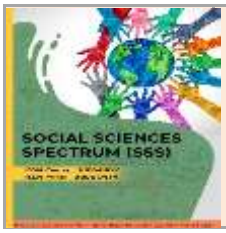

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Drought and Survival: A Systematic Exploration and Ethnographic Analysis of Childhood Stunting in Chagai, Baluchistan

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Abstract

A systematic and ethnographic analysis of national, regional, and international literature was undertaken from peer-reviewed databases for 2019-2025. The study combines regional data and peer-reviewed literature findings to calculate and examine how extended water scarcity affects the nutritional status leading to malnutrition. Ethnographic analysis revealed that in Chagai, one of the hardest-hit districts, prolonged drought has exacerbated malnutrition, with stunting emerging as a major public health crisis. Various socio-cultural factors made the region more vulnerable and increased the disparities. The qualitative insight indicates how the diminished crop impacts the availability of nutrient-rich food to families. And how the impacts are constructed and perceived at sociocultural levels. However, comparing Chagai's crisis with similar drought-affected regions also revealed that reduced water access, poor dietary diversity, and maternal malnutrition are key contributors to childhood stunting. The findings from systematic analysis and ethnography indicated that the lack of dietary diversity further increased micronutrient deficiencies, including multivitamins, iron and zinc, and calcium essential for child growth. These factors also permeated the social fabric contributing to weakened immunity and delayed development. Vulnerable populations, including nomadic communities, face complex challenges. The study therefore assesses the critical need for targeted nutrition interventions and drought-resilient agricultural practices.

Keywords: Malnutrition, Drought, Food insecurity, Baluchistan, Stunting, Sociocultural, Ethnographic.

1. Introduction

Baluchistan is divided into uplands in its northeast, plains, deserts, and coastal lines and the extreme climate and diverse geography led to a scattered population in the province. Chagai is the one of the largest districts of Pakistan by area located in north-western Baluchistan. Although the number of stunted children in this region has reduced, this still contributes to a high prevalence of stunting, which is 31.7%, higher than the global average of 21.3% (Azirani, 2024). Agriculture in Pakistan relies mostly on rainfall especially in Balochistan as most parts experience a dry climate (Rafiq et al, 2024). This country is vulnerable to droughts as out of every 10 years, droughts have occurred four times in Pakistan. Baluchistan due to its arid climate is most vulnerable to drought hazards, where 85% of the population relies on agriculture for their livelihood (Ali, 2021).

Baluchistan, Pakistan's largest and drought-prone province, faces chronic water scarcity and food insecurity, severely affecting child health. In Chagai district—one of Pakistan's most drought-prone regions—is characterized by factors including agricultural collapse, and socio-economic disparities. However, the reports also indicated that it has average rainfall of <50mm/year as extreme aridity. Malnutrition is the greatest public health issue globally. 165 million malnourished children under 5 years are affected globally (Katoch, 2022). Malnutrition accounts for half of deaths in children worldwide (Shahid et al., 2022). Child malnutrition is a problem in only underdeveloped and developing countries. According to Ali (2021) on his study on malnutrition in Pakistani Children and what needs to be done, he revealed that Pakistan is a developing country with the second-highest infant and child mortality rate in South Asia. Child stunting is a global public health issue, which is characterised by poor physical and cognitive development. Child stunting occurs due to inadequate nutrition during the first 1000 days of life; from conception to two years of life as predicted by the Nutritional Survey of UNICEF (2019), these children face difficulties and disadvantages in schooling, careers, and the ability to contribute to their communities.

Figure 1: *Google Map - Chagai District (20250)*

According to the key findings of UNICEF/WHO/World Bank Group joint child malnutrition 2023, nearly 150 million children under five experienced stunting worldwide in 2020 (UNICEF, 2018). Stunting is characterized by impaired linear growth caused by chronic malnutrition from early life. Children whose height for the age z-scores was less than -2SD (standard deviation) of the World

