

Early Childhood Development in Pakistan: A Human-Centered Design Approach to Empower Positive Parenting

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ABSTRACT

The early childhood development (ECD) provides a pivotal window of opportunity to lay the groundwork for a child's future. This study delved into the practices of caregivers with children aged 0-3 years, examining their engagement, challenges, and the consequential impact on childcare. Employing a human-centered design (HCD) approach, the research embraced understand, empathize, synthesize, prototype, and testing phases. A mixed-methods strategy, including surveys, home observations, key informant interviews (KII), and focus group discussions (FGD), captured the knowledge, attitude practices (KAP), and perceptions of caregivers. Findings revealed entrenched gender inequalities in rural families, influencing caregiving practices where fathers predominantly fulfilled financial obligations. Less than 40% of parents engaged in activities like storytelling, demonstrating sensitivity to their child's needs, or actively playing and protecting them. The study adapted, contextualized, and tested parenting material, presenting it in diverse formats such as Vroom messages-based booklets, illustrations, animations, and video clips. Caregivers rated these materials highly, indicating their usefulness for child development and bonding. The project aimed to enhance our understanding of caregiving practices in remote Pakistani contexts, contributing valuable insights to parenting practices, service delivery, and caregiving structures. With implications for policy and practice, caregivers in targeted areas were empowered to foster positive relationships and supportive environments for young children. The study's recommendations, emphasizing contextually and culturally relevant, science-based learning resources, had the potential to scale up parenting programs and influence ECD outcomes and policies throughout Pakistan.

KEYWORDS

Early years; early learning; brain development; parenting education.

INTRODUCTION

Early childhood development is shaped by a range of socio-demographic, biological, cultural, and environmental factors. Key elements such as good health, adequate nutrition, early learning opportunities, safety, security, and responsive caregiving have an immediate and significant impact on age-appropriate child development (Wertlieb, 2019).

During the early years of life, brain development and learning are continuous processes, heavily influenced by factors like health, nutrition, early stimulation, responsive caregiving, and protection from physical and psychological harm. These influences, combined with social environmental factors, shape early childhood development. Most experiences during the 0-3 years occur at home, where parents play a vital role in fostering holistic development. Home environments that foster caregiver-child interaction, stimulation, attachment, and bonding have been shown to positively affect early brain development (Walker et al., 2011; Zhang et al., 2021). A systematic review of parenting support programs reported significant improvements in holistic child development outcomes, with Gao et al. (2020) highlighting the effectiveness of family centered approaches, particularly when fathers are actively involved.

The socioecological theory informs the factors in the environment that highly impact caregivers' roles and practices, eventually influencing child development (Bronfenbrenner, 1994). Parenting support programs recognize components of caregiver-child engagement crucial for fostering children's growth and development (Ayob et al., 2022; Britto et al., 2015). Black et al. (2017) and Jeong et al. (2016) highlighted that parental engagement with young children varies depending on the nature of activities and the setting, whether at home or in school. Home-based involvement, such as providing educational resources or assisting with homework, has been found to significantly improve early childhood development (ECD) outcomes across different contexts. Research studies have reported time and resources as significant barriers for caregivers to engage in stimulating activities with their children (Dawes et al., 2020). In some places, although caregivers do interact with children, these activities are 'instructive with limited responsive interaction and stimulation' (Hollowell et al., 2019). Vroom is a parenting resource developed by the Bezos Family Foundation (<https://www.vroom.org/>), which offers a variety of creative tools and resources to inspire and engage caregivers with their children to turn everyday moments into brain development and early learning opportunities. These resources were developed with early childhood experts, neuroscientists, parents, and community leaders.

Approximately 8 million children in Pakistan are at risk of developmental delays during the first 5 years of life (Engle et al., 2007; Grantham-McGregor et al., 2007). Being a Low-Middle-Income Country (LMIC), Nadeem et al. (2014) reported 24% of children at risk of developmental delays in socially disadvantaged environments in low socioeconomic households in Pakistan. Poverty is globally recognized as the most pervasive risk factor for child development (Melchior et al., 2007).

