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Envisioning Social Robots in Daily Life: A Home-Based Design Study with Older Adults in Pakistan

Sunbul M. Ahmad[1], Muneeb I. Ahmad[2], Carolina Fuentes[1], Nervo Verdezoto[1], Katarzyna Stawarz[1]
School of Computer Science and Informatics, Cardiff University, Cardiff, Wales, UK.[1]
Department of Computer Science, Swansea University, Fabian Way, Swansea, Wales, UK.[2]
{ahmads31, fuentestoroc, verdezotodiasn, stawarzk}@cardiff.ac.uk[1], m.i.ahmad@swansea.ac.uk[2]

As life expectancy increases, the global population is aging, which has led to increased interest in social robots designed to support independent living, emotional well-being, and caregiving. However, most research and development in this area is based on Western cultural assumptions and infrastructures, creating a gap in understanding how these social robots may be accepted in low- and middle-income countries (LMICs). In this paper, we present findings from our design sessions conducted with older adults in Pakistan, as part of a broader home-based research study exploring the role of social robots in later stages of life. This study examined how older adults envision incorporating robots into their daily routines and what expectations they have regarding their use through co-design methods. The results highlight the importance of culturally sensitive robot design and user involvement in the development of social robots for LMICs. The study presents design recommendations for developing social robots that are contextually relevant and aligned with the values and care needs of older adults in Pakistan. Additionally, it compares the cultural dynamics of LMICs with the literature from high-income countries (HICs).

Older adults, Pakistan, Low- and middle-income countries, Social robots, Design, Culture.

1. INTRODUCTION

The global population is rapidly aging (Speck 2021), bringing complex challenges to caregiving, healthcare, and emotional well-being practices. As traditional caregiving structures evolve worldwide, there is a growing interest in technological solutions to support the aging population (Akhter-Khan et al. 2023). Among these technologies, social robots - designed to engage users through speech, movement, and interaction (Duffy et al. 1999) - are emerging as promising tools to support independent living, alleviate loneliness, particularly the emotional loneliness described by Schoenmakers (2020) as stemming from the absence of an intimate figure or close emotional attachment (e.g., a partner or best friend), and provide both cognitive and emotional support to older adults (Chen et al. 2020; Ito et al. 2023).

Recent research and development in social robotics have progressed significantly in high-income countries (HICs), largely influenced by Western cultural norms, values, and healthcare systems (Ikeuchi et al. 2018; Björling et al. 2021; Tae et al. 2021; Ahmad et al. 2023). However, there are substantial differences in infrastructure, digital literacy, and healthcare systems when comparing HICs to low- and middle-income countries (LMICs) (Hui et al. 2022; Khan et al. 2024; Brewer et al. 2006). In many LMICs, socio-cultural values and systemic limitations play critical roles in shaping the acceptance and implementation of assistive technologies, including social robots. For instance, in Egypt, studies have highlighted how cultural perceptions influence human-robot interaction, with findings showing differing levels of acceptance and discomfort during greeting scenarios compared to Japanese participants (Trovato et al. 2013). Similarly, cross-cultural research conducted in Bangladesh and Thailand indicated that social norms and national identity significantly affect how people interpret and engage with robot-initiated greetings (Shidujaman and Mi 2018). Building on this, research in Pakistan - where the population of older adults is rapidly increasing (Ashiq and Asad 2017) - shows that socio-cultural factors, such as strong intergenerational family ties, religious values, and traditional caregiving roles, also play a crucial role in shaping the daily lives and expectations of older adults (Abenir et al. 2018;

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Figure 1: *Participants doing design activities, with the robot sitting in front of them*

Gutierrez et al. 2016). Therefore, it is essential to consider these contextual nuances when designing or deploying technological interventions aimed at supporting aging populations in LMICs like Pakistan. Ignoring socio-cultural factors can lead to mixed receptions for technologies, as seen with Paro, the robotic therapy seal, in non-Western contexts (McGlynn et al. 2014). While Paro has been successfully adopted in several HICs, its use in some LMICs has revealed cultural mismatches. In India, for instance, older adults and caregivers were less receptive to animal-like robots, instead preferring robots with human-like appearances and culturally adaptive behaviors, more in line with local caregiving norms and expectations (Natarajan et al. 2022). Therefore, it is important to take contextual factors into account when designing and implementing new technologies like social robots, rather than applying assumptions based solely on Western lifestyles and routines.

There is a significant lack of empirical research exploring how older adults in Pakistan perceive robots, particularly studies employing co-design methods. While some work focused on understanding the role of language and older adults' expectations (Ahmad, Ahmad, Toro, Dias and Stawarz 2025; Ashraf et al. 2020), there are no studies that involved Pakistani older adults in designing robots they would like to use for themselves. Involving older adults directly in the design and ideation process is essential to ensure that technologies like social robots are contextually relevant and acceptable (Ostrowski et al. 2021). Without input from the older adults, there is a risk of developing solutions that, while technically sound, may not align with their needs.