Health Organization (WHO) Child Growth Standard median are considered to be stunted (Soofi et al., 2023). The South Asia region comprises seven countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka). Pakistan has the second highest prevalence of stunting, while Afghanistan has the highest. This has caused economic inequality and persistent poverty in many countries in the region. Limited access to adequate healthcare and nutritious food results in a high risk of stunting among children under five in the region (Azizani, 2024). Stunting is a major problem in Pakistan, with 12 million children of low height for age. According to the National Nutrition Survey (NNS) 2018, the national average is 40.2%, indicating chronic malnutrition (UNICEF , 2018). The results mask provincial disparities. The prevalence of stunting varies from 32.6% in ICT to 46.6% in Baluchistan. This figure represents a slight decrease from the 43.7% reported in the 2011 survey. The prevalence of stunting among young children in Baluchistan, Sindh, KPK and GB is higher than the national average. At 40.2% it remains at a critical level (UNICEF Report, 2018). The Contemporary estimates propose malnutrition costs Pakistan 3% of its GDP annually (USD 7.6 billion), with Baluchistan being the prone in which over 40% of children under five are stunted (UNICEF 2018; SMART Survey 2023). Yet, the precise pathways linking drought severity, household food access, and intergenerational malnutrition remain understudied, particularly in marginalized agro-pastoralist communities like Chagai.

1.2. Research Questions of the Study

How does drought-induced agricultural losses and water scarcity influenced the variations in child stunting across Chagai?

What socio-cultural factors—particularly gender norms and maternal malnutrition play in malnutrition and drought in Chagai

The findings will inform targeted interventions, leading from the climate-smart agriculture to gender-responsive nutrition programs. It challenges the deterministic narratives of Baluchistan's "inevitable" deprivation through grounded ethnographic findings.

2. Methodology

The study employs a mixed-methods approach to explore these dynamics. Firstly, the systematic review combines nutrition surveys, and policy reports to quantify the climate-malnutrition indicators and longitudinal data (2019–2025) on drought indicators such as the UNICEF report on Chagai district. Secondly, ethnographic fieldwork has documented the lived experiences which included maternal health barriers, gendered feeding practices which has been often overlooked in top-down analyses. The ethnographic analysis contains three months of fieldwork in the villages of Chagai District that are selected for stunting prevalence and the drought exposure and. The methods include 15 in-depth interviews with mothers, grandmothers, and local healers, participant observation, and gender-segregated focus groups to study the cultural norms. Data has been coded thematically to categorise the patterns, such as the role of traditional foods and male-preference in food distribution. The two methods are incorporated through triangulation comparing, for instance, numerical findings on livestock drop with ethnographic narratives. The Ethical consent prefer the oral consent which is essential for non-literate participants), community reciprocity and anonymization. By bringing the lived experience with environmental data, this approach covers not just how drought has been the driving factor for stunting, but also to account for the reasons how some households perceive to its effects.

3. Analysis and Finding

According to IPC Acute Malnutrition Analysis May – November 2019, acute malnutrition affects around 0.4 million children who are under the age of 5, more than half of all children aged 6-59 months in the 14 drought-affected districts of Baluchistan, making it a major public health problem in these districts as revealed by the study on Malnutrition in Kohulu district (Marri, 2022). It is often predicted that socioeconomic, economic, and household dietary factors are the underlying causes of stunting in Southeast Asia (Azriani et al., 2024). These factors are interrelated and affect each other. Underlying causes of stunting include lack of access to adequate health information, exposure to an unhealthy environment, and increased risk of infection (Azriani et al., 2024). Therefore, the study aims to have an insight. A child's health is affected by many conditions including fevers, infections, dental caries, and digestive disorders like diarrhea (Wicaksono et al., 2021; Haq et al., 2024). Household and environmental factors influence these conditions, including access to sanitation, clean water, and hygiene habits (Vaivada et al., 2020; Mehmood & Arshad, 2024). Child health is also associated with access to health facilities, including immunization status, mid-upper arm circumference (MUAC), iodized salt use, vitamin A consumption, and multivitamin use (Sari, 2022; Siddiqa et al., 2023). Dietary diversity plays an important role in growth and development, reflecting the intake of essential macronutrients and micronutrients (Sianti et al., 2024). Breast milk is optimal for infant digestion, with exclusive breastfeeding for the first six months providing adequate calories for growth requirements (Hadi et al., 2021). Many studies show that non-exclusively breastfed toddlers have higher stunting risk (Hadi et al., 2021; Marlina et al., 2022). According to the Pakistan Bureau of Statistics, Chagai District spans approximately 44,748 km² (Google Maps, 2019). Balochistan, Pakistan's largest and most drought-prone province, faces chronic water scarcity and food insecurity that severely affect child health (Rafiq et al., 2024; Gul et al., 2022). Stunting is influenced by food consumption, infectious diseases, food availability, cultural practices, and socioeconomic and political factors (Raj et al., 2022; Khaliq et al., 2021). Additional causes include low birth weight (LBW), early complementary feeding, non-exclusive breastfeeding, and economic deprivation (Siddiqa et al., 2023). Stunting leads to long-term consequences such as reduced physical growth, impaired cognition, lower educational attainment, and decreased labor productivity (Ali, 2021; UNICEF, 2018). Nutritional demands are highest during the first two years of life. Inadequate nutrient intake or frequent infections in the first 1,000 days elevates stunting risk (Siddique & Batool, 2021). Chronic malnutrition causes structural and functional brain pathology, including disordered differentiation, synaptic reduction, delayed myelination, and impaired dendritic development (Khaliq et al., 2021). Stunting also results in growth failure and hormonal disruptions (Ali, 2021).