School enrollment starts at 4 years in Pakistan; however, 42% of these children in urban and 61% of children in rural areas are out of school (ASER, 2019). Those in schools are struggling with the quality of education and teacher absenteeism (Iqbal et al., 2015; Niamatullah et al., 2020) therefore, the home environment is crucial for optimizing child developmental outcomes. Interestingly, interventions supporting caregiver-child interactions have demonstrated better child developmental outcomes in rural Pakistan (Yousafzai et al., 2014).

Before implementing the Vroom parenting resource in rural Pakistan, it was essential to understand the ground realities before implementing a pre-planned intervention, ensuring it would be relevant and suited to the needs of the study population. Therefore, this research aimed to understand how caregivers perceived their role in practicing early child development at the household level, how they engage with their children regularly, and what kind of challenges they face in their day-to-day lives concerning childcare practices. The focus was on listening to their perspectives, letting them share their stories, and observing their caregiving practices, engagement, and interaction with their children. The findings of this research were to support the adaptation, contextualization, and implementation of parenting resources (Vroom) in rural communities in Pakistan.

Research Aims and Objectives

The key objectives of the study were:

- To explore Early Childhood Development (ECD) practices in the context of Gilgit-Baltistan, particularly in District Ghizer.
- To identify the primary and secondary caregivers of children 0-3 years and to understand/explore caregivers' engagement and interaction with their children.
- To empathize with caregivers about strengths, weaknesses, and challenges regarding caregiving practices.
- To contextualize and adapt Vroom messages and brainy backgrounds for children under 3 years of age.
- To ensure accessibility of these culturally relevant early learning and brain development messages through different modalities, particularly empowering caregivers of underserved areas.

METHODS

The study employed a human centered design (HCD) approach, focusing on critical components: understand, empathize, synthesize, ideate, prototype, test, and plan, involving distinct data collection tools for each phase. Human-centered design is ideally positioned to provide desirable, practicable, and viable solutions by understanding people, their hopes, emotions, and needs. The foundation of human-centered design is a first-hand understanding of human needs and behaviors in the systems being designed, followed by decision-making based on that understanding. It relies heavily on collaboration from a team, participation from potential end-

users and stakeholders, a willingness to find the solution through iterative cycles of learning, and a focus on action over planning.

HCD is one lens through which solutions can be devised and examined. However, there could be a variety of solutions that may potentially appeal to the community being attempted to serve. Hence, the focus is on solutions that are technically and financially viable. It is a delicate balancing act but one that is extremely essential for building effective and lasting solutions. The most interesting thing about using HCD is that each phase is built upon learnings from the previous phase.

The Understand Phase

This component of the design process consists of investigating what the team already knows about the problem through a mind-mapping exercise, and in addition collecting, evaluating, and presenting contextual knowledge and secondary research. Thus, the research began with an understanding of the problem to be solved. This involved understanding the context, caregiving practices, stakeholders, issues, and how these challenges are addressed daily. The purpose of this phase was to integrate the design team around the framing of a specific issue so that the subsequent stages of design work are well-defined and tied to the team and the bigger difficulties confronting the community.

During this phase, the primary focus was exploring and understanding the caregivers' interaction and engagement with the child in the households. This was undertaken through a Rapid Baseline Assessment in the targeted context with the help of household observations and interviews conducted with primary and secondary caregivers, based on the knowledge, attitude, and practice (KAP) survey.

Sampling

This baseline survey deployed a cluster sampling technique. In the district under study, there are 15 local support organizations (LSOs). Each LSO represents a single cluster. Within each LSO, the average number of villages is 6. Taking a lean sample approach (33% of stratum), 2 villages were randomly selected from the list of villages in each LSO area. From each village, 10 households were randomly selected and invited to participate in the study based on having at least one child aged 0-3 years. The estimated sample size was 300 households with a variation possibility of 10%. At the end of the survey, however, 304 households were surveyed. The data collection period was between April to Oct 2023.

Data Collection Tools

The following data collection tools were used to collect data. All the tools were developed in English, translated into Urdu, and back translated into English and piloted and pre-tested before its implementation.

Survey Questionnaire:

A structured questionnaire was used to gather data from caregivers at the household level. This tool, with permission from the original author, was adapted from a similar study conducted in India. The research team modified the instrument to ensure its relevance to the Pakistani

context. The questionnaire was designed to assess caregivers' knowledge, attitudes, and practices regarding Early Childhood Development.

