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Systematic Review



Addressing Food Security and Nutritional Challenges: A Comprehensive Systematic Review of Health Administration Strategies for Vulnerable Communities in South Asia

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ABSTRACT

South Asia having problems with food deficiency and malnutrition, which are made more problematic by ongoing poverty, fast increase in population, environmental loss, and unstable sociopolitical circumstances. This systematic approach analyzes how good is the health administration techniques that increased food security and nutritional benefits for the region's most disadvantaged inhabitants work. It evaluated a lot of health policies and initiatives that have been seen in South Asian nations, such as Bangladesh, Nepal, Bhutan, India, Pakistan, and Sri Lanka. Material from 2013 to 2023 was included in the review, which was occurred by employing a comprehensive search plan across seven electronic databases. Studies that were relevant to South Asian countries were given favoritism when selecting the studies, which focused on peer-reviewed publications that evaluated health policies and treatments related to food security and malnutrition. Thirteen studies in all were included following accurate screening program and a quality evaluation utilizing PRISMA guidelines. The study summarized research on women's empowerment plan, integrated resource management, agricultural interventions, and direct food assistance. It highlighted both effective strategies and areas in need of development, providing evidence-based suggestions for program optimization and policy improvements. The final objective was to develop practical insights that help improve food security, strengthen health administration procedures, and boost nutritional values for the most vulnerable communities in the region.

INTRODUCTION

Food insecurity is referred to as absence of access to adequate quantities of safe and nutritious food needed for an active and healthy life. In case of South Asia, this is compounded by a double burden of malnutrition that comprise of undernutrition, hidden hunger and obesity among children Azmi FR *et al.*, in 2023 [1]. The South Asian region where more than a quarter of the comprehensive population resides has various issues hindering healthy diets such as food insecurity and malnutrition. Approximately 43.8% of the global population in poverty resides in South Asia where the hunger rate stands at 15.9 % in contrast with the global average of 9.3%. Moreover, it

has been speculated that the population of the area could grow by 40% over the next 30 years Hibino G and Masui T in 2024 [2]. The prevalence of high-rate of malnutrition in South Asia reflects a daunting image of the region entangled with public health related issues. Various indicators portray the status of nutritional deficiencies in the region. The stunting charges are high as 36.9% in Pakistan, and anemia in women impacting up to 53% in India. Around 17.3% of children are wasted every year in India Zhang X *et al.*, in 2022 [3]. Childhood obesity is common in many countries, with 5.2% in Bhutan Awasthi A *et al.*, in 2023 [4]. Figure 1 clearly shows that Pakistan and



Afghanistan are the most vulnerable countries with maximum cases of stunting Zhang X *et al.*, in 2022 [3]. Stunting, anemia, and wasting are a complex combination of malnutrition indicators that highlight the urgent need for focused health administration measures to address these concerns Azmi FR *et al.*, in 2023 [1]. This is a need to enhance the nutritional outcomes for vulnerable communities in South Asian.

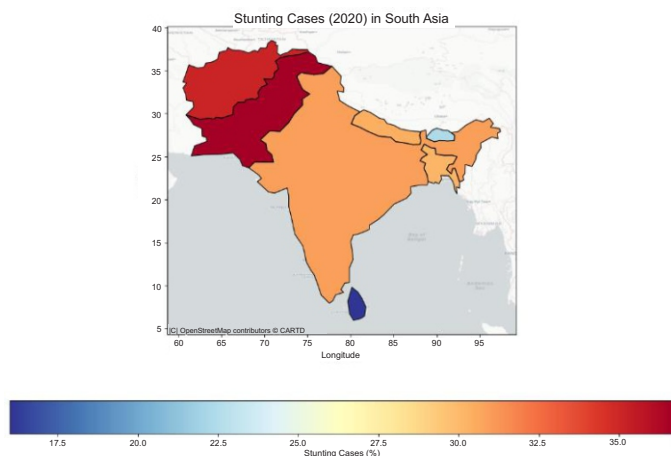


Figure 1: Heat map of South Asia reflecting country-wise status of stunting (%) Zhang X *et al.*, in 2023 [3]