3.1. The Nutritional Disparities and Gendered food allocation

The ethnographic data has revealed that how the feeding practice are preferred to only male children of the family. The food with the proteins and the calorie dense diet are prioritized for the male child than their female counterparts. Mothers and grandmothers were observed that how they behaved towards the young girls, thus making some biased statements. However, in some households it has been justified in the myths as how the biology aligns with the stamina and growth of certain gender.

One of the female respondent, Naila – a 32 years old stated as:

> *Girls will marry to secure their life; what strength they need any more to live in the house. Boys need to work and plough in the fields and do the labour all day, therefore needs more energy rich food.*

The insight from the statements truly analyse that the perception is formed at the basic level e.g. in the family. Paul Farmer (2003) in structural violence stated that the socio-cultural norms manifested in the patterns of growth of boys versus girl. It also showed that how the body is politicized at various levels. The food distribution reflects a survival strategy where a woman needs to comply with the standard norms of the society for the stability in the economic terms thus referred as patriarchal bargain (Kandiyoti, 1988). Mothers often interpreted and favoured the sons with statements such as "They will care for us in old age,". It illustrates that how social potentials often command with the inequities in nutritional terms.

The systematic deprivation of nutritional needs in girls demonstrates how gender bias lead towards the biologically embodied thoughts. Another concept of Bourdieu's Habitus (1977) which states as Food allocation practices are "natural," that leads towards the intergenerational disadvantage. While mothers acknowledged the unjust behaviour, however their agency was controlled by the obligations under kinship and where there is the fear of rise in marital conflict.

3.2. The Intergenerational Impacts and Maternal Malnutrition

The in-depth interviews with females also highlighted that how there is the maternal malnutrition in the females. There were 65% off women among interviews whose BMI is less than 17, thus leading towards low birth weight. Furthermore, there is the impaired lactation. One of the mother, having 3 children at the age of 26 explained in a way:

> *She couldn't have breastfed their few month old child as her milk dried up after drought and therefore baby is relied on the tea instead."*

However, it has been revealed that stunting rates were double times more among children with mothers having anaemia (PDHS, 2023). Moreover, another woman explained in a way that

> *"Her mother-in-law restricted her to have fish while breastfeeding based on the saying in their culture that it leads to worms in children's stomach".*

The traditional knowledge system also made women to refrain themselves to the available nutritious food. It highlights the cycle of the intergenerational malnutrition among mothers where the mothers in low nutrition food have children with stunted growth.

3.3. The Local Perceptions and Structural Neglect

The fieldwork data also documented that how the members of the community view the stunted growth as the normalized phenomenon, as it is the everyday thing with the inaccessibility to the healthcare facilities. One of the mother, 19-years old added in a way:

> *Our children are small, however are strong like the mountains (pointing to the one beside her home.*

Floods and droughts are not gender neutral, they are more seriously affecting poor, vulnerable and marginalized groups in the community, especially Women. Generally, women are poorer, less educated, and have lower health status with limited ownership of or access to natural resources (29). The graphic below shows some distribution of the factors and its impact in the drought in the region and the malnutrition among children.

