providers offer broad perspectives and expertise [71]. Access to a diverse array of providers and perspectives could help participants gather holistic knowledge to make informed decisions that balance their religious and health needs. For instance, P6 shared how the variety of provider support could address the holistic nature of menstrual health, aiding with more informed religious decisions toward menstrual health care and education:

> "*I would use this opportunity (collaboration) to pull in other supporting services, such as lactation specialists, acupuncture, massage therapy, and other healing options, as menstrual health is linked both physically and emotionally. And when you have access to different providers, it makes it easier to make religious decisions because you also have more information.*"-P6

From a religious perspective, participants highlighted the need for information from women scholars to provide and validate information related to women's health. Given that there might be varied interpretations for a nuanced aspect of the faith, the app would also offer considerations for variations in religious sects (e.g., Shia, Sunni, etc.), schools of thought, and interpretations that may be nuanced to capture the diversity of muslim women's experiences with health and wellbeing. P6 detailed the importance of including these Islamic scholars, particularly female scholars, who are knowledgeable about health challenges, such as Polycystic Ovary Syndrome (PCOS), to guide and educate Muslim women in a way that supports their Islamic values, responsive to current health issues, and supportive of their overall well-being:

> "*In terms of Islamic values, the most important thing for the future is to have more women scholars who can go through and validate Hadith related to women's issues as well as who are familiar with modern society and the challenges that arise from that, including new diagnoses, such as Endometriosis and PCOS*" -P6

Participants' design concepts emphasized the need for technologies that integrate medical expertise with religious guidance, reflecting their desire for menstrual support systems that are both medically accurate and theologically trustworthy. By envisioning collaborative platforms that connect healthcare providers with female Islamic scholars, participants emphasized that meaningful menstrual education must simultaneously address physical health and religious obligation. These ideas highlight the importance of multi-source, coordinated support for navigating menstruation in ways that are aligned with religious values.

4.3.2 Fostering Community Support. Participants highlighted the importance of having a social support network comprised of individuals who share similar experiences, religious beliefs, and values. Consequently, they described ways to seek and receive support from a community of Muslim women and scholars. Participants envisioned such a community as a resource for sharing knowledge and providing guidance, helping them better understand their bodies from a religious perspective while also facilitating connections among Muslim women through technology. For instance, inspired by the Muslim social app *Salams* [7], P9 talked about having a menstrual support group for religious advice on how to address challenges with women's health, such as menstrual spotting, PCOS, endometriosis, etc.

> "*It can even have some sort of support group of (Muslim) sisters in different parts of the world (like the Salams (an App) friends section) so people can attend spiritual events together, share experiences, or just form some sort of menstruation community.*" -P9

This social support network reinforces Tam et.al.'s discussion of the power of socially constructed safe spaces for enabling and sharing community knowledge [62]. However, in our findings, some participants expressed concerns about the accuracy and validity of advice and information received from online support groups. For instance, P6 expressed her challenge of navigating information from both expert and non-expert sources and expressed how technology can help with discussions primarily guided by experts like Islamic scholars:

> "*I would stay away from forums or groups- it's time-consuming and not everyone is an expert because of their own experience...I would also like to see things moving away from social media and more into the hands of experts. [...] Chatting with a scholar online is also very helpful within the group that you trust.*" -P6

Most participants generated design ideas using emerging technologies, such as generative AI or VR, to connect individuals to a community of Muslim women, whether scholars or non-scholars, similar to the example shown in (Fig. 4). For example, P14 generated several design ideas that she felt could help women find support or answers to specific health or religious questions: a recommendation system that would "follow" scholars or communities on social media, an AI system she could query that is specifically related to Islam and menstrual health, or VR technology to address challenges in openly discussing female health and provide a supportive virtual community for knowledge sharing:

> "*Remember when you felt lonely because you couldn't ask certain questions about female health or feel connected to shared experiences in the Muslimah community? Well, that's over. VR goggles used to be expensive and inaccessible, [...] but everyone has them now (in the developed nations anyway). [...] It's easier than ever to speak with like-minded practicing Muslimahs with*