Recent evidence indicates that older adults in Pakistan are increasingly using modern AI technologies as voice assisted companions (Kumar et al. 2022*b*,*a*). This suggests an openness towards novel technologies and integrating them into their everyday life. As such, there is potential in introducing robots to assist in Pakistani households, especially if their design reflects the culture and values (Ahmad, Ahmad, Toro, Dias and Stawarz 2025; Ashraf et al. 2020). Therefore, as part of our home-based research study conducted with older adults to explore the potential of robots in Pakistan (*manuscript in preparation*), we organised a series of design activities, which we report in this Late Breaking Work paper. Our research question was: *How do older adults in Pakistan perceive, imagine, and expect social robots to assist them in their daily lives at home?* We aimed to help older adults envision how robots could fit into their daily routines and to understand their perceptions, needs, and expectations regarding the use of social robots as well as their role and place in the household. Our results offer novel and culturally relevant insights into the daily routines, emotional needs, and care expectations of older adults in Pakistan.

2. RESEARCH METHOD

Our overall research investigates the use of social robots in Pakistani home settings. As part of our research process, we first conducted a study with older adults in a lab environment in Pakistan to explore their preferences regarding social robots' appearance and their potential use in home environments (Ahmad et al. 2025). The study revealed key user needs, cultural sensitivities, and functional expectations in the local context, highlighting older adults' preference for a human-like robot and the importance of addressing language barriers for better engagement. Consequently, we prepared a robot able to communicate in Urdu, the local language, and made efforts to enhance its cultural sensitivity. We then tested its language proficiency with Urdu-speaking individuals, aged 45 and older, in a lab setting (Ahmad, Ahmad, Toro, Dias and Stawarz 2025). This study allowed us to refine the robot's speech before introducing it to home settings in Pakistan. As part of our

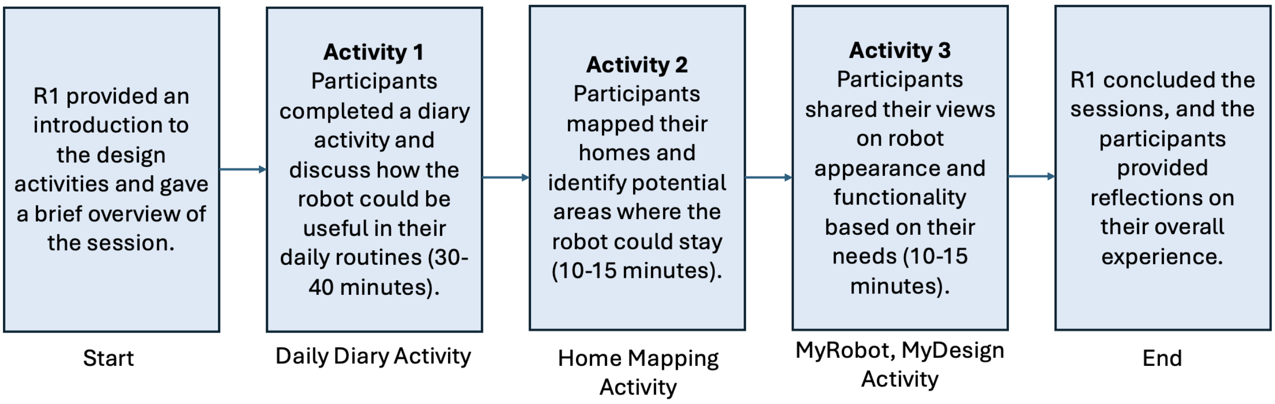

Figure 2: *The overview of the study procedures. The study lasted 60-70 minutes, including a brief introduction, three interactive design activities, and a final reflection session.*

latest study (*manuscript in preparation*), we tested the robot's use with participants in their home settings over the course of three days, with each session lasting approximately 60–70 minutes and researchers present throughout to facilitate and observe interactions. This Late Breaking Work paper focuses specifically on the design activities held at the beginning of Day 2 of the study. By this time, participants had already become familiar with the robot's functionality and had interacted with it on Day 1. The timing of the study allowed them to draw from their initial experiences and to provide valuable suggestions as part of the design activities.

2.1. Participants and recruitment

We recruited 14 older adults who were aged between 55 and 81 years, including of 7 men and 7 women, with an average age of 68.5 years (SD = 7.74; see Table 1 in the Appendix). All participants were living in the urban areas of Pakistan. The recruitment was carried out through social media advertisements. The study received a favorable ethical opinion from the School Ethics Committee at the researchers' institution.

2.2. Study procedure and materials

We conducted the study in participants' homes, ensuring that the space was quiet and free from distractions (see Figure 1). First author (R1) and second author (R2) conducted the study because they have lived for 20 years in Pakistan and are well-acquainted with the culture and language. R1 led the design activities (detailed in the following paragraph) and collected data from the participants, while R2 took notes and provided technical support. We used the Nao robot, a medium-sized humanoid robot (*NAO robot – aldebaran.com* 2013) that is capable of performing different gestures with its hands and torso. The session lasted approximately 60-70 minutes for each participant.