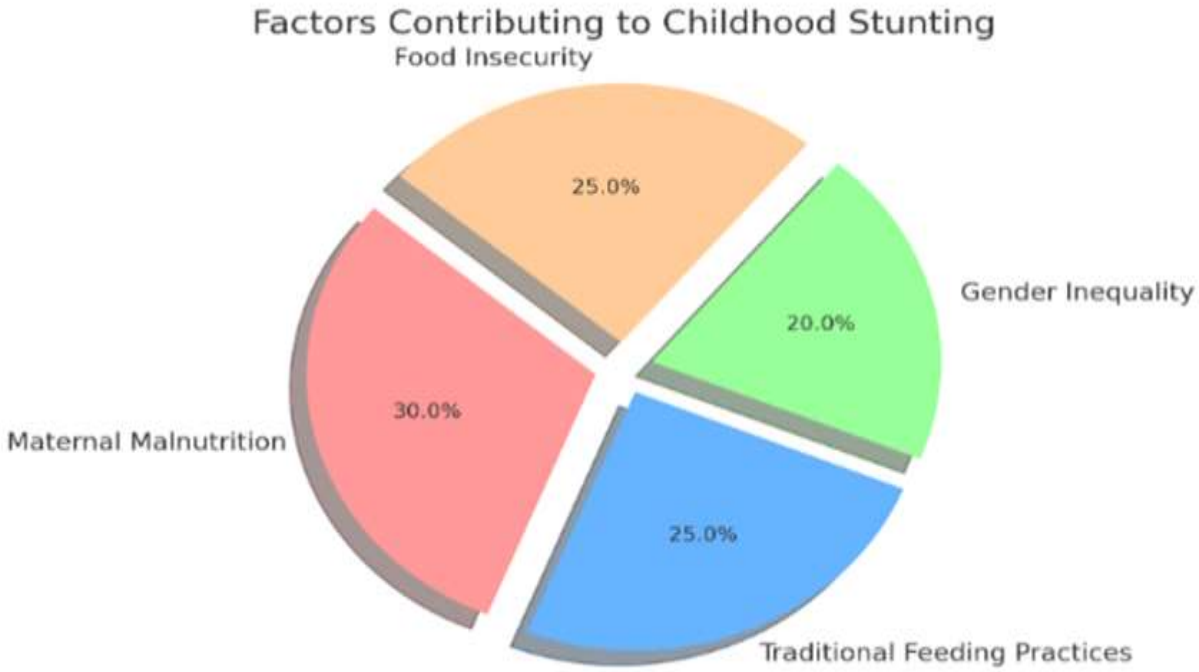

Figure 2: *Contribution of factors in Stunting*

The region of Chaghi is characterized by droughts, water scarcity and harsh climatic conditions. That is the reason it is not suitable for large-scale farming. Due to these factors, the region is highly vulnerable to food insecurity, and reduced availability of water and food. Prolonged droughts severely impact food security and nutrition (Gul et al., 2022). This dry spell led to reduced livestock productivity and crop failures resulting in reduced dietary intake ultimately leading to child malnutrition and stunting. Moreover, these drought conditions also affect sanitation and water quality increasing the incidence of food-borne illnesses and other infections. The constant drought condition in the region has reduced the availability of productivity in the region (Khaliq et al., 2021; Zafar et al., 2023). Moreover, many families in Chaghi rely on livestock and subsistence farming, which are highly affected by water scarcity. As a result, it leads to limited access to nutritious food, and poor dietary diversity resulting in macro and micronutrient deficiencies, particularly iron, zinc and vitamin A. Hence, prolonged undernutrition leads to impaired growth and development in children. According to the Chaghi Nutrition SMART Survey Balochistan 2023, stunting was found in 31.6% of the surveyed children. Boys had a slightly higher prevalence of stunting compared to girls. (SMART Survey report, 2023). The water borne diseases due to the poor sanitation also leads towards the complications. Children are more likely to be affected by poor sanitation, contaminated water, and unhygienic practices out of which children under age five are more vulnerable, leading to malnutrition and mortality. In Pakistan, approximately 53,000 children under five die annually due to diarrhoea caused by poor sanitation and unsafe drinking water (Mehmood & Arshad, 2024). Frequent floods can contribute to the spread of various complications and diseases, some of which may result in diarrhoea, especially among children under 5. During the summer of 2022, floods affect 16 million people in Pakistan, especially affecting Balochistan.