[7] Salams: https://www.salams.app/meet-Muslims

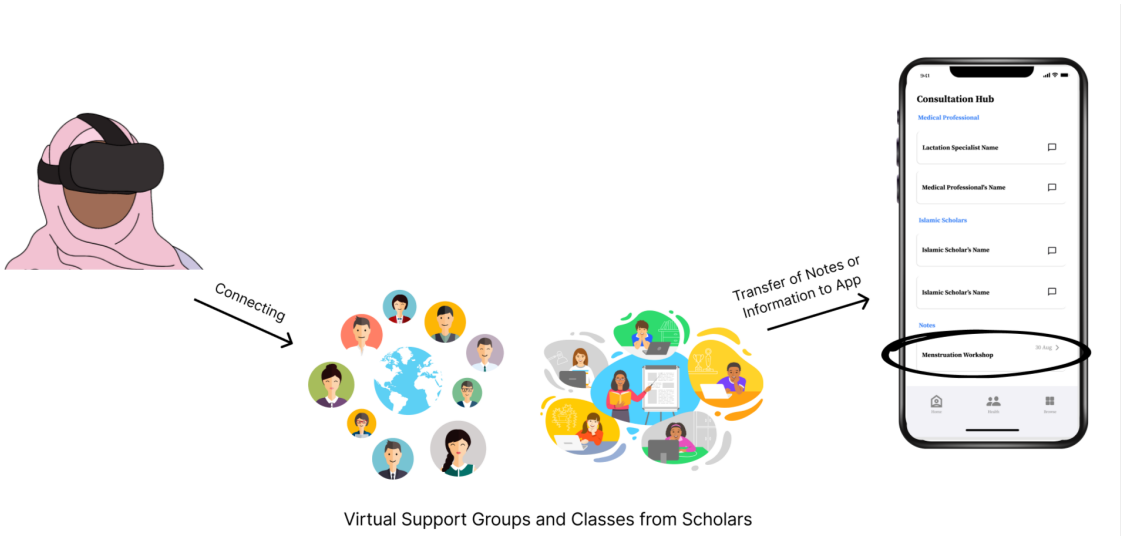

Figure 4: This process shows how participants described using VR technology to connect users with virtual, Muslim support groups and Islamic scholar-led classes, with notes and information transferred to a mobile application.

> *a wealth of knowledge and who can address concerns about menstruation.*" -P14

However, emphasizing the role of experts, P14, shared that she was wary of using AI technology when seeking suggestions or advice related to religious guidelines and rulings:

> "*You were able to hop on an AI chat, ask a brief question about things like ways to boost iman (belief) during menstruation, and receive a complete answer from a variety of trusted sources. AI is so advanced now that it feels like you're talking to another human. However, it's difficult to evaluate if the responses are truly valid interpretations of the Islamic faith or a mixture of beliefs and voices of other non-secular people who talk to or teach the AI.*" -P14

Participants found comfort in being able to share their experiences and ask advice from their peers. While concerns were raised around the accuracy of advice, participants emphasized the importance of a supportive, religious-based online community for Muslim women to discuss health education and religious matters. Suggested technologies like VR and AI could provide environments for desired expert-led guidance, education, and community building.

4.3.3 AI-Powered Tools for Holistic Health Education and Religious Guidance. Participants expressed a strong interest in AI-powered tools for holistic health tracking, particularly for tracking menstruation and religious practices. They discussed technologies, such as smartwatches and implantable chips, to track their menstrual data and mobile apps to integrate health, religion, and daily life management. While reflecting on the complexities of managing menstruation alongside religious obligations in their daily routines, participants highlighted the potential of personalized AI-powered tools to incorporate factors such as health, stress levels, economic and ethnic background, and religious beliefs in order to provide tailored guidance for maintaining mental and physical well-being (Fig.5). P4 expanded on this idea by proposing a design concept involving smartwatches or implantable chips that track health metrics to anticipate menstruation and provide timely religious guidance to support menstrual care and education:

> *"You now have a chip installed which monitors your BP, insulin, hydration, and cramps, and it anticipates your period. It also identifies if you are lacking vitamins. It uploads data to an app which tells you when you can and cannot pray and has a virtual Ustadha that answers your questions via an AI bot."* -P4

Participants also generated ideas using AI tools that could assist in determining if they were able to pray by analyzing their period spotting (Fig. 5). P9 suggested the possibility of using image recognition technology for this purpose:

> *"I think some sort of app that you can submit a picture of what spotting looks like that can detect if you can pray (hopefully AI will be well advanced by the time). Better technologies and remedies to help people with irregular periods and side effects they experience."* -P9

P14 echoed this sentiment, explaining how the app would give users a sense of security by confirming religious observance guidelines:

> *"This app will literally become your friend because it will always have your back and create some sense of security as if someone (or something in this case) understands you very very well."*-P14

While participants saw significant potential in AI-powered tools for managing health education and religious practices, they also expressed concerns about the drawbacks of such technology. Participants highlighted the difficulty in determining whether AI-generated responses align with valid interpretations of the Islamic faith. P14 expressed concerns about advanced AI's predictive capabilities, comparing them to fortune-telling. She believed that since