Home Observation Tool:

The research team developed a semi-structured tool based on global literature and their own contextual experiences to observe and record childcare practices. Guidelines were also created to help enumerators know what and how to observe during household visits. This tool underwent critical review by experts at every stage of development to ensure content validity and contextual relevance. It was piloted in Karachi and pre-tested in the study area before being officially implemented.

The tool was divided into two main parts:

- Part I focused on seven key themes that highlighted caregivers' engagement and activities with children.
- Part II provided a broader overview of the household, including the caregiver-child interaction, a layout of the household area where the child was present, and other relevant observations related to the child's environment.

The semi-structured tool, originally developed in English, was later translated into Urdu. The home observation was conducted in 30 households across 30 villages and 15 LSOs.

The Empathize Phase

Empathy is the ability to put oneself in someone else's shoes, comprehend their experiences, and begin to solve issues from their point of view. Human centered design is positioned on empathy, based on the notion that the people you are creating for are your road map to inventive solutions. Thus, it is essential to empathize, gain their understanding, and include them in the design process. Empathize is therefore a qualitative approach that focuses on the specific contexts of people and promotes dynamic conversation.

Sampling

Primary caregivers (mothers) and secondary caregivers (fathers, grandparents, and health workers) were selected and invited through purposive sampling as shown below in Tables 1 and 2.

Data Collection Methods

Three data collection methods were employed in this study to engage participants in conversations to generate key insights into their day-to-day routine, practices, challenges, and needs of caregiving:

Key Informant Interviews (KIIs):

Conducted with 18 primary and secondary caregivers.

Focus Group Discussion (FGD):

Conducted with mothers and ECD facilitators in an ECD Centre.

Perception of primary and secondary caregivers:

Investigated through a picture perception activity using Vroom content, Vroom adapted tips, Illustrations recreated from home observation data, and journey mapping.

Data Collection Tool

Interview Guide:

An Urdu-translated semi-structured interview guide was used to understand the stakeholders' perspectives about the caregiver's life, challenges, and engagement with their children in their daily lives. The key themes in the tool were caregivers (parents/grandparents), childcare practices, daily routines of children and caregivers, communication channels, and strengths and limitations of childcare practices.

Table 1.

Geographical distribution of participants

Target Region	Gilgit Baltistan	
Participants	1.	Primary caregivers (Mothers),
	2.	Secondary caregivers (Fathers and Grandparents)
	3.	Lady Health Workers (LHWs)

Table 2.

Demographic information of research participants (caregivers)

Village	Caregivers	Age	Qualification	Occupation	Child's Age
A	Mothers (2)	25-30 years	NK ¹	Homemaker	13 Months
		25-30 years	12 Grade	Homemaker	7 Months
	Grandmother (1)	80 years	No Schooling	Homemaker	36 Months
	Father (1)	35 years	8 th Grade	Government Servant	6 Months
	Lady Health Worker (LHW) (1)	26 years	12 Grade	Health Worker since 1995	
B	Mothers (3)	26 years	Matriculation	Homemaker	8 Months
		25 years	Never been to school	Homemaker	3 Months
		25-30 years	NK	Homemaker	27 Month
	Father (1)	NK	NK	Farmer	24 Months
	Lady Health Worker (LHW) (1)	30-35 years	NK	Health Worker since 2006	
C	Mothers (2)	25 years	Graduate	Homemaker	7 Months
		20-25 years	Never been to school	Homemaker	20 Months
	Grandfather (1)	55-70 years	High School	Army retired	8 Months 1.5 Months
	Father (1)	30-40 years	Matriculation	Army retired and working as a guard	11 Months
	Lady Health Worker (LHW) (1)	45-60 years	Matriculation	Health Worker since 1995	
D	Mothers (2)	29 years	High School	Homemaker	22 Months
		25-30 years	Graduate	Homemaker	06 months
	Grandfather (1)	68 years	NK	Army retired	12 months

¹ Not known

Data Analysis

Quantitative data were analyzed using MS Excel, with the results presented through frequencies, graphs, and charts. Qualitative data underwent a thematic analysis. The recorded data was transcribed and translated, after which researchers independently and collaboratively identified codes through multiple readings. A thorough discussion helped finalize the list of codes, and broader themes were created from this list. The process involved constant reference to raw data, code generation, and literature review for meaningful findings.