3.4. Systematic Analysis: Malnutrition and Drought

The findings from the systematic review of the study indicates that how the limitation of certain nutrients along with comparative analysis of other regions prone to drought presented some data

on prevalent food insecurity. The food availability, accessibility and affordability are crucial in determining food security, which is significantly associated with malnutrition. The SMART Survey in 2023 indicated that 82% of the women has also reported there are no access to any nutrition clinic to their homes. The Systematic spatial analysis confirmed 47% fewer health facilities in Chagai compared to Punjab (PDHS 2023), leaving families reliant on traditional healers who often promoted ineffective remedies. However, exceptions existed: some mothers covertly traded jewellery for micronutrient supplements, indicating latent demand for change. These findings highlight the need for decentralized nutrition programs that work with local healers and address structural neglect. The prevalence of stunting was found to be higher in those suffering from diarrhoea than those without it (Haq et al., 2024). Frequently observed famine and food scarcity in Chagai lead to severe undernutrition in children (Siddique & Batool, 2021). This is evident from The Smart Nutrition Survey conducted in Chaghi 2023. According to the findings, 57% of the households experienced moderate to severe hunger, and 34.15% of the households in Chaghi reported experiencing severe hunger in the past. The studies suggest that the effect of household water poverty on diarrhoea in young children is high in Baluchistan and Punjab compared to KP (Akhtar et al., 2021; Qurat-ul-Ann et al., 2023). The SMART Survey Baluchistan 2023 reveals a high prevalence of illnesses, with malaria (51%) being the most common in children under 5. Acute Respiratory infection/cough (31%) and Watery diarrhoea (13%) were also prevalent. (SMART Survey report, 2023). While having an insight into the impact of infants and their mothers on the health in Pakistan 2018, 61.3% of WRA in Balochistan suffer from anaemia (NSS, 2018). Additionally, 34.6% of WRA in the province are deficient in vitamin A (UNICEF, 2019). Flooding has seriously harmed the already underdeveloped Pakistan's health care system, and more than 198 medical facilities have been damaged in Balochistan province. Since, the majority of births in Pakistan take place at home, and now the affected women are uncertain about their place of delivery (Ochani et al., 2023). Food shortage due to floods leads to poor foetal development, higher maternal anaemia and reduced breastmilk production. It has been studied that the 65% population is engaged in the agriculture sector (Magsi, 2023). The province landscape consists of low-grade rangeland and rugged desert, where land productivity depends on water availability. The agricultural sector faces challenges such as waterlogging, scarcity and salinity, all of which impact crop productivity. Adequate freshwater supply is essential for sustaining Balochistan's cultivated areas (Magsi, 2023). Drought-driven declines in agriculture and livestock—key economic sectors in Chagai—lead to: Reduced household income, limiting access to sufficient, nutritious and diverse food; increased rural-to-urban migration which further strain food security and health services and greater dependence on food aid and government assistance programs (Rafiq et al., 2024; Ahmad et al., 2023).

Indicator	Prevalence (%)	95% Confidence Interval (CI)	Severity Classification (WHO)
Global Acute Malnutrition (GAM)	14.3%	11.4% - 17.9%	High
Severe Acute Malnutrition (SAM)	2.9%	1.8% - 4.7%	High
Moderate Acute Malnutrition (MAM)	11.4%	8.8% - 14.8%	High
Stunting (Chronic Malnutrition)	31.6%	25.9% - 37.9%	Very High
Moderate Stunting	19.7%	15.6% - 24.6%	High
Severe Stunting	11.9%	8.6% - 16.2%	Very High
Underweight (Low Weight-for-Age)	22.6%	18.6% - 27.3%	High
Moderate Underweight	16.5%	13.2% - 20.4%	High
Severe Underweight	6.2%	4.2% - 9.0%	High
Overweight (WHZ > +2 SD)	0.4%	0.1% - 1.5%	Very Low

Figure 3: *Smart Nutrition Survey (2023)*

There is the evident impact of childhood stunting over their cognitive development relatively. The nutritional stunting is also associated with both functional and structural pathology of the brain and leads to a wide range of cognitive deficits. In the CNS, chronic malnutrition can lead to disorderly differentiation, tissue damage, reduction in synapses, delayed myelination and reduced overall development of dendritic arborisation of the developing brain (Saleem et al., 2023). Furthermore, the stunting also leads to growth failure and hormonal implications (Ali, 2021). The National Nutrition Survey (NNS) 2011, reported a stunting rate of 52.2% among children under five years of age in Baluchistan. The NNS records in 2018 indicates that the prevalence of stunting in Baluchistan was 58.7%. This data suggests an increase in stunting rates over the seven years, highlighting persistent nutritional challenges in the region. Moreover, to combat the effects of water scarcity and drought on child stunting in Chagai, the key interventions include strengthening food safety measures such as livestock diversification and drought-resistant crops; improved water access through desalination wells, plants and rainwater harvesting; nutrition support programs targeting children under five, pregnant and lactating mothers; and public. The ethnographic inside should be taken into consideration. The crop failure due to drought has been a pertinent factor. It includes the socio-economic factors including floods in case of high rainfall and the dryness off weather in some drought condition. When it come to the vulnerability of climatic effects, Pakistan has been ranked on 8th on the list of countries prone to the impacts of environmental change. A significant increase in the severity, magnitude, and frequency of floods has been observed due to climate change (33). A study in 2022 found the effects of the flood on agriculture in the Qila Saifullah District of Baluchistan, Pakistan. The results revealed that 96.7% of the crops were fully damaged due to the floods according to the local farmers. These floods caused huge losses to livestock sectors and agriculture. As a result, leading to food insecurity in the region (34).