The activities were conducted with individual participants and followed a set format (see Figure 2). R1 began the session with a brief introduction and a discussion on the capabilities of the robot. The design part involved three design activities. The first one (Activity 1) was a diary activity inspired by Ghorayeb et al. (2023), where participants and R1 evaluated participants' daily routines over the last two days, discussing what they did, how they felt, and their health status. We then asked them to envision how a robot could be useful during those situations (see Figure 6 in the Appendix for examples of participant outputs).

Following this, the second design activity (Activity 2), also inspired by Ghorayeb et al. (2023), involved asking participants to draw a rough layout of their home. After completing the drawing, they were instructed to use color coding to categorise different spaces, e.g. private spaces in blue, favorite places in black, favorite objects in orange, and areas where they could place the robot in red (see Figure 5 in the Appendix). The aim for this activity was to help participants understand where the robot could be placed in their homes, allowing them to better visualise its potential uses.

The third design activity (Activity 3) called "my robot, my design" was inspired by Obaid et al. (2023). We provided participants with cue cards featuring different robot embodiments (head, torso, arms, and legs) and asked them to suggest and discuss various appearances and functionalities for the robots (see Figure 4 in the Appendix). The goal was to give participants freedom to design their own robots, specify any desired changes, and discuss potential use-cases. Participants were also provided a flip chart with robot image and sticky notes to write down their suggestions (see Figure 3).

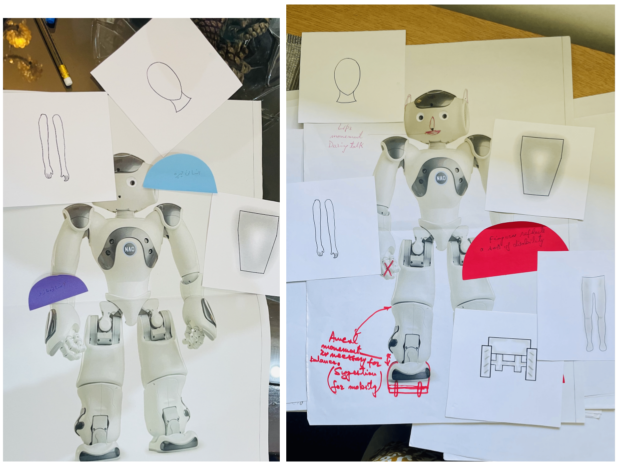

***Figure 3:** Participants' responses on robots' appearance and functionalities*

2.3. Analysis

We conducted a thematic analysis of the design activities as described in Bowman et al. (2023). Both R1 and R2 are bilingual, and most of the activities were audio recorded in Urdu. To facilitate discussion with the rest of the research team, R1 transcribed the data and R2 cross checked the transcription. While R1 took the lead in analysing the data, each step of the analysis was discussed with rest of the team.

Our analysis centered mainly on examining the potential usefulness of a robot in participants' everyday routines, investigating their perceptions of the robot during Activity 1, and identifying common trends. In Activity 2, we thematically analysed the data using our notes and the conversations we had with participants. The primary focus was to understand where participants preferred to place the robot in their homes - particularly in private spaces or favored locations - and the reasons behind these choices. During Activity 3, we aimed to determine whether participants still preferred a human-like robot and if they desired any changes in the robot's appearance or functionality.

Following the thematic analysis steps, we repeatedly reviewed the data to enhance our understanding of participants' perceptions. During this process, we generated initial codes by identifying recurring ideas, phrases, and behaviors across the transcripts. For example, mentions of loneliness, references to religious or cultural routines, and general comments on the robot's appearance and language use. These codes helped us capture common trends, concerns, and expectations expressed by participants. Next, we examined the relationships and patterns among these codes, organising them into broader categories such as emotional needs, cultural appropriateness, and usability preferences. Through iterative refinement and discussion, we organised these categories into three main themes.

3. RESULTS

This section presents the findings from a thematic analysis of design sessions conducted with older adults. The following themes reflect participants' perspectives on the design and the potential role of a social robot in their life.

3.1. Emotional companionship and easing loneliness in daily routines

The discussions among participants and researchers revealed a strong and consistent desire for emotional companionship, particularly in response to feelings of loneliness, loss, and psychological vulnerability in later life. While all participants agreed that aging is a communal process and that older adults in Pakistani culture typically receive support from their children or close family members, they still expressed a need for emotional companionship in the later stages of life. Eight participants maintained active routines such as praying, watching television, and engaging in household chores, and they reported that these activities often served to conceal a deep emotional isolation they feel, especially for those who had lost spouses or lived far from their children and relatives.