Limitations

The study focused only on caregivers actively involved in caregiving practices, excluding those who were out stationed for various reasons. Additionally, time, distance, and weather conditions in the district limited the study to certain households. Harsh weather and road constructions prevented reaching some far-off settlements. Language barriers were addressed with assistance from local team members proficient in native languages.

Ethical Considerations

The research adhered to principles of academic integrity, honesty, and respect. Transparent procedures for adapted informed consent were employed, and participants were informed of their right to withdraw without consequences. Participants' decisions not to answer questions were respected. Confidentiality and anonymity were ensured throughout the study. Risks and harms during data collection were minimized, and findings will be shared with communities and stakeholders through seminars, webinars, research journals, and conference presentations.

FINDINGS

Understand Phase

Knowledge, Attitude, and Practices (Survey and Home Observations)

Demographics:

The majority of respondents (99%) were mothers, while 1% were fathers. Most mothers were homemakers (88%); fathers had diverse professions, such as skilled laborers (27%), armed force personnel (26%) and others. Regarding education, 4% of parents never went to school and 38% of mothers and 29% of fathers had completed grade 12. The majority of households (63.3%) had a clean and safe living environment, proper ventilation, and electricity. Some households had unsafe outdoor areas due to mountainous terrain.

Caregiving Practices:

Regarding caregiving practices, only 38% of caregivers reported playing with children frequently, while the rest cited time constraints. Caregivers reported providing opportunities for outdoor play (39%), but safety concerns limited some. Indoor play was allowed in most households, with variations in availability of toys. Only 38% of caregivers used rhymes/songs. A significant number (55%) of caregivers did not engage in storytelling, citing children's perceived inability to understand. Nonverbal communication, particularly eye contact, played a significant role in

caregiver-child interactions. This was also highlighted by Hess (2016) that nonverbal behavior, specifically eye contact, plays a significant role in the communication of emotions and first impressions. Grandmothers were primary caregivers after mothers; fathers' involvement was minimal. Caregivers varied greatly in effectively soothing children and understanding their needs. Rewards and positive discipline practices were inconsistent, with some caregivers using neglect as a disciplinary strategy.

Home Observations:

Less than half (40%) caregivers provided proper attention to children while being engaged in household chores. In 13.3% of households, children were completely ignored by caregivers, leading to potential risks. In 46.7% of the households, caregivers other than parents supported childcare, particularly grandparents.

Caregiver-Child Locus:

Less than half (43.3%) caregivers had a face-to-face or near position while actively engaging with children.

Play Material:

Less than half (43.3%) of households had a variety of play materials available.

Caregiver's Behavior:

A significant number of caregivers (60%) displayed positive and loving behavior towards children. Others exhibited non-responsive and sometimes harsh behavior, leading to negative child responses and reactions.

Empathize Phase**KII and FGD findings**

The Empathize phase included Key Informant Interviews (KIIs) with 18 primary and secondary caregivers of children aged 0-3 and healthcare workers from four villages of District Ghizer. Participants represented various socio-economic and multi-lingual backgrounds and included mothers, fathers, grandparents, and health workers.

During the Empathize phase, caregivers were given the opportunity to reflect on their own childhood in relation to their caregiving practices, emphasizing the importance of early childhood development and the challenges they face in providing quality care to their children. Caregivers shared joyful childhood memories and engagement in various activities, such as sports like cricket and football, as well as helping parents with household chores. They expressed that these childhood experiences played a substantial role in their holistic development.

"During childhood, I used to play football with my friends. I also used to play cricket and volleyball, but I was more interested in playing football. I also play this sport with my children. (Father)

"During childhood, I used to play cricket with my friends. I did not know how to play cricket, but I used to try and have fun. Four Square game was also one of my favorite games, it is also referred to as Topza_(Mother Immit-Mujawir).

Journey Maps

Journey maps helped researchers understand and empathize with caregivers, illustrating the time they spent with their children and highlighting their activities throughout the day. Based on the cumulative analysis of journey maps, children typically woke up at 6 am, and various caregivers, including siblings and grandparents, were involved in caregiving. Primary caregivers (mothers) spent time with children in the evening reciting poems and storytelling.