Additionally, the Comparative analysis on how does the stunting in Chagai compare to Tharparkar in Sindh is another drought-prone region. Stunting is an indicator of chronic malnutrition. In Chaghi it was found that 31.6% of the children under five are suffering from stunting. Boys had a slightly higher prevalence of stunting compared to girls. (SMART Survey, 2023). As compared to

Tharparkar, another drought-prone region, where malnutrition is also prevalent especially affecting children under five. A study revealed that 81.1% of children assessed were stunted, and 57.3% were underweight (Mehngwar, 2022). Comparing child stunting between Tharparkar in Sindh and Chagai in Balochistan reveals that stunting is a challenge in both drought-prone regions. Addressing child stunting in these drought-prone areas requires comprehensive strategies, including improving food security, and water access, promoting maternal and child health services, and implementing effective nutritional programs tailored to the unique challenges of each district. The National Nutrition Survey (NNS) 2018 of Pakistan reveals concerning statistics on maternal malnutrition, and dietary diversity. Approximately 47% of women of reproductive age (WRA) in Pakistan suffer from anaemia, with 19.1% of pregnant women being underweight and 34.9% experiencing chronic energy deficiency. In terms of dietary diversity, fewer than 10% of women meet the recommended daily intake of fruits, vegetables, and animal-source foods. Long-term strategies focusing on sustainable development and resilience-building are crucial to breaking the cycle of malnutrition and poverty in this region.

Conclusion

Water scarcity and droughts have a profound impact on child health, particularly in the regions like Chaghi. Longitudinal nutrition data reveals a strong correlation between increasing child stunting rates and prolonged drought conditions. Multiple factors lead to this relationship, including disease prevalence, food insecurity, maternal malnutrition and economic factors. The study from both ethnographic and systematic review has analysed that there is the correlation between drought, water scarcity, and child stunting in Chagai is undeniable. Addressing these challenges requires a holistic approach combining, nutritional interventions, improved water management, and economic support for vulnerable populations. The review has highlighted that the dietary diversity score for WRA is alarmingly low. Persistent droughts substantially reduce the overall agricultural productivity of the region, leading to food shortages and rising food prices**.**

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Conflict of Interest

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References

Ahmad, M. B., Muavia, A., Iqbal, M., Arshed, A. B., & Ahmad, M. M. (2023). Spatio-temporal drought assessment and comparison of drought indices under climatic variations in drought-prone areas of Pakistan. *Journal of Water and Climate Change, 14*(10), 3726–3752. https://doi.org/10.2166/wcc.2023.446.

Akhtar, M. M., Mohammad, A. D., Ehsan, M., Akhtar, R., Rehman, J. U., & Manzoor, Z. (2021). Water resources of Balochistan, Pakistan—A review. *Arabian Journal of Geosciences*, *14*, 1–16. https://doi.org/10.1007/s12517-021-08613-y

Ali, A. (2021). Current status of malnutrition and stunting in Pakistani children: What needs to be done? *Journal of the American College of Nutrition*, *40*(2), 180–192. https://doi.org/10.1080/07315724.2020.1825256

Azriani, D., Qinthara, N. S., Yulita, I. N., Agustian, D., Zuhairini, Y., & Dhamayanti, M. (2024). Risk factors associated with stunting incidence in under five children in Southeast Asia: A scoping review. *Journal of Health, Population and Nutrition*, *43*(1), 1–13. https://doi.org/10.1186/s41043-024-00510-w

Bourdieu, P. (1977). Outline of a theory of practice (R. Nice, Trans.). Cambridge University Press.