The main drivers of food insecurity in South Asia include: poverty, environment degradation, social and economic inequalities, and high population growth rates. These confronts have been compounded by recent economic instabilities, political turmoil's and conflicts resulting in high food inflation and inadequate access of basic goods. Hence, the incidences of diseases related to malnutrition and other linked health complications have become rampant (World Bank, 2021). Consequently, this systematic review intends to show that improving food security and nutrition in the area is central to the question of sustainable development in the region. Considering recent surge in the population of South Asia, which is struggling with food insecurity and malnutrition, it becomes very important to come up with viable health administration policy. Therefore, it is the high time to assess the rate of malnutrition in the area and review current policies, strategies and interventions. Many studies need to be conducted and analyzed to assess the effectiveness of various health administration systems in addressing complications associated with nutrition and food insecurity in the region Mughal M and Fontan Sers C in 2020 [5]. Such as, several studies emphasize the importance of joining the interventions to promote local farming, enhance the communities' infrastructure, and supplement the food purchases with the food distribution Miller L and Malacarne J in 2023; Mishra P *et al.*, in 2023 [6, 7]. Such an analysis may provide insights into whether these strategies are effective or not, besides providing recommendations

to practitioners and politicians. This systematic review will therefore assess the impact of health administration approaches in South Asia and their impact on food security and nutrition results. It will also relate different intervention strategies of the various regions in order to build those that are most effective in dealing with food insecurity and malnutrition. In order to achieve these purposes, this review presents an analysis of related literature and evaluation of various approaches with the aim of banding the best practices that could be employed to enhance the effectiveness of existing health policies and programs. The aim here was to gain fresh understandings regarding what can be done to improve the design of interventions for food insecurity and malnutrition in the region and in turn, advance the health and quality of life of vulnerable populations in South Asia.

METHODS

To assess different options for health administration concerning food security in South Asia, we performed a literature review in scientific databases. The procedures followed in conducting the literature search and analysis matched the standards of the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses" (PRISMA) Moher D *et al.*, in 2009 [8].

Information Sources

The databases that were used for the search to include seven of the most easily accessible open-access and free databases to conduct research between the years 2013 to 2023. The preliminary search was made using seven electronic databases. The databases searched PubMed Central (PMC), Google Scholar, the Directory of Open Access Journals (DOAJ), BioMed Central (BMC), the Social Science Research Network (SSRN), Health Systems Evidence, and the Lancet.

Search Strategy

A thorough search of the published databases was conducted using an extensive set of keywords. Boolean operators were employed to combine these keywords and narrow down the search results (Table 1). According to Table 1, the primary search topics included 'South Asia', 'Food Security', and 'Health Policies'.

Table 1: Search Concepts and Key Terms

Concept	Search Terms
South Asian Region	"South Asia" OR "Asia" OR "Pakistan" OR "India" OR "Afghanistan" OR "Bangladesh" OR "Nepal" OR "Bhutan" OR "Maldives"
Food Security	"Food security" OR "Food availability" OR "Nutritional Challenges" OR "Malnutrition" OR "Micronutrient Deficiencies" OR "Nutritional Deficiencies" OR "Dietary Intake"
Health Policies	"Health administration strategies" OR "public health policies" OR "health programs" OR "health management"

Study Selection

The process for screening and selecting studies was based on the following inclusion criteria: 1) peer-reviewed, 2) available full text articles, 3) published in English, 4) studies focusing on vulnerable communities in South Asia, including countries India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan, and the Maldives, and 5) studies that evaluate health administration strategies or public health policies aimed at improving food security and nutrition, with relevant outcomes such as dietary intake, nutritional status, and food availability. Articles that did not meet the specified criteria were excluded. The stages of systematic mapping exercise are presented in Figure 2.