"I like it when my daughter walks, talks, and calls ammi (mother) or papa (father). If she cries while having a bath, I sing a poem to her, and she becomes cheerful." (Mother)

Mothers were primarily occupied with domestic duties throughout the day, including cooking, cleaning, childcare, collecting water and firewood, and caring for livestock. Fathers tended to spend time with their children when they were free from work. Grandparents, especially grandmothers, were more involved in child-rearing activities and provided care during the daytime.

Mothers were mostly preoccupied with domestic duties throughout the day, including cooking, cleaning, childcare, collecting water and firewood, and caring for livestock. Fathers tend to spend time with their children when they are free from work. Grandparents, especially grandmothers, were more involved in child-rearing activities and provided care during the daytime.

"The father is illiterate and works as a labor. He comes back home at 3:00 pm and spends very little time with the child. The rest of the time, he uses his mobile phone and Facebook." (Mother)

"We face many challenges while taking care of our children because they (children) fight, shout, and ask for food at any time. It is extremely difficult for us to fulfill these demands, so we offer them tea and bread. Sometimes we ask them to wait for their mothers to come back home. When their parents give them pocket money, all they want to do is go to the shop and buy junk food." (Grandparents)

Caregivers' Personas

Participants shared personal stories and experiences, highlighting unique daily routines, challenges, and experiences in taking care of their children. These stories illustrate the diverse backgrounds and circumstances of caregivers and underscore the importance of early childhood development. Pseudonyms are used for anonymity and confidentiality. These stories provide a glimpse into the daily routines and challenges faced by caregivers in various roles and settings. Everyone's experience is unique, but they all shared the common thread of caring for their families and communities.

Fatima (Mother)

Fatima is a young mother of five children, and she carries the weight of household chores and childcare responsibilities on her shoulders. Her day starts early, and she gets engaged in cooking, cleaning, and feeding her family, along with the additional task of fetching water from the river due to the lack of nearby water facilities. Fatima faces loneliness and helplessness at times,

especially when she falls behind schedule, and her mother-in-law's reactions can be harsh. Her story highlights the physical and emotional toll of caregiving in challenging conditions.

Ahmed (Father)

Ahmed is a government employee who balances his work with other responsibilities, such as farming and taking care of his children. While he has limited time for his kids due to his busy routine, he encourages their self-learning by allowing them to use cell phones for educational purposes. Ahmed's story reflects the struggle of modern parents to find a balance between work and family, relying on technology to support their children's learning.

Saima (Mother)

Saima is a homemaker with a 7-month-old son, and her day is completely occupied by household chores. She makes efforts to teach her child vocabulary, but her time with him is limited as other family members help with caregiving. Saima faces challenges when her son falls ill due to the lack of easy access to medical facilities, highlighting the need for better healthcare and early childhood development resources in her town.

Ibrahim (Grandfather)

Ibrahim, a retired army veteran, plays a supportive role in caregiving by providing financial assistance and meeting the needs of his family. He reflects on the past, emphasizing the affordability of basic needs and the importance of cultural traditions. He expresses concerns about climate-related disasters and their impact on his family's well-being.

Jabeen (Grandmother)

Jabeen looks after her grandchildren and focuses on their safety and well-being. She engages in activities with her 2-year-old grandson and tries to provide the best care despite limitations. She recognizes the importance of early childhood development in shaping a child's social and moral development.

Najma (Lady Health Worker)

Najma is a dedicated Lady Health Worker, providing essential health and awareness services to her community. The challenges she faces in her community involves, poverty, poor diet, domestic violence, and lack of support from spouses. Her job requires her to balance work and household chores, often involving travel to remote areas.

Samina (Lady Health Worker)

Samina has been a Lady Health Worker for a long time, serving her community with health-related guidance. She juggles her responsibilities as a LHW with her role as a grandmother, prioritizing community service. She encountered difficulties in raising awareness about the importance of hygiene and nutrition for children.

These stories underscore the complex and demanding roles of caregivers in different circumstances, and the need for support and resources to ensure the well-being of families and communities. The caregivers also shared problems with engaging practices, responsiveness, safety, and health and nutrition aspects of childcare. Caregivers used various methods to engage with their children, provide responsive care ensuring children's safety. Some families prioritized

homemade, fresh, and healthy food, while others face financial constraints. Harsh weather, freezing temperatures and lack of medical facilities during that time highly affected children's health. The KIs revealed that despite dedication to caregiving, caregivers face challenges in providing quality care to their children. And this sometimes resulted in feelings of guilt, being stressed, and overwhelmed due to the constant workload, economic constraints, and harsh weather conditions.

