

Original Research

Understanding and enhancing immune resilience among children in the Southern Philippines through parental perspectives: A qualitative case study



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Abstract

Background: Children in rural communities face significant health challenges due to environmental hazards and limited access to healthcare. Understanding their immune resilience and parental perspectives is crucial for addressing health disparities in such contexts.

Objective: This research aimed to explore the immune resilience of children in Tugaya, Lanao del Sur, Philippines, and understand parental perspectives on fostering their children's health in the face of environmental challenges.

Methods: A qualitative case study approach was used. Ten parents of children aged 5-10 from two barangays were selected through purposive sampling. Data were collected from 15 January 2024 to 15 February 2024 through semi-structured interviews. Data were analyzed using a thematic analysis.

Results: Three main themes were generated: 1) Parental guardianship of children's immune resilience, 2) Parental insights on fostering immune resilience in children, and 3) Parental perception and action in nurturing children's immune resilience. These themes highlight parental roles in nurturing health, understanding immune resilience, prioritizing children's well-being, maintaining

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cleanliness, providing balanced diets, and promoting proactive and informed parenting practices.

Conclusion: It is evident that parents play a crucial role in fostering immune resilience among children by adopting various strategies. Understanding these perspectives can inform public health policies and community interventions to improve children's health in similar rural contexts. This insight has significant implications for healthcare management and policy, suggesting the need for targeted support and interventions to empower parents in rural communities to enhance their children's immune resilience.

Keywords

Philippines; parents; child; immune resilience; rural population; parenting; perception; health inequity

Background

The immune system is crucial in protecting the body from harmful pathogens and diseases. While adults may have a well-developed immune system, children are more vulnerable to illnesses due to their developing immune system ([Shimpi et al., 2023](#)). However, some children seem to have a remarkable ability to fight off diseases and maintain good health despite being exposed to various pathogens ([LoBue et al., 2023](#)).

The concept of immune resilience in children has gained increasing attention in recent years due to its potential impact on childhood health. Immune resilience refers to the ability of the immune system to respond effectively and maintain homeostasis, even in the presence of stressors or challenges ([Ahuja et al., 2023](#)). It is believed that some children have a stronger immune system than others, allowing them to resist infections and maintain good health despite being exposed to various environmental factors ([Casas, 2022](#)). Understanding the factors that contribute to immune resilience in children can have significant implications for their overall health and well-being.

Several studies have already explored the association between exposure to microorganisms and the development of immunity among children. For instance, [Riedler et al. \(2001\)](#) conducted a study in Germany examining the immune responses of rural children compared to urban children. The results suggested that the rural children who lived in environments with increased exposure to microorganisms exhibited a lower prevalence of allergic diseases, indicating a potential link between microbial exposure and immune system development. Similarly, [Mutius et al. \(2000\)](#) conducted a study in Austria and observed a contrasting pattern between children growing up on traditional farms,

characterized by close contact with animals and the outdoors, versus those growing up in urban settings. The study found that exposure to traditional farm environments was associated with reduced asthma and allergy rates, further supporting the Hygiene Hypothesis (Strachan, 2000).

While these studies have shed light on the influence of microorganism exposure on immune development, there is still limited data on this topic, specifically within the context of children in the Southern Philippines. This region presents a unique setting with distinct cultural and environmental factors that may contribute to different immune responses among children exposed to microorganisms. Additionally, despite the growing interest in immune resilience, there is still limited research on this topic, particularly from a qualitative perspective.

This qualitative study aims to explore the concept of immune resilience in children through the perspective of their parents. The study seeks to unravel the natural defenses of children by understanding the experiences and perceptions of parents regarding the immune resilience of their children. By exploring the experiences and perceptions of parents, who play a crucial role in shaping their children's health behaviors and practices, this study aims to provide insights into the protective and risk factors that influence the immune resilience of children in Tugaya. This research is significant as it can inform the development of targeted interventions and policies that promote the well-being and health of children in this community and similar settings. Furthermore, the findings of this study may contribute to the existing literature on the immune resilience of children in resource-poor and conflict-affected settings, thereby adding to the body of knowledge on this important topic.