Several participants described their routines as quiet, repetitive, and lacking social engagement. The participants living with their families mentioned that they sometimes enjoyed the quiet moments in the chaos of their homes, while others expressed that they did not have much to do and had few activities available to them (*"I used to have a lot to do in my younger years, but now I don't have much to occupy my time. I constantly try to find activities to keep myself busy"* – P6). This sense of purposelessness and the emotional void were echoed by others, particularly when discussing the evening and night activities. Nighttime was reported as a time of vulnerability for many individuals. Several participants reported experiencing insomnia and anxiety when alone at night. Those who had recently lost their spouses found it particularly challenging to adjust to sleeping independently (*"At night, it's the hardest. The house is so quiet, and my thoughts just keep me awake"* – P2). Even when living with children and grandchildren, the sense of loneliness persisted, as everyone would go to their own rooms, leaving the older adult alone during the night. These examples highlight how emotional loneliness can create physiological issues, such as sleep disturbances or nightmares. Two participants specifically mentioned having nightmares; one welcomed the idea of a robot providing comfort afterwards, while the other was concerned that a visible robot might increase her anxiety, illustrating individual differences in how emotional support should be offered.

The majority of the participants expressed interest in a robot that could provide companionship through subtle, empathetic interactions. They envisioned robots that could offer calming reassurances, radiate soft background light, or simply maintain a presence without speaking (*"Even if it doesn't talk, just knowing something is there would make me feel better"* – P8). This highlights the idea that emotional support does not always need to be verbal; presence, attention, and responsiveness are equally valuable. This, therefore, suggests that the envisioned robot could shift from being a passive device to an empathetic companion that could provide emotional support during emotionally challenging moments.

During the design activities, one participant (P13) compared the robot to Siri, the mobile voice assistant. They mentioned that they have talked to Siri when they were feeling lonely. They argued for the benefits of using a robot instead of Siri, highlighting the advantages it could bring, such as a sense of presence and a voice assistant with a body. This comparison shows the potential of robots to not only provide functional support, but also suggesting that robots may offer a better user experience than traditional voice assistants like Siri.

3.2. Contextual awareness and cultural sensitivity in the domestic environment

Participants had their mental models and beliefs about space, privacy, and cultural rituals, which shaped their preferences regarding the robot's physical presence and behavioral patterns. During the home mapping exercise, they described their homes with a clear understanding: spaces like prayer rooms and bedrooms were considered private, while living rooms were viewed as social and leisure areas.

The living room was the most preferred area for keeping the robot, particularly near the television or in a corner. Participants described this location as "visible but non-intrusive," offering companionship during daily activities without interference in their personal space, expressing a desire for the robot to remain less independent in their homes (*"I'll like if the robot can be just around, quietly present while I go about my day. It doesn't have to get in my way or take over, it would just keep me company without being too independent or intrusive"* - P6). Yet, despite classifying bedrooms as private, many participants also chose to place the robot there as a second option. This contradiction reveals a subtle shift in boundaries, as one participant expressed: *"I feel safe in my room. If the robot is quiet and nice, it can be there too"* (P11). This highlights that perceptions of space depend on trust. The robot was seen not merely as a machine but as a companion who could be trusted enough to be allowed into the most private spaces.

Cultural and gender expectations significantly influenced the participants' perceptions of robots' roles. Participants noted that, within families living together, robots should consider the needs of older adults and help them without disrupting the routines of other family members. Regarding gender expectations, female participants were more likely to see robots as assistants in daily household tasks, especially in cooking and cleaning (*"If it could remind me how much spice to put in a biryani or help me remember festival days like kids' birthdays, that would be a blessing"* – P4). This shows the importance of maintaining the traditions, as they help provide a sense of purpose to older adults. Participants also mentioned that the robot must support these everyday tasks without replacing or disrupting them i.e., by trying to change the traditional recipes. In contrast, male participants often emphasised the robot's technical or entertainment value. For example, one participant (P9) commented: *"It would be great if it could control the TV or play games with me"*. Participants also highlighted the need for the robot to align with religious norms. Many expressed a desire for a "do not disturb" feature during prayer times or the ability for the robot to lower lights during Maghrib (evening) prayers.

3.3. Practical assistance: supporting health, memory, and safety

Beyond emotional and contextual needs, participants had clear expectations regarding the functional roles a robot should perform in their regular routine. These roles included reminders for medication, appointment management, monitoring health vitals, and communication with family members. Such features were viewed not as luxuries but as essential components for aging in place safely and with satisfaction.

Participants also expected the robot to support hazard detection, especially for those with mobility issues (*"My carpet near the sofa always folds. If it could remember that and warn me before I trip, that would be useful"* – P10). This request for proactive safety monitoring shows an important combination of memory assistance and environmental awareness, reinforcing the robot's potential as a preventive tool against injuries or falls. Others envisioned the robot as an intelligent system capable of learning from their routines and adapting over time. For example, if the robot detects when they wake up, it could automatically offer morning greetings or read news headlines. Some participants imagined the robot as a guardian of rituals, with features like automatic reminders for prayer times and assistance with performing ablutions (wudu).