Quality Assessment and Potential Bias

A strict quality estimate was used in compliance with PRISMA criteria to guarantee the validity of this systematic review. All the articles that have been considered in the review were reviewed for methodological quality and sources of bias according to the study type using appropriate and reliable instruments. A possible presence of biases was considered within the screened studies at various stages of selection. These measures were taken to reduce the potential sources of bias-including publication and selection bias-such as the detailed evaluations of the inclusion criteria and the search methods used to screen papers. Also, at each study, conflict of interest and funding for the purpose of determining was used that could bias the study results. Priority was given to studies on the basis of relevancy to the topic; focused on health policies aimed to cater food insecurity and malnutrition in South Asia.

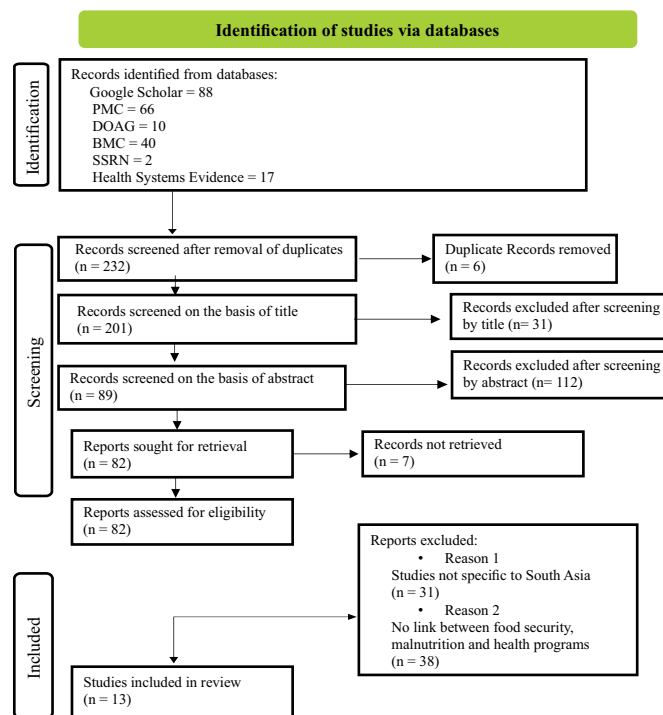
Data Charting

Details such as sample characteristics, intervention descriptions, and fidelity, outcomes, and effect sizes were carefully identified and documented from each of the included publication to conduct meta-synthesis systematically. The extracted data involved the name of the first author, the year of the publication, location of study, design, aim, key findings and conclusion about the role health policies regarding food security/malnutrition prevention in South Asia (Table 2). Based on the information published in the books and articles, all the related information was organized and presented in Table 2. This table provides a structured overview of the key aspects of each study, allowing for easy comparison and analysis of the evidence regarding the effectiveness of health policies and their impact on food security and nutritional outcomes in the region. This complex extraction method proved very useful because it allowed to grasp various outcomes reported by different studies, as well as the ways in which the given issue was addressed (Table 3).

Study Selection

In order to ensure a transparent and rigorous procedure to

select studies for inclusion in the selection process of systematic review, the guidelines of PRISMA were followed (Figure 2). Initially, a comprehensive search across seven databases yielded a total of 238 articles. After the removal of 6 duplicates, 201 articles were selected for further screening for relevant title and abstract. A total of 89 articles were selected, and 7 articles were excluded on the basis of unavailability of full text. Further 69 articles were excluded for non-relevance and lack of focus on vulnerable communities in South Asia. These selected studies were then evaluated for quality and bias analysis. In the end, 13 studies were screened to be eligible for inclusion. The selected articles offer insightful information about the efficacy of various health administration techniques.



RESULTS

Characteristics of Screened Studies

Each selected study was assessed based on their applicability to the region's most vulnerable population, and how effectively it added to the efficacy of different health interventions and policies. The table 2 provides a detailed summary of each study's focus, objectives, and conclusions, which gives a comprehensive overview of these diverse strategies applied in different countries and the overall region of South Asia. It further aids in comparing and contrasting the effectiveness of various health administration strategies, and identifying key factors contributing to their success or limitations.