Methods

Study Design

This study utilized a qualitative case study approach to explore the dynamics of immune resilience among children, recognizing its efficacy in unraveling complex real-world phenomena. This design aligns with a constructivist paradigm, where the emphasis is on understanding social phenomena from the perspective of those involved (Creswell, 2014). By employing this approach, the researcher aimed to gain an in-depth understanding of the immune resilience of children in Southern Philippines. This methodological choice also allowed for a nuanced examination of the phenomenon from various angles, capturing the richness and complexity of the participants' experiences and perspectives. Moreover, it provided flexibility in data collection and analysis, enabling the

researcher to make adjustments as necessary to ensure the research was relevant and meaningful to the participants.

Participants

The participants of this study comprised parents residing in Barangay Dilimbayan and Barangay Kuta in the Municipality of Tugaya, Lanao del Sur, Philippines. These parents were identified as the primary caregivers and decision-makers regarding their children's health and well-being, thus possessing valuable insights into their children's overall wellness. Participants were approached through a combination of face-to-face interactions and telephone calls. Initial contact was made in person within the community, where the researchers introduced the study's objectives and sought participants' willingness to contribute insights on immune resilience. Through purposive sampling technique, ten parents from Barangay Dilimbayan and Kuta were chosen, considering their children's ages (5-10 years) and willingness to contribute insights on immune resilience. Selection from specific barangays ensured geographic diversity within Tugaya, while diverse demographics enhanced the comprehensiveness of data. Among the approached participants, all demonstrated a willingness to participate.

Data Collection

This study utilized semi-structured interviews as the primary research instrument to explore parental perspectives on immune resilience. An interview guide was crafted to facilitate comprehensive discussions with parents, allowing them to share their insights and experiences. The interview guide was piloted before implementation, ensuring its effectiveness in eliciting relevant responses. Additionally, the guide incorporated prompts and probes to encourage detailed elaborations from participants.

The data collection followed a systematic and ethical approach, ensuring attention to detail and participant confidentiality. Data were collected primarily in the participants' homes in Barangay Dilimbayan and Barangay Kuta within the Municipality of Tugaya, Lanao del Sur. Data were collected from 15 January 2024 to 15 February 2024. Throughout the data collection process, only participants and researchers were present. However, in some instances, other family members or individuals may have been present in the household during interviews. Efforts were made to minimize potential distractions and ensure privacy and confidentiality during data collection sessions. The average of the interviews lasted between 20 to 30 minutes.

Prior to the study's commencement, the researchers established a relationship with relevant authorities in the Municipality of Tugaya to garner support and facilitate smooth data collection procedures. Additionally, characteristics of the interviewer/facilitator, such as potential biases, assumptions, and reasons for and interests in the research topic, were disclosed to participants to foster transparency and trust in the data collection process.

A combination of methods, including in-depth interviews and observations, was employed to gather data. Participants were contacted beforehand, and their consent was obtained to participate in the study. Observation of children's daily routines and behaviors supplemented data collection to gain insights into their environment and its potential influence on immune resilience.

Data Analysis

All data collected, including interviews and observational notes, were recorded and transcribed for analysis. Field notes were taken to capture additional observations or insights. This study employed a meticulous approach to data analysis, involving multiple coders to ensure accuracy and reliability. A total of 4 data coders were involved in the coding process, enhancing the robustness of the analysis (Creswell & Poth, 2016). The coding tree utilized in this study was comprehensive and meticulously designed to capture the diverse nuances of children's immune resilience (Creswell & Poth, 2016). It encompassed a range of thematic categories, allowing for a thorough exploration of parental perspectives and experiences. NVivo was employed to manage the data effectively, facilitating the organization, coding, and retrieval of data. This software enhanced efficiency and accuracy in data management, ensuring that the analytical process remained systematic and well-structured.

Themes were primarily derived from the data through an inductive approach, allowing for the emergence of patterns and insights organically from the participants' narratives. While certain themes may have been identified in advance based on existing literature and research objectives, the majority of themes arose from the data itself, reflecting the richness and complexity of parental perspectives on immune resilience.

Trustworthiness

To ensure the trustworthiness of this study, an audit trail was conducted throughout the research process. This included keeping thorough field notes, audio recordings, and transcripts of interviews.