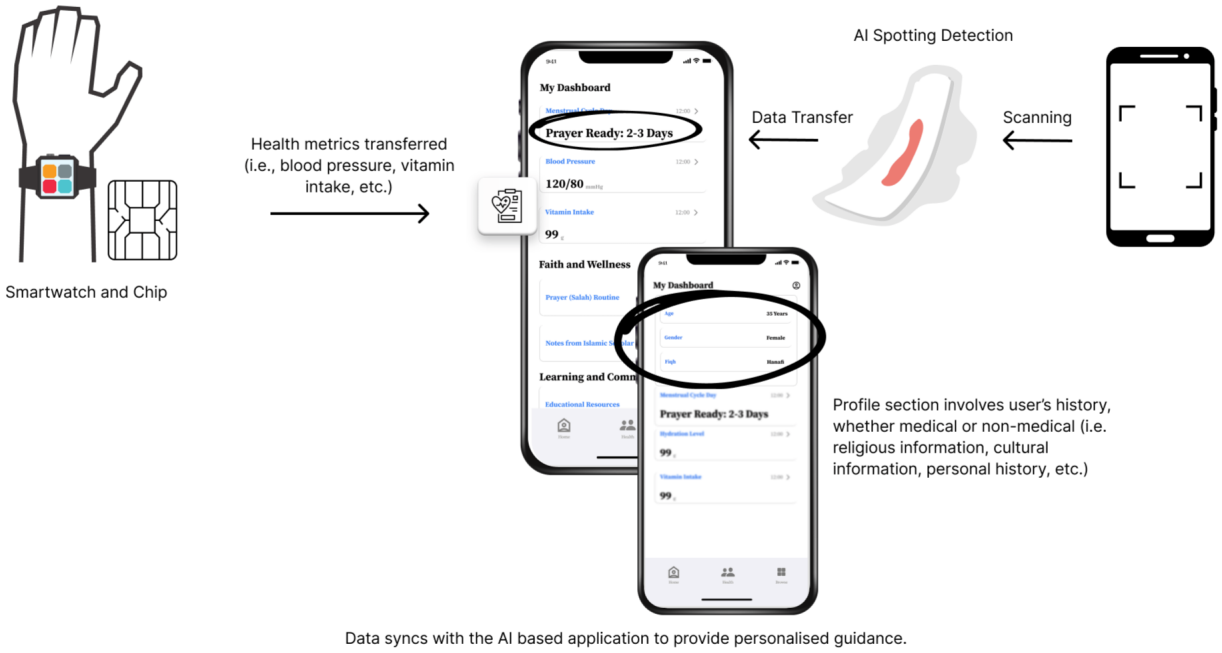

Figure 5: Participants discussed two data transfer processes to a mobile app. First, health data from a smartwatch and a chip is sent to the app that then displays health metrics and personal history. Second, data from the scanning period spotting on a menstrual pad, is transferred to suggest when the user can pray.

fortune-telling is not permissible in Islam, AI's ability to make future predictions could similarly be considered impermissible:

> *"I wish AI didn't develop its own sense of 'intelligence' and still maintained valid sources of knowledge, especially from female scholars regarding women's health in Islam...Also, religiously speaking, the predictive analysis might come a little too close to 'fortune-telling,' which, in essence, is frowned upon. So, I would advise that the app uses only past experiences, scientific information, and the user's social and health data to determine potential future experiences without using questionable outside sources or unreliable means."*-P14

This quote highlighted the need to consider the potential harms, privacy, and ethical considerations of AI integration while designing tools for sensitive contexts, such as menstrual health.

In summary, participants viewed AI and sensor technologies as promising tools for integrating health tracking with tailored religious guidance, enabling more informed and contextually appropriate decision-making. At the same time, their concerns about theological accuracy, predictive features, and validating sources show the need for careful guardrails when designing AI tools for religious contexts. Together, these perspectives highlight participants' desire for AI systems that support holistic well-being while remaining firmly grounded in credible, well-sourced, religious knowledge. Across their design ideas, participants envisioned technologies that bridge medical, religious, and community-based forms of expertise to support menstrual education in ways that reflect both their health realities and Islamic commitments. Their concepts foreground the need for systems that integrate biomedical knowledge with trusted religious interpretation, facilitate expert-supported peer communities, and leverage emerging technologies such as AI and VR for personalized guidance. Taken together, these envisioned solutions illustrate how Muslim women articulate a holistic model of menstrual care—one that is medically informed, socially supported, and religiously aligned—while also identifying safeguards needed to ensure the accuracy, legitimacy, and theological integrity of technology-mediated guidance.

5 Discussion

Our discussion section focuses on technology design promoting menarche education and unpacking the ecosystem of religiously aligned menstrual information.