Table 2: Characteristics of the Studies included in the Review (n=13)

Lead Author	Study Focus (Country/ Region)	Publication Year	Objective of Study	Conclusions
Gillespie [9]	South Asia	2019	To analyze how agriculture and agri-food systems impact nutrition in South Asia, focusing on LANSAs research and governance effects.	Combining nutrition and agriculture strategies with good governance is essential for sustainable development and effective malnutrition combat in agri-food systems.
Rasul [10]	South Asia	2016	To assess South Asian challenges in meeting food, water, and energy needs, and evaluate policies' impact on resource sustainability.	Wheat production subsidies harm resources and increase water and energy demand, threatening SDG progress. Cross-sectoral cooperation and coherent policies are needed for sustainability.
Bird [11]	South Asia	2019	To evaluate peer-reviewed research from 2012-2017 on agricultural interventions' impact on nutrition in South Asia, focusing on key countries.	Nutritional habits and anemia have improved, but child growth data is mixed. LANSAs research aims to find practical solutions for South Asian nutrition.
Vir [12]	South Asia	2016	To examine how direct nutrition interventions and non-nutritional factors like gender inequality affect women's nutrition, birth outcomes, and child stunting in South Asia.	Combining nutrition interventions with women's empowerment—through economic, educational, and anti-abuse measures—can significantly reduce child stunting in South Asia.
Dewey [13]	South Asia	2016	To identify strategies that enhance nutrition for pregnant women and young children in South Asia, improving nutrient density in staple diets.	Dietary diversification and supplements can boost child growth, but infections and mixed results limit effectiveness; integrated, evaluated interventions are crucial.
Alam [18]	Pakistan	2022	To examine how financial stress and socio-economic deprivation during COVID-19 affected the nutritional status of young children in Bahawalpur.	COVID-19 lockdown worsened stunting and underweight in children, with increased risks linked to financial stress and socio-economic deprivation.
Leyvraz [21]	India	2016	To assess how well the fortified food product Bal Amrutham, provided by ICDS in Telangana, is used and identify effectiveness barriers.	Bal Amrutham is well-used and accepted, but effectiveness is limited by supply issues and intra-household sharing in Telangana.
Harris-Fry H [22]	South Asia	2017	To evaluate factors affecting stunting reduction in four Indian states from 2006-2016, focusing on maternal, household, and intervention variables.	Effective stunting reduction in India requires targeted maternal and household interventions, with a focus on comprehensive health and nutrition strategies.
Harding KL [23]	South Asia	2018	To examine factors influencing stunting reduction in four Indian states from 2006-2016, focusing on maternal, household, and intervention variables.	Stunting reduction in India depends on targeted maternal and household interventions, alongside effective health and nutrition strategies.
Pradyumna [24]	India	2022	To explore how national-level food systems policies in India address health concerns and the involvement of the health sector across various relevant policy domains.	This study aimed to explore how national-level food systems policies in India address health concerns and the involvement of the health sector across various relevant policy domains.
Wali [25]	South Asia	2023	To evaluate nutrition programs and policies in eight South Asian countries targeting child malnutrition and micronutrient deficiencies for 2025 goals.	South Asian countries struggle with implementing and evaluating nutrition policies, requiring better tracking and contextualization to improve effectiveness.

Diverse Regional Approaches to Address Food Security and Nutritional Concerns in South Asia

Regional disparities in food security and nutritional outcomes in South Asia reveal significant variations with respect to challenges and interventions (Table 3). In India, food availability and access are the pivotal issues contributing to high stunting rates and anemia prevalence, with key programs such as the Integrated Child Development Services (ICDS) and the National Nutrition Mission addressing these challenges Gillespie, Van Den Bold, and Hodge 2019. In contrast, Bangladesh's

National Food Policy and Social Safety Nets Program prioritizes enhancing nutritional diversity and quality in order to fight child malnutrition (Bird, Pradhan, Bhavani, and Dangour, 2019). With the help of programs like the Benazir Income Support Program and the Pakistan Integrated Nutrient Management Program, Pakistan is working to alleviate child stunting and underweight by focusing on the availability and affordability of food (Rasul, 2016). The School Feeding Program and the National Multi-Sectoral Nutrition Plan are two of Nepal's strategies for improving access to food security and reducing micronutrient deficiencies (Dewey, 2016). The significance of localized policies designed to address particular food security and nutritional demands is highlighted by these geographical changes.