Ethical Considerations

This qualitative case study rigorously adhered to ethical guidelines to safeguard the rights and well-being of research participants. Prior to commencement, permissions were sought from the Tugaya Municipal Health Office (TMHO), and ethical clearance was obtained from the College of Health Sciences Research Ethics Committee with certificate number CREC 2024-01 on 13 January 2024. The informed consent process ensured participants' voluntary involvement, with measures taken to ensure comprehension. Confidentiality and anonymity of participants were strictly maintained throughout the data collection process, and data were securely stored and utilized solely for the purpose of the study.

Results

The ten participants in this study came from diverse backgrounds and socio-economic situations. Each participant shares unique insights into their experiences and perspectives on children's immune resilience (Table 1).

Table 1 Characteristics of the key participants

Participant	Background	Number of Children	Children's Vaccination Status	Household Description
Nairah	Meranao	4	Two children aged 3 and 1 not fully vaccinated; other children also not vaccinated since birth	One-story house made of wood and bamboo, three meals a day
Hidaya	Meranao	5	None fully vaccinated	One-story house made of plywood and bamboo, three meals a day
Hima	Meranao	2	Both aged 4 and 2 were not fully vaccinated	One-story wooden house, three meals a day
Fida	Meranao	3	None vaccinated since birth	One-story house made of bamboo and wood, three meals a day
Lyn	Meranao	3	Two children aged 2 and 4 were not vaccinated	One-story wooden house, three meals a day
Aisha	Meranao	4	One child aged 3 was partially vaccinated; others were not vaccinated	One-story house made of concrete and wood, two meals a day
Zaina	Meranao	2	Both children aged 5 and 3 were not vaccinated	One-story bamboo house, three meals a day
Fatima	Meranao	5	Three children were partially vaccinated; two were not vaccinated	Two-story house made of wood, three meals a day
Mariam	Meranao	1	Not vaccinated	One-story house made of wood and bamboo, three meals a day
Amina	Meranao	3	One child aged 6 fully vaccinated; two not vaccinated	One-story wooden house, three meals a day

To protect the privacy and confidentiality of our participants, we used pseudonyms or fictitious names in our documentation and reporting, which was in line with ethical research guidelines. None of the names used in our reports correspond to the participants' real names.

Three main themes were generated: 1) Parental Guardianship of Children's Immune Resilience, 2) Parental Insights on Fostering Immune Resilience in Children, and 3) Parental Perception and Action in Nurturing Children's Immune Resilience. These themes encapsulate the essence of parental perspectives and practices, providing valuable insights into the complex interplay of factors that shape children's immune resilience.

Theme 1: Parental Guardianship of Children's Immune Resilience

This theme highlights the importance of parental guidance in empowering children to face various health challenges and adapt to their environment, ultimately safeguarding their future health and quality of life. This theme is further elaborated through three sub-themes: Nurturing Health, Adaptive Shield, and Parental Priorities.

Sub-theme 1.1: Nurturing Health - Parents' role in fostering children's immune resilience

The findings from the study reveal that parents play a crucial role in nurturing the health and fostering the immune resilience of their children aged 5-10 years. The participants shared their perspectives on what immune resilience means to them as parents, highlighting the importance of caring for their children's health from a young age to prevent illnesses and ensure their well-being.

"For me, that's how we take care of our children since they were babies so that we can see the state of their health and their bodies for us to observe if they are always sick." - Nairah

The statement reflects the emotional and psychological impact of seeing their children suffer from illnesses, with parents willing to bear the suffering themselves if it meant keeping their children healthy.

"That's really important; no parent wants to see their child get sick; if I could only acquire their sickness for them not to suffer. It's like all problems are thrown at me when one of them is sick." - Hima

Parents also expressed their concerns about the high cost and difficulty of accessing healthcare services, underscoring the importance of maintaining their children's health to avoid the burden of illness. The lack of access to healthcare services and the financial constraints faced by these families have forced them to rely on natural defenses and preventive measures to keep their children healthy.