Cross-sectional study in southern Punjab, Pakistan. Medrxiv. 2023:2023.01. 04.23284177

Farmer, P. (2004). An anthropology of structural violence. *Current Anthropology*, *45*(3), 305-325. https://doi.org/10.1086/382250

Google Maps. (2019). Chaghi, Pakistan [Map]. https://www.google.com/maps/place/Chaghi

Gul, W., Makki, M., & Yamin, T. (2022). Water energy food security nexus: Perspectives and challenges in Balochistan, Pakistan. *International Journal of Sustainable Society*, *14*(2), 165–183.

Hadi, H., Fatimatasari, F., Irwanti, W., Kusuma, C., Alfiana, R. D., Asshiddiqi, M. I. N., et al. (2021). Exclusive breastfeeding protects young children from stunting in a low-income population: A study from Eastern Indonesia. *Nutrients*, *13*(12), 4264. https://doi.org/10.3390/nu13124264

Haq, I. U., Mehmood, Z., Ahmed, B., Shah, J., Begum, N., Hajira, B., et al. (2024). Determinants of diarrhea among children aged 1 to 6 years in flood-affected areas of Pakistan: A cross-sectional study. *The American Journal of Tropical Medicine and Hygiene*, *110*(2), 323–330. https://doi.org/10.4269/ajtmh.23-0432

Katoch, O. R. (2022). Determinants of malnutrition among children: A systematic review. Nutrition, 96, 111565. https://doi.org/10.1016/j.nut.2022.111565

Kandiyoti, D. (1988). Bargaining with patriarchy. Gender & Society, *2*(3), 274-290. https://doi.org/10.1177/089124388002003004

Khan, I., Lei, H., Shah, A. A., Khan, I., & Muhammad, I. (2021). Climate change impact assessment, flood management, and mitigation strategies in Pakistan for sustainable future. *Environmental Science and Pollution Research*, *28*, 29720–29731. https://doi.org/10.1007/s11356-021-12805-0

Khaliq, A., Wraith, D., Miller, Y., & Nambiar-Mann, S. (2021). Prevalence, trends, and socioeconomic determinants of coexisting forms of malnutrition amongst children under five years of age in Pakistan. *Nutrients*, *13*(12), 4566. https://doi.org/10.3390/nu13124566

Magsi, H. A. (2023). Water crisis in Balochistan its implications and way forward. Grassroots, 57(2).

Marlina, H., Triana, A., & Fanora, E. (2022). Causes of stunting in toddlers: Literature review. *International Journal of Multidisciplinary Research and Growth Evaluation*, *3*(1), 138–142.

Marri, M. N., Abbasi, B. H. A., & Zarkoon, S. U. (2022). Assess the impact of childhood nutritional status: A case study of District Kohlu Balochistan. *Pakistan Journal of International Affairs*, *5*(3).

Mehmood, Y., & Arshad, M. (2024). Water contamination, childhood diarrhoea, and household willingness to pay for safe drinking water in Pakistani urban slums. *Sustainable Water Resources Management*, *10*(4), 141. https://doi.org/10.1007/s40899-024-01099-y

Menghwar, B., Laghari, Z. A., Memon, S. F., Warsi, J., Shaikh, S. A., & Baig, N. M. (2022). Prevalence of malnutrition in children under five years' age in District Tharparkar Sindh, Pakistan. *Journal of the Pakistan Medical Association*, *72*(1), 33–36. https://doi.org/10.47391/JPMA.22-004

Ochani, S., Aaqil, S. I., Nazir, A., Athar, F. B., & Ullah, K. (2023). Effect of recent floods on women's reproductive health in Pakistan: An alarming situation. *IJS Global Health*, *6*(1), e98.

Panezai, S., & Kakar, A. K. (2024). Exploring the impacts of climate change on agriculture: The case of devastating floods of 2022 in Balochistan, Pakistan. Nangarhar University *International Journal of Biosciences*, 339–343.

Qurat-ul-Ann, A.-R., Rizvi, S. B.-u.-H., & Bibi, M. (2023). Impact of water, sanitation and hygiene poverty on child health in Pakistan: Evidence from micro data. *Pakistan Journal of Humanities and Social Sciences*, *11*(2), 1265–1273.