5.1 Fostering Menarche Education

We observed that early conversations within the family context played a crucial role in preparing Muslim women for their experience of menarche. Participants highlighted that these discussions often relied on personal narratives or historical and religious stories, and importantly, needed to take place in supportive environments that allowed individuals to comfortably ask questions and engage in open conversations. Participants stated the importance of preserving Islamic values by using their native language when having these conversations and sharing personal narratives, further embedding

cultural nuances and religious teachings into the dialogue (Section 4.2.1). The process of sharing these stories not only provided practical guidance but also reinforced a sense of identity and belonging within the religious community. As researchers like Progga et.al [50] and Hammid et al. [23] have pointed out, storytelling is one of the oldest forms of teaching and remains a powerful tool for conveying information in a meaningful way. Storytelling allows for the dissemination of complex and abstract concepts by making them more relatable and accessible, particularly when employed for educational, social, and cultural messaging [23].

Technology presents a unique opportunity to foster religiously aligned menarche education through storytelling. When considering how to integrate storytelling for menarche education, we can draw inspiration from the design approach discussed by Michie et al. [41] in their creation of the digital storytelling platform, *HerStoryTold*. This platform was developed to capture and share the narratives of women in Ireland who traveled out of the country to receive an abortion, providing a space for their experiences to be voiced and preserved. Similarly, we can design a platform that captures and disseminates historical and contemporary tales of Muslim women, focusing on Seerah stories and the experiences of women within their communities. These stories could focus on positive ways of addressing the initial experience of menarche and its disruptive effect on religious practices, such as exemptions from certain religious worship, like praying and fasting, and overall feelings of exclusion [1, 26]. Similarly, a digital storytelling platform could be tailored to reflect the rich diversity of religious experiences by allowing stories to be told in native languages. The platform would not only preserve the cultural and linguistic nuances embedded in these stories but also foster a deeper connection as they prepare for menarche by enabling women to share their narratives in their native languages. Our participants described storytelling as a powerful tool for learning. Hence, it may be valuable for future work and design to explore intergenerational use, such as mother-daughter interactions, to better support sustained and long-term learning.

Although the use of native language in stories can convey embedded religious traditions and teachings, the design presents certain challenges. Stories told in one language may unintentionally exclude individuals who do not speak or understand that language. To address this issue, it is crucial to incorporate multilingual support, enabling users to switch between languages seamlessly and select the languages with which they are most comfortable. These stories can be accompanied by subtitles, translations, or interpretations, allowing people from diverse backgrounds to appreciate their cultural heritage without feeling excluded. Prior HCI research has provided relevant considerations for designing for multilingual support, and supporting 'code-mixing' (or linguistic style of switching between multiple languages) for multilingual users [5, 21, 30]. Additionally, incorporating universally recognized and culturally neutral visuals, such as icons and images, or providing alternative representations that accommodate different cultural norms, can also help bridge this gap. Moreover, it is crucial to uphold Islamic values of authenticity and preservation, which are strictly regulated within Islamic scholarship, when recounting historical narratives about Islamic figures [39, 52]. This means that stories must be conveyed accurately and responsibly, even when translated into different languages. Authentic storytelling is vital in preserving the religious significance of these narratives, ensuring that they resonate with audiences while remaining true to their origins. For emerging technologies, such as large language models (LLMs)-powered chatbots, the historical narratives they convey must be authentic, providing real educational value without conflicting with Islamic principles. A key way to safeguard authenticity is to provide opportunities for designers to collaborate with credible experts, such as Islamic scholars and community leaders, to ensure that the shared stories are both accurate and faithful to the tradition.

With the emergence and prevalence of robotics, AI, and autonomous agents, existing research has explored how educational robots can be designed to help people learn in ways that are personalized, engaging, and free of shame [17, 43, 69]. For instance, Weng and Cho [69] explores the use of educational chatbots in language education, while Cuéllar et al.[17] explores robots for learning about culture and historical topics. Similarly, these emerging technologies hold potential for supporting learning about menstruation in a personalized and judgment-free manner.

5.2 Supporting the Religious Information Ecosystem

We found that participants followed a hierarchical structure when seeking religiously aligned menstrual information and guidance, typically starting with imams or religious scholars, then turning to peer networks, and finally online search engines, such as Google. However, as individuals progress through this hierarchy, skepticism tends to rise, the process becomes more private, and access becomes easier. Technology designed to support the information-seeking journey should account for these dynamics by improving access to trusted sources, reducing skepticism, and strengthening connections with religious experts.