Table 3: Regional Variation in Food Security and Nutritional Outcomes

Region/Country	Food Security Indicator	Nutritional Status Indicator	Key Programs/Policies
India	Food availability, access	Stunting rates, anemia prevalence	Integrated Child Development Services (ICDS), National Nutrition Mission
Bangladesh	Nutritional quality, diversity	Child malnutrition rates	National Food Policy, Social Safety Nets Program
Pakistan	Food availability, affordability	Child stunting, underweight	Benazir Income Support Program, Pakistan Integrated Nutrient Management Program
Nepal	Food security access	Micronutrient deficiencies	School Feeding Program, National Multi-Sectoral Nutrition Plan

Evaluation of Health Administration Strategies in South Asia and their Impact on Target Population

Significant differences in food security and nutritional results are shown by the interpretation of regional data across South Asia, emphasizing unique challenges and

policy solutions in various nations. A comparative summary of the health administration approaches used to address these problems in different South Asian nations is given in Table 4. The effects of these tactics on malnutrition and food security are further illustrated in Table 5. While food security is determined by availability and access, stunting and anemia rates are important markers of nutritional status in India Gillespie S in 2019 [9]. Pakistan addresses child stunting and underweight issues while enhancing food security through measures of availability and cost, relying on the Pakistan Integrated Nutrient Management Program and the Benazir Income Support Program Rasul, in 2016 [10]. The Integrated Child Development Services (ICDS) and the National Nutrition Mission are noteworthy programs. Bangladesh prioritizes food diversity and nutritional quality, focusing on child malnutrition through programs like the Social Safety Nets Program and the National Food Policy Bird FA et al, in 2019; Gillespie S in 2019 [11,9].

Table 4: Comparative Summary of Health Administration Strategies and their Effectiveness on Target Population

Strategy	Region/ Country	Objective	Key Findings	Effectiveness	Target Population
Direct Food Assistance	South Asia	Improve food availability and accessibility	Mixed results; some improvements in dietary intake	Variable effectiveness	Vulnerable populations
Agricultural Interventions	India, Bangladesh	Enhance dietary diversity and quality	Improvements in dietary practices; mixed results in nutritional outcomes	Partially effective	Farmers, rural communities
Integrated Approaches	South Asia	Address interconnected issues of food, water, and energy	Improved resource management and sustainability	Promising, needs further integration	General population
Women's Empowerment	South Asia	Improve nutritional outcomes through women's education and economic opportunities	Positive impacts on nutrition and child stunting	Effective in specific contexts	Women and children
Fortified Foods	India, Pakistan	Increase micronutrient intake through fortified food programs	Increased micronutrient intake; reduction in anemia and stunting rates	Generally effective	Children
Mobile Health Interventions	India	Improve nutrition knowledge and practices through mobile health platforms	Enhanced nutrition knowledge; positive impacts on child nutrition practices	Effective in improving knowledge	Rural women
Social Safety Nets Programs	South Asia	Enhance food access and overall nutritional status among vulnerable populations	Improved food access; positive impact on nutritional status	Effective in improving food security	Vulnerable populations
Nutrition-Specific Interventions	South Asia	Target specific nutritional deficiencies through targeted programs	Significant reduction in stunting and anemia; improved dietary intake	Effective with proper implementation	Children and mothers