Raj, E., Calvo-Urbano, B., Heffernan, C., Halder, J., & Webster, J. (2022). Systematic review to evaluate a potential association between helminth infection and physical stunting in children. *Parasites & Vectors*, *15*(1), 135. https://doi.org/10.1186/s13071-022-05234-6

Rafiq, M., Li, Y. C., Rahman, G., Sohail, K., Khan, K., Zahoor, A., et al. (2024). Regional characterization of meteorological and agricultural drought in Baluchistan province, Pakistan. *PLoS ONE*, *19*(8), e0307147. https://doi.org/10.1371/journal.pone.0307147

Saleem, J., Zakar, R., Aadil, R. M., Butt, M. S., Mushtaq, F., Bukhari, G. M. J., et al. (2023). Determinants of wasting, stunting, and undernutrition among children under five years: Cross-sectional study in southern Punjab, Pakistan. medRxiv. https://doi.org/10.1101/2023.01.04.23284177

Sari, A. L. (2022). Exclusive breastfeeding as an effort to prevent stunting in toddlers. *NeuroQuantology*, *20*(5), 3668–3675. https://doi.org/10.14704/nq.2022.20.5.NQ44105

Sartika, A. N., Khoirunnisa, M., Meiyetriani, E., Ermayani, E., Pramesthi, I. L., & Nur Ananda, A. J. (2021). Prenatal and postnatal determinants of stunting at age 0–11 months: A cross-

sectional study in Indonesia. *PLoS ONE*, *16*(7), e0254662. https://doi.org/10.1371/journal.pone.0254662

Shahid, M., Ahmed, F., Ameer, W., Guo, J., Raza, S., Fatima, S., et al. (2022). Prevalence of child malnutrition and household socioeconomic deprivation: A case study of marginalized district in Punjab, Pakistan. *PLoS ONE*, *17*(3), e0263470. https://doi.org/10.1371/journal.pone.0263470

Siddiqa, M., Shah, G. H., Mayo-Gamble, T. L., & Zubair, A. (2023). Determinants of child stunting, wasting, and underweight: Evidence from 2017 to 2018 Pakistan demographic and health survey. *Journal of Nutrition and Metabolism*, 2023, 2845133. https://doi.org/10.1155/2023/2845133

Siddique, F., & Batool, R. (2021). Gender disparity and chronic malnutrition among female: A case study of Balochistan province. *Pakistan's Multidisciplinary Journal for Arts & Science*, *2*(3), 1–15.

Sianti, R. N., Kartasurya, M. I., & Kartini, A. (2024). Can exclusive breastfeeding prevent stunting in lower middle-income countries (LMIC)? A systematic review. *International Journal of Integrative Science*, *3*(1), 37–58.

Soofi, S. B., Khan, A., Kureishy, S., Hussain, I., Habib, M. A., Umer, M., et al. (2023). Determinants of stunting among children under five in Pakistan. *Nutrients*, *15*(15), 3480. https://doi.org/10.3390/nu15153480

United Nations Children's Fund (UNICEF). (2018). Child stunting, hidden hunger and human capital in South Asia: Implications for sustainable development post 2015. *UNICEF Regional Office for South Asia*.

United Nations Children's Fund (UNICEF). (2019). National nutrition survey 2018: Key findings report. *UNICEF Pakistan*.

United Nations Children's Fund (UNICEF), World Health Organization, International Bank for Reconstruction and Development, & The World Bank. (2021). Levels and trends in child malnutrition: Key findings of the 2021 edition of the joint child malnutrition estimates. World Health Organization. https://apps.who.int/iris/handle/10665/341135

Vaivada, T., Akseer, N., Akseer, S., Somaskandan, A., Stefopulos, M., & Bhutta, Z. A. (2020). Stunting in childhood: An overview of global burden, trends, determinants, and drivers of decline. *The American Journal of Clinical Nutrition*, *112*(Suppl.), 777S–791S. https://doi.org/10.1093/ajcn/nqaa159

Wicaksono, R. A., Arto, K. S., Mutiara, E., Deliana, M., Lubis, M., & Batubara, J. R. L. (2021). Risk factors of stunting in Indonesian children aged 1 to 60 months. *Paediatrica Indonesiana*, *61*(1), 12– https://doi.org/10.14238/pi61.1.2021.12-9

Zafar, H., Muneera, D. A. G., & Gul Hasan, D. S. S. U. (2023). The impact of climate change on food security in Balochistan. *Journal of Positive School Psychology*, *7*, 1698–1709.