Furthermore, participants emphasized the insights and opinions of scholars or individuals with specialized knowledge of Islamic teachings and laws. These experts play an essential role in facilitating participants' self-learning, knowledge curation, and the refinement of their understanding of menstruation from a religious lens. As illustrated by the exemplars visualized in Figure 2, every participant included a religious figure within their support network, underscoring the role of religious authority in navigating menstrual health challenges. Additionally, as participants sought religiously aligned and culturally congruent answers to their menstrual health questions, a potential design consideration could involve developing a social matching technology. Previous work, has explored technology for social matching and collaboration [3, 10, 38, 74] in different contexts e.g., matching for user-safety [10], context-aware social matching [38], and academic researcher matching [74]. This technology would connect individuals with scholars, religious experts, or even trusted friends whom they consider to be more knowledgeable or better suited to address their specific informational or health-related needs. Social matching would be particularly valuable in contexts where Muslim women seek guidance from female scholars and other Muslimah whose perspectives align with their religious beliefs. For instance, social matching could help women identify female Islamic scholars or knowledgeable individuals, including friends within their support network, who not only

understand their social context, such as the unique challenges of living as a Muslim woman in the West, but also share their fiqh (Islamic jurisprudence) perspective and other commonalities, such as age, language, and similar life experiences. Participants also highlighted the importance of fostering collaboration between medical providers and Islamic scholars. This collaborative approach would not only ensure that medical advice is culturally and religiously aligned but also promote holistic health education by integrating religious and community support. This collaborative approach to providing healthcare (as illustrated in Section 4.3.1 and Figure 3) would cater to the comprehensive needs of Muslim women, bridging the gap between medical expertise and religious guidance.

While human experts are the primary source of religious information and guidance, Large Language Models (LLMs) can serve as a supplementary information source. Generative AI tools could offer foundational support in helping individuals during the initial stages of menstrual education, learning the process of ghusl (ritual purification), or understanding basic Islamic tenets surrounding menstruation. However, a few participants expressed concerns about the accuracy of AI-generated religious responses, particularly when interpretations could be blended with non-religious or secular perspectives (Sections 4.3.2 and 4.3.3). Islamic scholars usually undergo rigorous training in classical Arabic and Islamic sciences to interpret the Quran and employ meticulous methods to safeguard the accuracy and integrity of religious knowledge, preventing its corruption across generations [73]. In contrast, LLM tools lack formal mechanisms of learning and authentication to ensure that their interpretations remain faithful to core Islamic tenets. For instance, LLM tools do not verify information sources, analyze chains of transmission, or distinguish valid interpretations from invalid ones [54]. Hence, challenges exist for researchers and designers in aligning LLM tools with religious scholarly traditions for menstrual education. Furthermore, Alam et al. identified a notable disconnect in their study: although users expressed a strong preference for scholarly religious guidance, they overwhelmingly favored LLM-generated responses to religious questions [2]. The authors suggested that this inconsistency stems from users' limited ability to assess the quality of religious information and recommended including religious experts as human-in-the-loop contributors to AI alignment for sensitive, faith-related topics. These tensions surrounding AI-generated religious guidance point to opportunities for future research on how religious ethics might inform AI explainability and on whether such systems should be designed to avoid functions that conflict with theological principles. Future research work on AI ethics and religious information-seeking must also account for data ethics, privacy, and protections related to sensitive topics such as menstrual and sexual health, with particular attention to the unique vulnerabilities and contextual sensitivities experienced by marginalized groups such as Muslim women.

To address users' overreliance on LLM tools, it is necessary to incorporate design principles for "Appropriate Trust & Reliance," as described by Weisz et al. [68], particularly through the use of friction. This friction helps users discern when to trust or question the AI system's outputs by encouraging skepticism about potential quality issues, inaccuracies, biases, and under-representation. Design principles for trust and reliance are important in the context of menstruation, where religious laws and guidance are often interpreted based on each individual's unique situation [26]. While AI can offer support, it should serve as a supplementary tool rather than a primary source of religious information. To support practicing individuals in making religiously informed decisions about their menstrual health care, HCI researchers and designers should consider designing socio-religious technologies that incorporate access to and guidance from recognized religious scholars alongside AI models' suggestions or recommendations, maintaining a balanced reliance on both AI and human expertise.

6 Reflections on the Methodological Approach

To the best of our knowledge, this is the first study to employ the ARC method for researching faith-based communities [72]. Therefore, we collected feedback from participants at the end of all activities to capture their overall study experience. The overall feedback was positive, and participants strongly appreciated the study's design and the emotional and intellectual benefits received from the activities. Building on participants' feedback and our reflections, we share lessons learned and offer recommendations to advance the conversation on how HCI researchers can adopt ARC in studies with faith-based communities.

Building strong rapport: We conducted an onboarding video call before recruiting participants into the ARC study. Such onboarding proved invaluable in creating a comfortable environment where participants felt at ease sharing intimate aspects of their lives beyond the scope of the study itself. While the onboarding call was designed to facilitate enrolling participants into the study, the secondary effect of meeting the research team face-to-face had additional benefits. Being able to see that members of the research team were "*people like them*" made it possible for them to feel comfortable sharing information about their intimate health. Additionally, this openness led to participants feeling comfortable sharing significant personal milestones that impacted their ability to complete activities on time. For instance, a few participants described encountering meaningful personal milestones over the course of the study, such as the birth of a child, undertaking a pilgrimage, entering a new marriage, moving to a new home, becoming an aunt, and experiencing the loss of a loved one.