"I am worried about the future of our children because we need to provide them with good education, food, health, and a better life. I fear winter seasons as they affect the health of our children, and they get sick." (Fathers and mothers)

At the end of the understand and empathize phases, the research team identified the following How Might We (HMW) questions to inform and design the next steps of HCD.

How Might We (HMW)

- HMW engage primary caregivers to spend more time with their children?
- HMW supports caregivers in practicing Vroom messages with their children in their households (HH)?
- HMW involve fathers in caregiving practices and spend more time with their children?
- HMW support and train LHWs in disseminating Vroom messages?
- HMW informs targeted community leaders to promote and strengthen the roles of primary and secondary caregivers, ECD, and Health care providers and establish Early Childhood Development facilities where needed?
- Grounded in current experiences, HMW strengthen such types of initiatives /projects / program modalities in the future in the respective communities?

These questions formed the basis for the subsequent steps in the HCD process and brought in the idea to translate, adapt, and contextualize the Vroom tips and brainy backgrounds using this wonderful resource to promote positive parenting practices. Based on this assertion the Vroom material was contextualized and adapted and various prototypes were created and tested with primary and secondary caregivers in the target communities.

Adaptation and Contextualization of Parenting Education Material

Parenting Education Material in the form of Illustrations

Some of the Vroom tips were created as illustrations that depicted the cultural background of these communities. These illustrations were constructed based on findings from the understand phase (Home Observation) of human centered design. A picture perception activity was employed to capture the views and opinions of caregivers about the messages depicted through these illustrations during the empathize phase (Focus Group Discussions and Key Informant Interviews).

Relevant Vroom tips were adapted, translated, and contextualized. The team engaged caregivers with samples of Vroom content to understand the nature of channels, the best ways

to disseminate Vroom messages, and the level of knowledge and understanding gained by caregivers through this Vroom content.

One of the findings from the understand phase revealed that caregivers instantly connected with the illustrations, finding them to be positive, interesting, informative, and relatable to their own contexts, experiences, and household dynamics. They appreciated how the illustrations depicted positive family relationships, with parents, grandparents, and other family members involved in childcare and other activities. The illustrations helped convey the importance of family togetherness, unity, and love within the family.

Caregivers suggested that such illustrations be provided to their communities to promote understanding of positive home environments, childcare practices, and family dynamics. They also recommended adding brief text to aid in better comprehension. Some illustrations depicted negative home environments, showing children fighting, loud TV noise, parents' aggressive behaviors, shouting, untidy homes, and unsafe elements like open stoves and other hazardous materials lying around the households. Caregivers recognized these negative aspects as well and acknowledged their existence in some households, making them relatable and easy to understand.

Overall, the feedback suggested that the illustrations, translations, and content were well-received by caregivers, with some suggestions for changes. Caregivers appreciated the positive messages about family engagement, but there were a few concerns about text size, facing readability and understanding issues, which were addressed through recommendations for more accessible and concise content. The use of relatable illustrations and resources from open sources was also seen as beneficial in promoting positive family dynamics and childcare practices. The tips and brainy backgrounds were designed to be shared on WhatsApp and broadcast on local cable networks. Additionally, some prototype messages were converted into animations and videos and channeled through WhatsApp and local cable. A booklet with tips and brainy backgrounds was also developed on Canva, all in the Urdu language.

DISCUSSION

Childcare and caregiving are dynamic processes that occur within the microcosm of the extended family, involving adult members of the family. The research project aimed to understand the caregivers, their practices and adapting a parenting education program involving communities as partners. A family-centered approach for parenting education for children aged 0-3 is highly recommended, as demonstrated by the caregiving practices in the targeted communities. Barton et al. (2014) also supported a family-centered approach for the successful implementation of parenting education programs. Research literature has shown that interventions involving only primary caregivers may introduce contradictions in childcare practices and may cause disagreements, especially between mothers and mothers-in-law, as both are equally involved in childcare.