"The strong resistance of our children is important to us because no parent wants to make their children feel the suffering. Nowadays, it is expensive and difficult to go to hospital." - Zaina

In the case of the parents, their strong emphasis on nurturing their children's health and promoting immune resilience can be attributed to their perceived susceptibility to illnesses and their belief in the severity of the consequences of poor health. The parents view their actions as effective in protecting their children from diseases and believe that the benefits of maintaining good health outweigh any potential barriers. As a result, they are motivated to take proactive steps to ensure the well-being and immunity of their children.

Sub-theme 1.2: Adaptive Shield - Parental understanding of immune resilience as a self-defense mechanism against diseases

The Adaptive Shield sub-theme underscores the importance of exposing children to germs and microbes to help train their immune systems to recognize and fight potential threats. Parents can support their children's immune resilience by encouraging outdoor play, fostering social interactions, and allowing for controlled exposure to pathogens to help build their immunity. Parents in the study perceived immune resilience as an adaptive shield that enables children to cope with various health challenges, including infections and allergies. They emphasized the importance of developing a robust immune system to protect their children from potential environmental health risks.

Hima stated that immune resilience is the strength of the body used to fight various diseases:

"For me, this is the strength of the body that is used to fight various diseases"- Hima

Another participant, Lyn, believed that a strong immune system prevents children from getting sick:

"The child's strong immune system helps prevent them from getting sick. They are always outside, but I never see that they are always sick"- Lyn

Fatima expressed her belief that exposure to the environment helps her children build immunity without causing significant harm:

"I think it (being exposed) helps my children. It's not that I'm neglecting them, but that's the only thing I think will help them. I can see that they don't hurt you that much."- Fatima

In this study, parents deeply understood immune resilience as a self-defense mechanism against diseases. They described immune resilience as the body's ability to fight various diseases and highlighted the importance of developing a strong immune system in children. Parents believe that a robust immune system enables children to cope with health challenges, including infections and allergies, and keeps them healthy even when exposed to environmental risks. By encouraging their children to play outside and interact with their environment, parents in Tugaya may inadvertently promote the development of a more robust immune response in their children.

Sub-theme 1.3: Parental Priorities - Safeguarding children's health and well-being through immune resilience

Parental priorities emphasize the need for parents to prioritize their children's health and well-being above all else. By making informed decisions about vaccination, medical interventions, and lifestyle choices, parents can protect their children from diseases and provide them with the best possible chance at a healthy and resilient immune system. The participants' statements showed parental vigilance and dedication to safeguarding their children against illnesses and ensuring their general welfare. Their convictions were apparent in their declarations:

"I can take care of them to avoid diseases that destroy them"- Hima

"It is important, especially here, that the environment is not very clean"- Lyn

The parents' dedication to their children's health was further underscored by statements like *"I focus on them and feed them all the time,"* indicating a strong commitment to providing for their children's physical needs. The following are direct quotes from the participants:

"Yes, of course, when I focus on them that by the mercy of the Lord, they don't always get sick."- Hima

*"As long as I'm always at home, there's no need to balance because I focus on them and feed them all the time"-
Hidaya*

Moreover, the parents emphasized the role of nurturing and caring for their children to promote immune resilience. The following statement highlights the parents' belief in the interconnectedness of parental care, children's self-care practices, and overall health outcomes.

"I think it helps my children. It's not that I'm neglecting them, but that's the only thing I think will help them. I can see that they don't hurt you that much" - Nairah

Parents recognize the importance of immune resilience in protecting their children's health, particularly in an environment where cleanliness may be challenging. Their actions and beliefs also reflect the health belief model, which emphasizes the role of individual beliefs and attitudes in shaping health behaviors. Parents play a crucial role in enhancing their children's immune resilience by creating a healthy environment, providing for their children's needs, and nurturing them with care and attention.

Theme 2: Parental Insights on Fostering Immune Resilience in Children

Parental insights play a crucial role in nurturing and safeguarding the health and well-being of their children. In the context of Understanding and Enhancing

Immune Resilience Among Children through Parental Perspectives, this section delves into various sub-themes that highlight the diverse approaches parents employ to foster immune resilience in their children. These sub-themes include the Nutritional Shield and Holistic Health Development, both of which emphasize the importance of parental guidance in promoting a robust immune system.