Creating Spaces for Socialization: Participants shared how engaging with other participants via responding to their comments improved their knowledge about intimate health and religious intersection. Participants also highlighted how engagement in the study offered them the opportunity to share religious resources with each other, discuss their challenges, and help bridge the existing gap in their knowledge on health and religious issues. Therefore, we encourage designing activities that foster discussion and information sharing among participants when adopting ARC in studies with faith-based communities.

Allowing Pauses or Transitions: The flexibility inherent in the ARC method allowed us to adapt our study design in response to participants' needs and external challenges. Initially, we planned for the study to run for 8 weeks, but recognizing the impact of religious observances (during Ramadan), we provided participants with a 2-week break to accommodate their schedules. A few participants shared that allowing for more time in between each posted activity

would have been preferred. Implementing this would have meant an even longer study engagement beyond what is typically recommended for ARC in Zakaresfahani et al [72].

Being Mindful of Platform-specific Challenges: We encountered difficulties related to Facebook's algorithm, which limited the visibility of our study activities within the private, closed group [9]. To ensure activity-post visibility, participants had to manually adjust the sorting feature to view the most recent posts, as the default setting displayed posts with the most recent comments instead. To address this issue, we created pinned posts that included unique URLs for each activity, ensuring easy access to the most current content. We sent an email to all participants with a unique link 24 hours after posting each new activity. This email served two purposes: it acted as a reminder for participants and provided a direct, convenient way to access the latest activity post. These strategies enabled us to maintain participant engagement and ensure the continuity of the study despite the challenges encountered.

7 Limitations

This work has a few limitations that can be addressed by future research. First, our findings may be subject to recall bias, as participants' recollections of their menarche were influenced by the activities and prompts used by the research team to explore their experiences (Table 2). However, given the profound physical, social, and religious changes associated with menarche, particularly for Muslim women, it remains a significant milestone in their lives. Additionally, some participants were mothers raising daughters or individuals with sisters and nieces, and they found that their own menarche experiences served as a valuable reference in guiding their loved ones through this transition. Moving forward, we aim to work with adolescents experiencing menarche to better understand their perspectives while they actively navigate this transition. Second, our study skewed toward participants who had Facebook accounts. Although participants were required to have a Facebook account to participate, we did receive interest and enrollment from individuals who created accounts specifically to join our study. It is unclear how our choice of platform specifically impacted the study. However, it is worth noting that our participants had varying levels of familiarity with the platform before engaging in the study, and that the mix of experiences potentially impacted participation.

8 Conclusion

We conducted a 10-week ARC study where 14 menstruating, observant cisgender Muslim women engaged with up to 15 different activities to explore their experiences of menstrual education and care. We uncover how Muslim women prepare for the experience of menarche through early education from religious perspectives. We also reveal tensions in menstrual education when it intersects with religious beliefs and values. In addition to early religious education about menstruation, Muslim women actively seek out and gradually refine their knowledge of menstruation, often forming social and religious support networks. Additionally, we present our participants' design ideas that illustrate how they envision socio-religious technologies supporting their menstrual education and care within the context of their religion. Building on our findings, we discuss how socio-religious technology can help Muslim women's experiences of menstruation by fostering menarche education and supporting the religiously aligned menstrual information ecosystem. We envision that HCI researchers and designers could further explore these implications in designing technologies to better support practicing menstruating Muslims.

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9 Appendices

9.1 Week 1

9.1.1 Activity 1A Ice Breakers: We asked participants to introduce themselves by sharing the most recent religious-related social gathering they attended. We also encouraged them to share any photos of this experience if they felt comfortable doing so.

9.1.2 Activity 1B Survey Completion: We introduced the week's second activity, which involves completing a survey estimated to take approximately 20 minutes.

9.2 Week 2

9.2.1 Activity 2A Menarche Experience [Religious Perspective]. We presented the following scenario: "Amal is a 12-year-old and has just recently experienced Menarche (first period). [Imagine that Amal is your sister/daughter/niece/neighbor's child. Please pick a relation, choose what relationship you have with her]. Now, based on what you know about Amal and your chosen relationship with

her: (1) How would you go about educating or supporting her to understand menstrual health from a *religious perspective?* (2) What resources would you recommend to her to learn more about menstrual health from *religious perspectives?* (3) What did you wish you knew when you were Amal's age? Feel free to share your own menarche stories, challenges, opportunities, and support".