Direct food assistance programs aim to improve food availability and accessibility, showing mixed results with variable effectiveness across the region Bird FA et al., in 2019 [11]. In Bangladesh and India, agricultural interventions aimed at improving the diversity and quality of diets have shown mixed results in terms of overall nutritional outcomes Gillespie S et al.,

in 2019; Vir, in 2016 [9, 12]. Although they need further integration to optimise advantages, integrated approaches to food, water, and energy challenges have demonstrated encouraging gains in resource management and sustainability Rasul G in 2016[10]. Although their effectiveness varies by local context and implementation, women's empowerment programs that emphasise economic possibilities and education have been successful in improving nutrition and lowering child stunting Dewey, in 2016 [13]. Child feeding practices have improved as a result of the Mobile Vaani initiative in India, which has increased rural women's awareness of nutrition Gillespie S *et al.*, in 2019 [9]. Children's consumption of micronutrients has improved dramatically as a result of fortified foods programs, which has decreased rates of stunting and anaemia Bird FA *et al.*, in 2019 [11]. Furthermore, food security and children's nutritional outcomes have been strengthened by women's empowerment programs Vir, in 2016 [12]. These results highlight the significance of customised interventions to meet the unique needs of populations throughout South Asia. Children's consumption of micronutrients has improved dramatically as a result of fortified foods programs, which has decreased rates of stunting and anaemia Bird FA *et al.*, in 2019 [11]. Furthermore, food security and children's nutritional outcomes have been strengthened by women's empowerment programs Vir, in 2016 [12]. These results highlight the significance of customised interventions to meet the unique needs of populations throughout South Asia.

Table 5: Impact of Strategies on Food Security and Nutritional Status

Strategies	Impact on Food Security	Impact on Nutritional Status
Direct Food Assistance	Improved food access	Variable impact on nutritional status
Agricultural Interventions	Improved dietary diversity	Mixed results; variable impact on nutritional outcomes
Integrated Approaches	Enhanced resource management	Positive impact on overall food security and nutrition
Women's Empowerment	Enhanced food security	Improved nutritional outcomes, reduced child stunting
Fortified Foods	Increased micronutrient intake	Reduced anemia and stunting rates
Mobile Health Interventions	Improved nutrition knowledge	Positive impacts on child nutrition practices
Social Safety Nets Programs	Enhanced food access	Improved nutritional status through increased food availability
Nutrition-Specific Interventions	Addressed specific deficiencies	Reduced stunting and anemia, improved dietary intake

DISCUSSION

In South Asia, significant rates of malnutrition and food insecurity are common. There are an estimated 412.9 million South Asians who are at risk of food insecurity. Only 3.4% of the world's land area is occupied by this region, which is home to 25% of the world's people Rehman A *et al.*, in 2024 [14]. Food insecurity in South Asia is caused by a number of variables, including economic problems, agricultural obstacles, climate change, increased urbanisation, and pandemics like COVID-19 Khalid, in 2020 [15]. Amidst already prevailing acute food insecurity in the region, challenges such as climate change, rising temperatures, extreme weather events, and soil degradation negatively affect the agricultural productivity. This impacts long terms as well as short term availability of food, hence exacerbating food insecurity in the region Rehman A *et al.*, in 2024 [14]. Declining arable land, farm sizes and insufficient fundings for research and development are main factors accounting for decline in agricultural productivity. Moreover, water-induced degradation has degraded around 25% of pasture and cropland in South Asia. Food inflation, trade restrictions