When parents have the opportunity to learn about effective child-rearing practices, it significantly influences their engagement in their children's development. Parents who are informed about positive caregiving strategies are more likely to incorporate early learning activities, create stimulating environments, and respond sensitively to their children's needs. Research shows that parenting interventions during the first three years of life are effective in improving early childhood development (ECD) outcomes and enhancing parenting practices across various income levels (Jeong et al., 2021). These interventions equip parents to better support their children's cognitive, social, and emotional growth, ultimately leading to improved developmental outcomes. Empowering parents can strengthen their role in fostering holistic child development.

Another significant finding is that parenting education should overcome gender stereotypes, particularly fathers' involvement and engagement in child-rearing. The phenomenon of 'missing fathers' was highly underscored and identified as a major cause of concern in the targeted communities. Father's inclusion is crucial; however, it will require finding ways to highlight the importance of fathers as partners, taking equal responsibility for childcare (Lamb, 2010). Fathers who engage actively and consistently with their children have been shown to contribute to a range of positive developmental outcomes (Nordahl, 2013).

This study also provided ample evidence that parenting resources from developed countries cannot be readily implemented due to sociocultural differences and the changing and differing needs of parents in Low-Middle-Income Countries (LMIC). Within a single country, different geographies also have diverse parenting requirements. This calls for a process of adaptation and contextualization of resources before their wider use. Baumann et al. (2015) and Ortiz and Vecchio (2013) underscored the importance of sociocultural adaptation for the successful design and implementation of parenting programs. In addition, cultural adaptation and contextualization involved Human Centered Design (HCD), engaging community stakeholders to reflect and ensure the resources needed for caregiving practices and the involvement of fathers in child-care interaction and engagement.

The use of communication channels, especially the Internet, is a cost-effective way to scale up parenting education; however, internet accessibility is still a significant problem in far-flung and remote areas of Pakistan. This is also true for households in rural areas and families with low incomes. A study by Jaggi et al. (2023) found that 88% of families with 0 to 2 years children in rural areas had access to the internet and smartphones. Despite that after five months of intervention, only 42% of families remained active. These are all important considerations when designing parenting education programs for target groups.

Consequently, the delivery modes for Vroom parenting resources would use a variety of formats, such as cable and WhatsApp dissemination, face-to-face sessions in Early Childhood Development (ECD) centers, household visits, and within other local bodies. A variety of materials, including posters, illustrations, animation, videos, and a booklet, are developed based on the accessibility and comprehension of caregivers.

We still need to determine the effectiveness of Vroom parenting resources on caregivers' and child developmental outcomes and intervention frequency and dosage to promote better caregiver-child engagement and compliance with the intervention. Another important concern is to ensure the scaling-up and integration of the intervention into existing systems for sustainability, and all these steps would be achieved in a stepwise process.

Conclusion and Recommendations

The study offers valuable insights into caregiving practices in Gilgit Baltistan, Pakistan. It highlights the crucial roles of primary caregivers, often mothers, in both childcare and household management. The study underscores the limited time primary caregivers have for self-care activities due to their busy routines, leading to potential stress and behavioral changes in both mothers and children. This emphasizes the need for support mechanisms and resources for primary caregivers.

In the absence of primary caregivers, secondary caregivers, including grandparents, aunts, and siblings, step in to provide care and support to children. Recognizing the roles of secondary caregivers is essential for understanding the broader caregiving network within families. The study notes that fathers are often occupied with work or other activities, resulting in limited involvement in child-responsive caregiving practices. Encouraging fathers to communicate and engage with their children is crucial for achieving a more balanced caregiving approach.

The study highlights the vital role of Lady Health Workers (LHWs) in providing awareness regarding maternal and childcare practices. Involving LHWs in disseminating information and support can be beneficial for communities due to their better understanding of local needs. Additionally, the study underscores the financial and psychosocial challenges faced by caregivers, exacerbated by frequent natural disasters and harsh weather conditions. Psychosocial effects such as distress, anxiety, depression, and social dysfunctions are prevalent, particularly in flood-affected areas. Promoting messages of care, strength, and hope can be instrumental in addressing these issues. Encouraging play-based activities with affordable or low-cost resources can also help families provide quality care to their children.

The study implications include the need for community leaders to strengthen the roles of primary and secondary caregivers, establish early childhood facilities where necessary, and motivate policymakers to provide support and monitor changes in child-rearing practices. Ultimately, the study contributes to the understanding of caregiving practices and challenges in this specific region, paving the way for tailored interventions and support to improve childcare practices and overall well-being.

Declarations

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