9.2.2 Activity 2B Menarche Experience [Health Perspective]. We presented the following scenario: "Amal is a 12-year-old and has just recently experienced Menarche (first period).[Imagine that Amal is your sister/daughter/niece. Please pick a relation, and choose what relationship you have with her. Now, based on what you know about Amal and your chosen relationship with her: (1) How would you go about educating or supporting her to understand the menstrual *health perspective?* (2) What resources would you recommend to her to learn more about menstrual health from a *health perspective?* (3) What did you wish you knew when you were Amal's age? Feel free to share your own menarche stories, challenges, opportunities, and support".

9.3 Week 3

9.3.1 Week 3: Activity 3A Navigating irregular menstrual health [Religious considerations]. We presented the following scenario: "12-year-old Zara recently experienced her first period. A few months later, she discovered that her period length was unusually longer than she had previously experienced. Her period is 14 days (about 2 weeks) this time around.[Imagine that Zara is your sister/daughter/niece. Please pick a relation, choose what relationship you have with her]. Now based on what you know about Zara and your chosen relationship with her: (a) What are the religious guidelines and considerations you would recommend to Zara as she navigates this new context of extended period duration? (b) What support may she need for her religious well-being, practices, and spirituality? (c) How would you go about helping her seek that support? (d) What are the opportunities, challenges, and gaps for support?"

9.3.2 Activity 3B Navigating irregular menstrual health [health considerations]. We presented the following scenario: "14-year-old Sadia recently experienced her first period. A few months later, she discovered that her period length was unusually longer than she had previously experienced. Her period is 14 days (about 2 weeks) this time around. [Imagine that Sadia is your sister/daughter/niece. Please pick a relation, choose what relationship you have with her]. Now based on what you know about Sadia, and your chosen relationship with her, as you respond to the question below feel free to share your own experiences (if any) of navigating irregular menstrual length: (a) What health considerations would you recommend to Sadia as she navigates this new context of extended period duration? (b) What health support do you think she may need and how would you go about helping her get support? (c) What are the opportunities, challenges, and gaps for support?"

9.4 Week 4

9.4.1 Activity 4A (Information/Knowledge Seeking on menstruation.) We asked participants to share the types of religious information they sought regarding menstruation, providing the following examples to help them think (e.g., spotting and ghusl, how to perform ghusl).

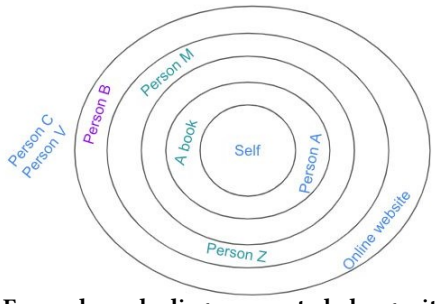


Figure 6: Example cycle diagram posted along with Activity 4B

9.4.2 Activity 4B: Religious Information/Knowledge Seeking [Circle Diagram Activity]. We asked participants to share whom they reach out to when they encounter religious concerns or questions about menstruation. We encouraged them to complete a cycle diagram based on whom they reach out to, moving from the inner to the outer circles (with the outer circles representing the most distant relationships). Additionally, we asked participants to place individuals they prefer not to talk to outside the circle and to answer the following questions

- 1. Based on your circle diagram, elaborate on the relationship with the persons (if you have specified a person above) on: (A) closer to self (B) farthest from self
- 2. Would this circle be different for Information seeking versus problem-solving?

9.5 Week 5 & Week 6

This week was a break to allow for the observance of the last few days of Ramadan and the observance of Eid. During this time, participants were permitted and encouraged to complete prior activities that they may have missed.

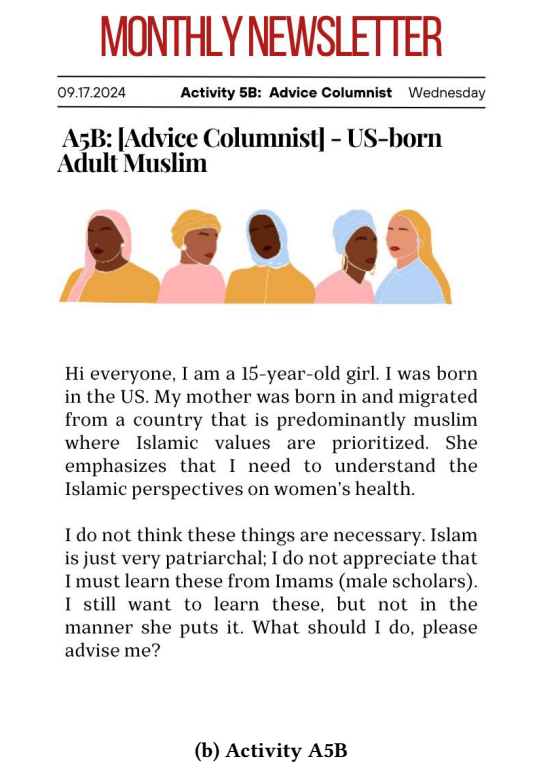
9.6 Week 7

Researchers created and posted advice columnists for Activity 5A and Activity 5B as follows (See 7a and 7b). *Activity 5A [Advice Columnist]: Migrant mother living in the US & raising US Born Children*
Activity 5B [Advice Columnist]: US Born Adult Muslim