From a design perspective, participants preferred friendly, human-like robot forms with facial expressions, modest features, and calm voices. Given the tasks they envisaged for the robots, they also emphasised the importance of mobility and accessibility of the robots. Some wanted the robot to be equipped with wheels for easier movement, while others suggested stair-climbing capabilities to accommodate the architecture of traditional homes. The robot was envisioned as more than just a tool: participants saw it as a reliable companion that could combine functionality with empathy. As one participant put it, *"It should be able to do things without me asking every time, like a person who knows you well"* (P8).

4. DISCUSSION

The findings offer insights into how older adults in Pakistan envision the role of social robots in their lives. They emphasise the importance of approaching technology design from a culturally contextualised perspective. While much of the existing literature on human-robot interaction (HRI) has emerged from research centred around HICs (Bardaro et al. 2022; Thunberg and Ziemke 2021; Ikeuchi et al. 2018; Björling et al. 2021; Tae et al. 2021), we highlight differences that must be considered when designing and implementing robotic technologies for aging populations in LMICs like Pakistan. These differences are not merely infrastructural or economic; they are ingrained in cultural values, social dynamics, and lived experiences.

4.1. Cross-context design differences

The most significant difference observed is in the caregiving expectations. In HICs, older adults are often encouraged to maintain their independence for as long as possible, which is reflected in the design of assistive technologies - including social robots (Luperto et al. 2021). These robots are typically seen as tools to compensate for physical or cognitive decline, supporting independent living or enhancing self-sufficiency in environments such as nursing homes (Tanner et al. 2023) and individual residences (Kim et al. 2022). In contrast, participants in our study described aging as a family-oriented experience. In Pakistan, as in many other countries in the Global South (GS) (Gutierrez and Ochoa 2017; Gutiérrez Figueroa and Ochoa 2020), older adults are typically not physically isolated. Instead, they often live in inter-generational households where care is viewed as a collective responsibility (Muzaffar et al. 2017). In this regard, robots are not perceived as replacements for human interaction or assistance. Instead, they might be considered as additional tools that can assist in alleviating minor tasks or provide companionship to older adults, without disturbing their family members.

Loneliness and social isolation are often cited as primary motivators for robot adoption in HIC research studies (Isabet et al. 2022; Lee et al. 2024). In many of these studies, loneliness is defined as an individual's lack of regular social contact or emotional companionship, which is frequently associated with living alone or being physically isolated (Johannessen et al. 2021). This perspective reflects HIC's cultural values of independence and nuclear family structures, where loneliness is common and sometimes preferred (Mariano 2025; Rubinstein and Kilbride 1992). However, prolonged isolation can lead to distress. In these contexts, robots are designed to provide general companionship, fill emotional gaps, or provide conversational support to alleviate the effects of physical isolation (Isabet et al. 2022). In our study, some participants expressed a different relationship with isolation. Many lived in multi generational households, surrounded by children and grandchildren. For them, physical isolation was rare, and they sometimes appreciated brief moments of silence in the presence of many family members. Nonetheless, they still experienced feelings of loneliness. Those who had lost spouses, in particular, described feeling emotionally alone at night, despite being physically surrounded by family. Their experiences indicate that loneliness is not solely defined by physical isolation; rather, it is often linked to a lack of emotional connections (Schoenmakers 2020). This difference highlights the need for a more nuanced understanding of loneliness when designing robots.

Another important difference lies in how technology itself is perceived. In many HICs, robots are often perceived as innovations with autonomy (Sundaresan et al. 2023) and advanced functionality. Older adults in those settings tend to focus on features such as automated reminders (Gasteiger et al. 2021), mobility support, medication management (Su et al. 2021), and integration with smart devices (Ghafurian et al. 2023). In contrast, our participants interacted with robots in more relational and task-oriented ways during the study, possibly due to the nature of the activities. Female participants, in particular, envisioned robots assisting with household chores, providing reminders for religious practices, or simply being a comforting presence in the room. Male participants, on the other hand, focused more on technical features, discussing aspects like voice recognition, entertainment options, and control systems. This gendered distinction was more pronounced than typically reported in studies based in HICs. For example, Nomura and Nakazawa (2017) found subtle gender differences in attitudes toward robots, often highlighting women's greater concerns about privacy and social implications, but these differences were generally less marked. Similarly, Abel et al. (2020) observed moderate variations in robot acceptance between men and women, emphasising contextual factors such as prior experience and cultural background as mediators. Parlangeli et al. (2022) reported nuanced perceptions of gender regarding robot roles, with women showing a slightly higher preference for relational functions; however, the differences were not significant. Moreover, research in HICs also indicates that while women often assume caregiving responsibilities due to traditional nurturing ideals, men are becoming increasingly flexible in negotiating these tasks, suggesting that household roles are more fluid than before (Zygouri et al. 2021). In contrast, our findings reveal a stronger and clearer gendered pattern in robot placement preferences and underlying reasons, suggesting that in our study context, gender plays a more significant role in shaping interactions with domestic robots.