Sub-theme 2.1: Nutritional Shield - The Synergy between Hygiene and a Balanced Diet in Enhancing Children's Immune Resilience

Parents in the study emphasized the importance of combining the nutritional aspects with hygiene practices to create a "nutritional shield" that protects their children from illnesses.

Participants shared their perspectives on the role of nutrition and hygiene in enhancing immune resilience. Nairah stated that feeding children healthy foods, such as vegetables and fruits, and cleaning them is essential due to the unclean environment and children's outdoor activities.

"Feeding them healthy foods such as vegetables and fruits... Of course, with washing and cleaning them. Just like here that our environment is not very clean and the children are always outside, cleaning is really necessary" - Nairah

Hima believed that feeding nutritious food and maintaining cleanliness helps develop a strong immune system:

"like feeding them nutritious food and cleaning helps their strong immune system" - Hima

Hidaya emphasized the importance of proper eating and cleaning for resistance-building:

"As long as they can eat properly three times a day, it helps. And that they clean properly and that helps their resistance" - Hidaya

Aisha highlighted the connection between a balanced diet, hygiene, and preventing common illnesses in children:

"When we make sure they eat healthy food and keep them clean, it really helps in preventing the common illnesses they usually get." - Aisha

Sub-theme 2.2: Holistic Health Development - The role of parental guidance in combining nurturing, discipline, and immune resilience promotion

The Holistic Health Development sub-theme emphasizes the comprehensive approach parents adopt to nurture their children's immune resilience. Parents recognize the importance of providing a supportive environment that encompasses nurturing, discipline, and immune resilience promotion. This sub-theme highlights the role of parental guidance in fostering a harmonious balance of these elements, ultimately contributing to the overall well-being and immune resilience of their children.

The parental perspectives gathered in this study revealed a strong emphasis on holistic health development's importance in enhancing children's immune resilience. The sub-theme of holistic health development specifically focused on the role of parental guidance in combining nurturing, discipline, and immune resilience promotion. The parents highlighted the practices they have adopted to ensure the overall well-being of their children, including cleanliness, proper nutrition, and physical exercise.

Hidaya emphasized the significance of cleanliness in preventing diseases, drawing a parallel between cleaning the body and maintaining immune resilience. She mentioned that she makes sure to clean her children properly in the morning and before they go to bed, especially after playing outside. This practice strongly believes in the correlation between cleanliness and immune health.

"It's just like when there's too much dirt on their bodies when they play outside, it's really necessary to clean them properly because sometimes different diseases come from them. Because I have time to clean them like in the morning and before they go to bed" - Hidaya

Similarly, Hima underscored the importance of regular bathing and cleanliness in promoting immune resilience. She mentioned that she bathed her children in the morning and at night and emphasized proper nutrition's role in maintaining their resistance to illnesses. This highlights the understanding of parents in Tugaya regarding the crucial role of hygiene and nutrition in enhancing immune resilience among children.

"When they are always clean, it's because I clean them morning and night, and only when the weather is good do I always give them a bath. And if they are well and properly fed, that is what helps their resistance" - Hima

Amina and Zaina also emphasized the importance of maintaining good health and physique to prevent frequent illnesses. They echoed the sentiment that proper nutrition, cleanliness, and physical well-being are essential to promote immune resilience. Their perspectives align with existing literature that suggests a strong link between overall health and immune function in children.

"So that they don't always get sick, their good physique or health should be maintained" - Amina

"It's important for parents to teach their children good hygiene and eating habits early on. This way, they grow up knowing how to take care of themselves and stay healthy" - Zaina

Theme 3: Parental Perception and Action in Nurturing Children's Immune Resilience

Proactive Parenting delves into the significance of healthy habits and hands-on monitoring in parents' efforts to enhance their children's immune resilience. Informed Guardianship, on the other hand, examines the diverse strategies employed by parents to ensure their children's well-being.

Sub-theme 3.1: Proactive Parenting - The significance of healthy habits and hands-on monitoring in parents' efforts to enhance their children's immune resilience

Proactive Parenting emphasizes the importance of healthy habits and hands-on monitoring in parents' endeavors to strengthen their children's immune resilience. By understanding the role of these practices, we can appreciate how parents actively contribute to their children's health and well-being.