9.7 Week 8

9.7.1 Activity 6A Design Activity I: Letter From the Future. Participants were instructed to imagine a future (e.g., the year 2050) where advanced technologies, systems, or solutions exist to address any challenges faced in navigating the menstrual health journey as a Muslim woman of faith. They are to write a letter from the year 2050 addressed to their current selves in 2024. In this letter, participants were asked to address, but are not limited to, the following points: (a) What they imagined futuristic technologies, systems or solutions would look like to support your menstrual health from

(a) Activity A5A



(b) Activity A5B

Figure 7: Prompts used for advice columnist activity during week 7

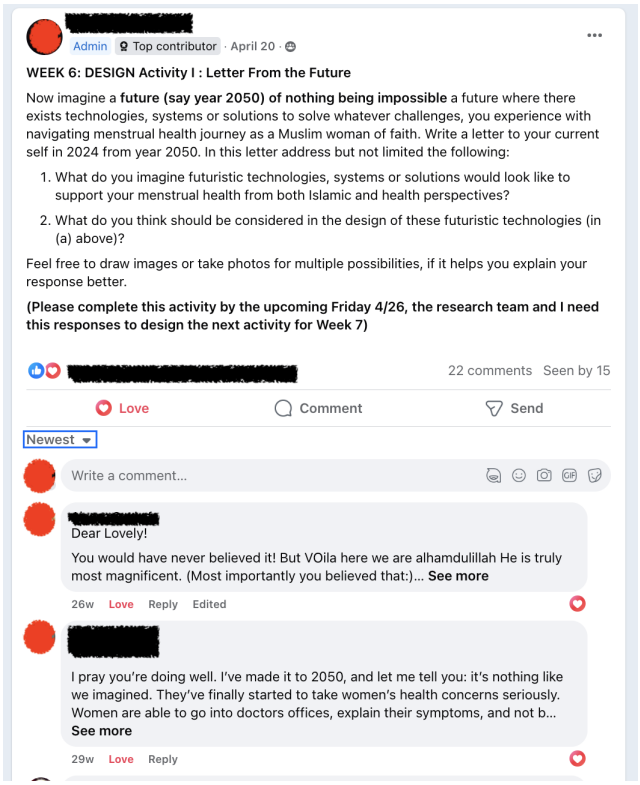


Figure 8: Sample Facebook Post (Featuring Activity 6A). For more images of Facebook posts corresponding to each activity, please see the supplementary materials.

both Islamic and health perspectives? (b) What they thought should be considered in the design of these futuristic technologies (in (a) above)?

9.7.2 Activity 6B Voting for Activity . This activity was removed to ensure that participants had more time to complete 6A.

9.8 Week 9

9.8.1 Activity 7A- Design Activity II. Participants were instructed to undertake a three-part design task. **Part A** required them to choose one of two design directions for developing technologies. Design **Direction 1** focused on collaborative care that incorporates religious beliefs, involving professionals such as doctors, healthcare providers, and religious scholars working together to deliver the necessary care. **Design Direction 2** emphasized the use of virtual religious agents and scholars to support menstrual and overall health. In **Part B** participants were asked to consider various form factors and determine which types of technology would be most suitable for their chosen design direction. They were encouraged to think about options such as VR glasses, chatbots, smartwatches, implanted chips, or combinations of these technologies, while also considering other possibilities beyond the provided examples. **Part C** involved revisiting their selected design ideas through the lens of specific factors, including privacy, ethical implications, trust, and Islamic values or concepts (e.g., authenticity of information,

Haya [modesty]). Participants were asked to specify any changes they might make to their designs to accommodate these aspects effectively.

9.8.2 Activity 7B App Prototype Test. We posted a survey that featured links to multiple interface designs and two user flows of a prototype app we named Muslimah. Upon completing each task, participants answered follow-up questions included within the survey to provide their feedback.

9.9 Week 10

9.9.1 Activity 8A: Project Wrap-up/Reflection. Participants were asked to respond to a series of reflective questions, including what they learned about themselves through the process, what aspects of the study went well for them, what aspects of the study did not go well, and what improvements could be made to enhance future studies.

9.9.2 Activity 8B: Survey. We asked participants to complete a debrief survey about their participation in the overall study.