The role of digital literacy and infrastructure is also significant. Older adults in HICs often benefit from years of exposure to digital systems, broadband internet, and formal or informal technology training (Jesse 2024). In contrast, many older adults in LMICs have had limited or delayed exposure to digital tools. In our study, although some participants had briefly used voice assistants like Siri or ChatGPT, there was a clear preference for simple, intuitive interactions over complex systems. This highlights the significance of creating robots that are easily approachable, with minimal dependency on previous digital expertise (Følstad and Brandtzæg 2017).

Another difference is how participants envision the robot's potential presence in the household. In Western contexts, robots are typically seen as autonomous agents operating throughout the home - moving from room to room, learning routines, and taking initiative (Luperto et al. 2021; Pooley et al. 2023; Kazhoyan et al. 2021). However, our participants emphasised the importance of control and predictability. Some expressed concerns about a robot being too "independent," preferring it to remain in one room or act only when called upon. This more cautious attitude reflects a broader cultural orientation towards predictability and privacy in domestic spaces – factors that people are now accustomed to and not particularly concerned about in HIC-based literature (Rueben et al. 2017; Lutz and Tamó-Larrieux 2020).

4.2. Cross-context design similarities

Despite the differences in context, there are also notable similarities between HICs and LMICs. Participants from both settings value companionship, support in daily routines, and entertainment. The increasing use of conversational AI tools among older adults across different socio-economic backgrounds suggests that voice-based interactions might be an appealing way to engage with technology (Hanley and Azenkot 2021; Kim and Kim 2024; Wolfe et al. 2025). In Pakistan, the popularity of tools like ChatGPT and voice assistants among older adults demonstrates a willingness to explore new technologies, especially when these tools are introduced in supportive, inter-generational environments (Kumar et al. 2022*b*,*a*). However, regardless of some similarities, our findings encourage researchers to move beyond Western-centric views and engage more meaningfully with the cultural and social contexts of LMICs (Hope et al. 2009). Simply applying technology developed in HICs is unlikely to be successful unless it is adapted through participatory processes that reflect local needs, routines, and values (Lazem et al. 2021). Our study shows that older adults in Pakistan are both interested in and capable of shaping these technologies, provided their voices are heard and their contexts are respected.

4.3. Design implications and recommendations

Future robot designs must consider the diversity of aging experiences around the world, ensuring that technologies are not only inclusive but also rooted in cultural understanding and real-world limitations. Therefore, we propose design implications for future researchers to consider when developing technologies in Pakistan and similar contexts.

1. Since extended families in Pakistan often live together, and caregiving is deeply rooted in cultural and religious norms (Chung 2023), social robots should be envisioned as collaborative members of the household, capable of engaging with the dynamics of a multi-user, inter-generational environment, rather than simply serving as personal companions. This perspective involves designing robots that can navigate shared routines, mediate differing expectations across age and gender, and support collective caregiving roles (Søraa et al. 2021). For example, a robot might need to interact

differently with an elderly grandparent, a working adult, and a child, all living in the same household. Such adaptability also aligns with findings from cross-cultural HRI studies, which highlight the importance of contextual sensitivity in robot design (Lim et al. 2021; Swami et al. 2025). Therefore, future designs for social robots must take a collective approach, enabling them to interact effectively with multiple generations and seamlessly adapt to shared routines and varied user expectations.

2. Robotic interfaces need to move beyond traditional Western-centric design models that often assume users possess high levels of digital literacy. In contexts like Pakistan, where linguistic diversity is vast and literacy levels vary significantly (Kalim and Bibi 2022) - especially across gender, age, and rural-urban divides - effective robot usage requires multilingual, voice-first, and gesture-based options that align with local communication practices and cultural norms. Voice-based interfaces have shown promise in bridging digital divides by providing accessible interaction for users who may be illiterate or unfamiliar with written commands (Kumar et al. 2022*b*). Additionally, gesture-based controls can promote inclusivity in communal settings, where verbal communication may not always be appropriate due to cultural or social norms regarding speech, privacy, or gendered interaction (Karim et al. 2023). This approach advocates for interfaces that respect local customs, communication habits, and socioeconomic realities. Therefore, it is essential to develop culturally-grounded interaction models that replace one-size-fits-all Western templates, allowing for more inclusive, effective, and contextually meaningful robot integration in Pakistani homes.

3. Finally, these technologies must be culturally sensitive, enhancing existing systems of care, not replacing human care, while aligning with spiritual values. The aim should be to amplify existing networks of care in ways that are context-sensitive, technologically appropriate, and socially meaningful, rather than positioning robots as substitutes for human connection.