The qualitative data collected from the parents revealed the importance of proactive parenting in enhancing children's immune resilience. The parents emphasized the significance of healthy habits, such as feeding their children nutritious food, particularly vegetables, and ensuring proper hygiene through regular cleaning. The quotes from the participants demonstrate a strong belief in the connection between these habits and their children's immune resilience.

Lyn mentioned that feeding her children vegetables strengthens their immunity, while Fida noted that her children's self-cleaning habits help them avoid diseases. Hima believes cleaning removes dirt and contributes to a good night's sleep, benefiting the children's health. Nairah and Hidayah both emphasized the role of proper cleaning in boosting immunity, especially during disease outbreaks.

"Feeding them properly, like vegetables, makes their immunity stronger. In terms of their cleaning, they always do that. Sometimes, they even remind me that they will clean. In the morning, they take a bath, and in the evening, they take a half-bath. I think that helps her" - Lyn

"Yes, because now, even if you don't instruct them, they clean themselves. They have trained themselves in these tasks when cleaning morning and night. At least that will help them to avoid diseases"- Fida

"That's when they clean; the dirt is removed from their body. So that when they go to sleep, they are clean and feel good. As for eating vegetables, it really helps their health" - Hima

"Just like feeding them nutritious food and cleaning helps their strong immune system"- Fatima

"That helps to boost their immunity when they are cleaned properly. Especially when diseases are spreading, they need to be cleaned"- Mariam

The parents' proactive approach to parenting reflects their awareness of the crucial role that healthy habits play in enhancing immune resilience among children. By instilling these habits in their children from a young age, the parents are equipping them with the tools they need to maintain a strong immune system and stay healthier in the long run. The parents' efforts to monitor and encourage their children to adopt these habits demonstrate their commitment to promoting their children's overall well-being and resilience against illnesses.

Moreover, the parents' perspectives highlight the importance of parental involvement in nurturing immune resilience among children. Their experiences and beliefs testify to parents' significant role in shaping their children's health outcomes. This finding emphasizes the need for community-based interventions

and educational programs that empower parents to adopt and promote healthy habits for their children.

Sub-theme 3.2: Informed Guardianship - Understanding the diverse strategies employed by parents to promote their children's immune resilience through daily practices and vigilance

Informed Guardianship highlights the diverse strategies employed by parents to ensure their children's immune resilience. This sub-theme explores the range of approaches parents adopt, showcasing their adaptability and commitment to their children's overall health. Together, these sub-themes provide a comprehensive understanding of how parents actively shape and support their children's immune resilience through their perceptions and actions.

The parental perspectives gathered from the interviews reveal various strategies parents employ to promote their children's immune resilience. The sub-theme of Informed Guardianship emerged as a core aspect of these strategies, highlighting the importance of knowledge, practices, and vigilance in maintaining the health and well-being of children in the community.

The parents demonstrated informed guardianship by employing various strategies to promote their children's immune resilience. The interviews with the participants shed light on the daily practices seen as crucial in enhancing immune resilience among children. Common practices mentioned by the parents include cleaning children with a fever, feeding them nutritious food, maintaining cleanliness, and limiting their exposure to potentially harmful environments. These practices are perceived to strengthen children's resistance to diseases, with a particular emphasis on the role of proper nutrition and hygiene.

Aisha mentioned that she takes care of her children when they have a fever:

"When they have a fever, I rub or clean them to make them feel better" – Aisha

While Fatima believes that feeding her children properly and cleaning them regularly helps strengthen their resistance despite the fact that they do not take vitamins:

"It's like my children, even the little ones, don't have vitamins. As far as I know, what helps them is feeding them properly and cleaning them regularly, which helps to strengthen their resistance. Children get used to it too" – Fatima

Hima emphasized the importance of focusing on feeding and cleaning her children to protect them from diseases and enhance their resistance:

"Just like I said earlier, I clean them morning and night and focus on feeding them. When I take care of them properly, it helps to protect them from diseases and strengthen their resistance" - Hima