5. LIMITATIONS

This study has some limitations. First, the presence of the researcher during activities may have unintentionally influenced participant responses, particularly in guided tasks such as Activity 1. To mitigate this, the researcher relied on standardised prompts, avoided evaluative feedback, and encouraged participants to expand on their own perspectives. Second, as data were collected through one-time sessions rather than longitudinal studies, the findings provide limited insight into long-term acceptance, adaptability, and evolving attitudes toward the robot. While this constraint was unavoidable within the scope of the study, efforts were made to capture a wide range of participant reflections as possible.

6. CONCLUSION

This paper offers culturally grounded insights into how older adults in Pakistan perceive and envision the role of social robots in their daily lives. By engaging participants in design activities, we highlighted their preferences, expectations, concerns, and challenges, which differ significantly from those observed in literature focused on HICs, particularly around family dynamics, caregiving norms, religious values, and infrastructural limitations. Rather than viewing robots as substitutes for human care, participants envisioned them as supportive companions and helpers within a socially interdependent household environment. These findings highlight the critical importance of context-sensitive design in the development of socially assistive technologies. To ensure social robots are both acceptable and useful for people in LMICs, researchers must move beyond Western perspectives and engage directly with local users, values, and living conditions.

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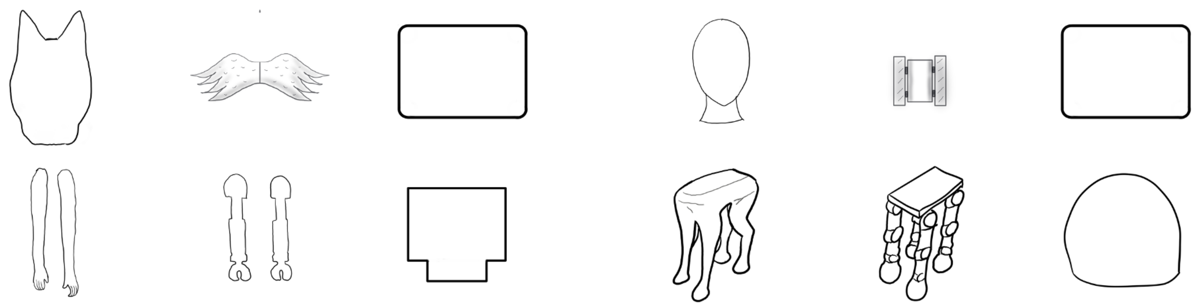
Appendix

Participant ID	Gender	Age	Living status
P1	F	71	Widow - living with son
P2	F	71	Widow - living with son
P3	M	75	Living with wife – children abroad
P4	M	78	Living with wife – children abroad
P5	F	56	Living with son – husband abroad
P6	F	81	Widow - living with son
P7	F	62	Living with husband and children
P8	M	69	Living with wife – children abroad
P9	F	62	Living with husband – children abroad
P10	F	59	Living with husband and children
P11	M	72	Living with wife – children abroad
P12	M	67	Living with wife – children abroad
P13	M	59	Living with wife – children abroad
P14	M	75	Living with wife – children abroad