Fida highlighted the significance of instructing her children to maintain proper hygiene and eat nutritious food:

"The times when I would instruct them to clean and feed them properly" - Fida

Zaina pointed out the balance between allowing children to play outdoors and ensuring they are clean to avoid diseases:

"Feeding them well always. Besides, it's also inevitable that they're always outside because that's their only hobby, so I always clean them so they don't get diseases - Zaina

Amina also expressed her concern about finding medical care for her children in the area:

"That's what keeps cleaning the child and feeding it nutritious food. These children are not always taken to health centers" - Amina

The parents recognized the importance of creating a safe and healthy environment for their children, as highlighted by Hima's concern about finding medicine for her sick children.

"I don't have a job. I'm always at home, and I take care of them. I can take care of them to avoid diseases that destroy them. When they get sick, I have a problem; where can I find medicine for them?" - Hima

The findings reveal that parents employ diverse strategies to promote their children's immune resilience. These strategies reflect their understanding of the importance of daily practices and vigilance in maintaining their children's health. These findings suggest that parents prioritize proactive measures in promoting immune resilience among their children, emphasizing preventative strategies. The focus on daily practices such as cleaning, feeding, and monitoring children's health reflects a belief in the importance of maintaining a strong immune system through consistent care and vigilance.

Additionally, the challenges faced by parents, such as limited access to healthcare resources and concerns about environmental cleanliness, further underscore the significance of informed guardianship in protecting children's health. Parents play a critical role in safeguarding their children's well-being without readily available medical services, highlighting the need for proactive measures to prevent illnesses and strengthen immune resilience.

Discussion

This qualitative study provides valuable insights into parental perspectives on immune resilience and strategies to promote children's health and well-being in Tugaya, Lanao del Sur.

One key finding of the study is the prevalence of suboptimal hygiene practices among families in Tugaya. Many parents reported a lack of access to clean water and adequate sanitation facilities, which can contribute to an increased risk of infections and weaken immune resilience in children. This aligns with the hygiene theory (Strachan, 2000), which suggests that exposure to microbes is

essential for the development of a strong immune system. Improving hygiene practices in the community, such as promoting handwashing and ensuring access to clean water, could help enhance immune resilience among children.

The participants' responses suggest that immune resilience is a priority for parents as they strive to provide a healthy environment for their children to thrive. Research has shown that parental involvement in promoting children's health and well-being significantly contributes to their immune resilience (Patrick et al., 2012). By focusing on preventive measures and maintaining good hygiene practices, parents can help boost their children's immunity and reduce the risk of infections (Leung et al., 2023).

The concept of immune resilience, as highlighted by the parents in the study, aligns with the Hygiene Hypothesis. According to this hypothesis, early exposure to microbes and infectious agents may be crucial in developing a strong and robust immune system in children (Strachan, 2000). Parents can potentially enhance their immune resilience and reduce their susceptibility to illnesses by nurturing their children's health and promoting good hygiene practices. The parents' beliefs and practices protect their children, shielding them from the harmful effects of pathogens and promoting their overall health and well-being. Rezk (2023) states that a balanced diet rich in fruits and vegetables is essential for supporting a child's immune system. The study found that micronutrients in these foods play a crucial role in strengthening immune response. Additionally, a study by Poczai and Karvalics (2022) highlighted the importance of good hygiene practices in preventing the spread of infectious diseases. Proper cleaning and washing can help reduce the risk of illness and maintain overall health.

Additionally, the study found that parents' health beliefs play a significant role in determining the health outcomes of their children. Parents who held beliefs that aligned with the Health Belief Model (Rosenstock et al., 1988), such as the perceived susceptibility of their children to illnesses and the perceived benefits of prevention measures, were more likely to take proactive steps to protect their children's health. This highlights the importance of health education and promotion in instilling positive health beliefs among parents, which can, in turn, enhance immune resilience among children.

The parents' perspectives align with existing research on the link between healthy habits and immune resilience in children. A study has shown that a balanced diet rich in nutrients, such as fruits and vegetables, can support a healthy immune system and reduce the risk of infections and illnesses (Gombart et al., 2020). Additionally, practicing good hygiene, including regular handwashing and cleaning routines, can help prevent the spread of germs and pathogens that can compromise the immune system.