Table 1: *Participants Details*



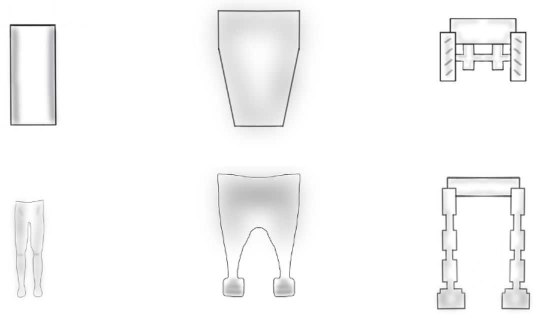


Figure 4: *Design cue cards*

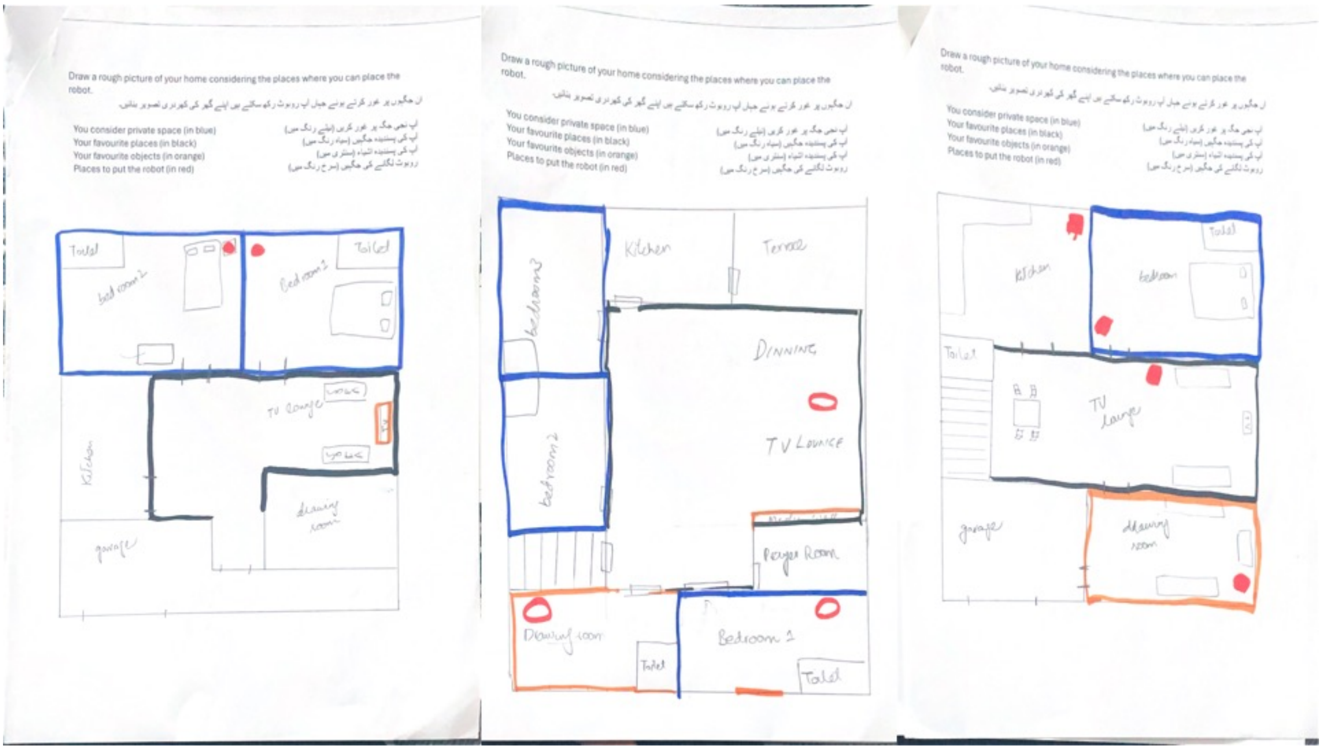


Figure 5: Home layout activity

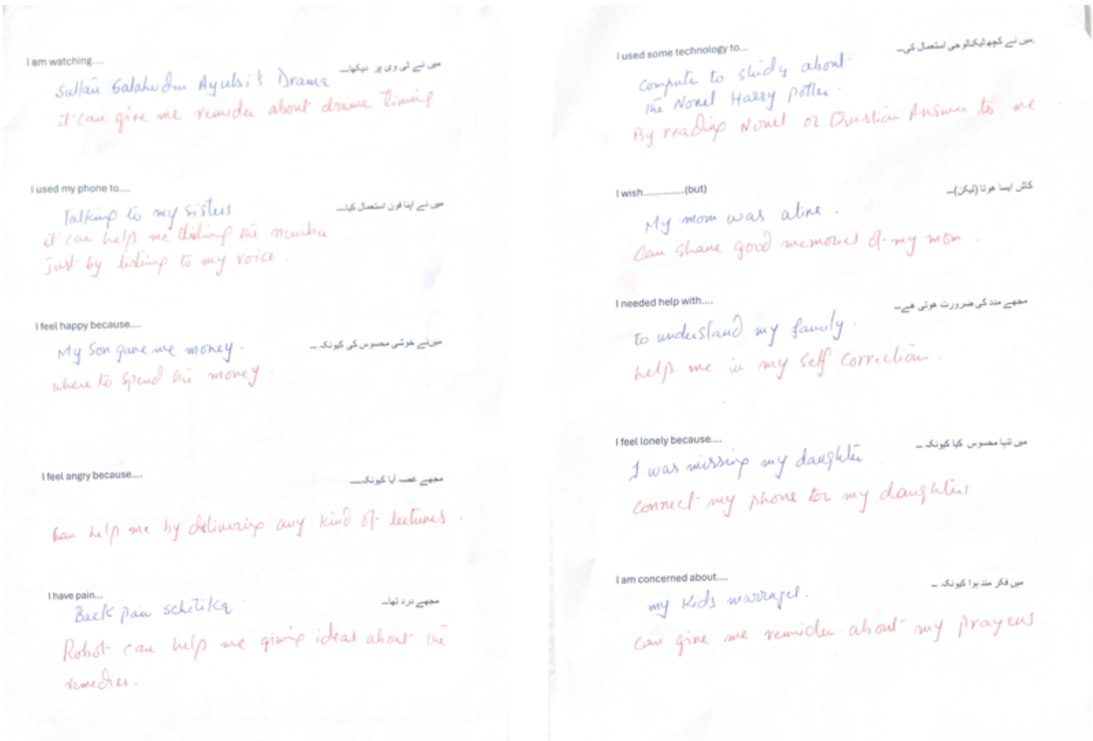


Figure 6: Diary activity