There is additional evidence to support the conclusions drawn in this research, which indicate that the immune resilience of children is significantly influenced by healthy behaviors such as adhering to proper hygiene practices and consuming a well-balanced diet (Yuniwati & Fithriany, 2022). Parents who proactively supervise and promote these behaviors positively contribute to their children's holistic health and welfare. Active involvement in their children's daily routines and encouraging healthy habits constituted proactive parenting on the part of the parents.

Implications for Healthcare Policy and Management

The findings of this study underscore the imperative for targeted interventions to bolster immune resilience among children in rural communities like Tugaya. Healthcare management initiatives should prioritize promoting access to clean water and sanitation facilities alongside advocating healthy dietary practices and hygiene habits. Policy interventions should focus on enhancing infrastructure and resource allocation to support these initiatives, fostering a conducive environment for children's health and well-being.

Further research could delve deeper into the specific dietary patterns and hygiene practices these parents employ in Tugaya. By examining these practices, researchers can better understand their impact on immune resilience and overall health outcomes. This knowledge can be utilized to develop targeted interventions and educational programs that empower parents to adopt and promote these healthy habits for their children. Moreover, future studies could explore the cultural, socio-economic, and environmental factors influencing parents' perceptions and practices related to children's immune resilience. This information can help tailor community-based interventions and policies to address better the unique needs and challenges faced by families in Tugaya and similar communities.

Limitations

Despite its contributions, this study is not without limitations. The sample size and scope were confined to a specific geographic area, potentially limiting the generalizability of findings. Future research endeavors could adopt a broader geographical scope and incorporate diverse demographic factors to enrich the understanding immune resilience dynamics.

Conclusion

The study's findings highlight the significance of Parental Guardianship, Parental Insights, and Parental Perception and Action in nurturing children's

immune resilience. Parents understand the importance of hygiene as a preventive measure against diseases. They also recognize the synergy between hygiene and a balanced diet in enhancing immune resilience, emphasizing the significance of nutrition in strengthening the immune system. Parental actions demonstrate proactive parenting and informed guardianship, emphasizing personal responsibility for health. The study also reveals the importance of community support in fostering health and well-being, as parents in Tugaya, Lanao del Sur, employ diverse strategies to support their children's immune resilience through daily practices and vigilance. Overall, the study's themes underscore the crucial role of parents in promoting immune resilience among children and the significance of hygiene, nutrition, and community support in this process.

Declaration of Conflicting Interest

The authors declared no conflict of interest in this study.

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Authors' Contributions

Arafat S. H. Noor, as the main researcher, played a pivotal role in conceptualizing and gathering data for the research. His contributions likely involved designing the research framework, formulating research questions, and overseeing data collection methods.

Saima S. Hadji Malic, as the main researcher, significantly contributed to the research by providing expertise in healthcare management and facilitating data collection efforts.

Ashley A. Bangcola contributed to the research by providing expertise in data analysis and being involved in applying methods to analyze the gathered data. Additionally, she assisted in interpreting the findings and drawing meaningful conclusions from the data analysis.

Monalinda M. Macawadib played a significant role in the research by assisting in the analysis of the gathered data and contributed to ensuring the accuracy and reliability of the data analysis process.

Norhanie A. Ali contributed to the research by providing valuable support in analyzing the gathered data and being involved in conducting data analysis, qualitative coding, or other data processing methods.

Alibasher D. Macalnas played an integral role in the research by assisting in the analysis of the gathered data and contributed to ensuring the robustness and reliability of the data analysis process.

All authors are responsible for each step of the study and approve the final version to be published.

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Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declaration of the Use of AI in Scientific Writing

We, the authors, hereby disclose the utilization of ChatGPT (<https://chat.openai.com/>) to enhance the tone and style of our manuscript. In March 2024, we employed ChatGPT to proofread our work comprehensively. Specifically, we instructed the AI to identify typos, grammatical errors, passive voice constructions, repeated phrases, and unnecessary adverbs within our manuscript. The resulting output was subsequently refined to align more closely with our intended writing style.

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