and elevated oil prices has further destabilized the situation of food security Khalid, in 2020 [15]. This calls for the formulation of realistic policies and strategies that would address the challenge of food insecurity and its related diseases. The potential solutions include: ramp up of agricultural research and development; improvement of agricultural technology; development and implementation of food security and safety net policies; contribution to rural economy; investment on climate-smart agriculture technologies and infrastructure; access to formal agricultural credit for farmers; and promotion of use of renewable energy Rehman A *et al.*, in 2024 [14]. Literature review of health administration strategies illustrates a system of framework, which has been used to analyze issues concerning nutritional problems and food insecurity in South Asia. While programs like 'Direct Food Assistance Programs' do help in the short run for a particular period say for a month yet such strategies do not rely much on lessons that are learnt from medium and/or long-term nutrition impact. Bird FA *et al.*, in 2019 notes that while such programs increase food access, their effects on food quality and long-term nutritional development are mixed: more supplementary interventions are required besides food provision [11]. It is remarkable that agricultural interventions are more effective according to the studies conducted to enhance dietary diversity and nutritional status among the populations of the less developed countries. From the research done by Gillespie S *et al.*, in 2019, practices which focus on nutrition-sensitive agriculture, like pushing for crop diversification, assists in increasing dietary intake eliminating malnutrition [9]. This is in accordance with the study carried out by Dewey, in 2016, where he points out that while these interventions have a positive influence in the nutritional status of populations, however their effectiveness is increasingly hindered by many factors. South Asia is inflicted with numerous issues, specifically abiotic stresses like drought, flooding, and salinity [13]. Various previous work has been carried out before aimed to promote the notion of 'climate-smart crops. The production of flood tolerant rice varieties, drought resistant maize hybrids, and salt-tolerant rice and

wheat varieties are some of previous success the in this domain. Other than this, enhancing the nutritional content of staple crops through breeding and genetic modification also aids in addressing concerns pertaining to food insecurity in the region. Vitamin A enriched golden rice, and iron and zinc biofortified rice and wheat are some potent examples Glover D and Poole N *et al.*, in 2019 [16]. Synergic approaches dealing with food, water, and energy needs at once are the effective ways to respond to malnutrition. According to Rasul, in 2016, these strategies that work on the policy process of harmonization of resources management across various sectors, count significant advantages whereby, there is enhanced synergy that enhances the overall food security [10]. However, according to Rasul, in 2021, there are also some limitations; thus, the integration might face some difficulties in synchronizing in several sectors. Another study carried out by Li G *et al.*, in 2019 also adheres to the integrated approach of water, energy and food nexus, aiming to maximize synergies and minimize trade-offs amongst these sectors [17]. It further highlights the importance of sector interdependencies, optimizing usage of resources, and insurance of policy coherence. This nexus aims to align strategies with Sustainable Development Goals (SDGs) to promote integrated, efficient, and sustainable development across water, energy, and food sectors Li *et al.*, in 2019. Therefore, it is crucial to have robust institutional infrastructure to realize these integrated measures. Projects aimed at empowering women especially in the aspect of health have been shown to produce a positive impact on the overall nutritional status of people by directly addressing some cultural, economic practices that negatively influence nutrition status. As highlighted by Vir, in 2016 as well as Alam MB *et al.*, in 2022 education of women coupled with their financial independence led to increased ability to feed families healthy foods [12, 18]. Moreover, their children also enjoy nutritional benefits. These programmes are most effective where they are accompanied by definite nutrition interventions, which clearly marks the paramount importance of these programmes as a permanent solution for poor nutritional and vulnerable communities. Policy makers need to adopt a holistic approach to empower women in agriculture by ensuring access to land, addressing over-loaded work burdens, and catering issues like childcare, poverty, and education. Such effective programs that include livestock transfer, agricultural training, and financial literacy have proven successful in enhancing food availability and access Quisumbing A *et al.*, in 2022 While each strategy has its own strengths and weaknesses, it may be most effective to use the combination of these strategies to give a comprehensive solution for the numerous issues of food insecurity and malnutrition in South Asia [19]. In South Asia, effectiveness of regional approaches and initiatives on enhancing food security and more nutritional outcomes range significantly

because of the situation and problem associated with the different countries of the region Chowdhury SK *et al.*, in 2017 [20]. Several strategies have been implemented in India to improve the status of food Security and nutrition. The program Integrated Child Development Services (ICDS) has been implemented in many schools as a way of providing children with nutrition, health, and early education services, have recorded varying success rates. Leyvraz M *et al.*, in 2016 have pointed out that, although ICDS has addressed the problem of access to fortified foods and supplements, various challenges such as, inadequate logistic management, and an uneven service coverage have constrained the effectiveness of the program [21]. Harris-Fry H *et al.*, in 2022 also notes that while ICDS has resulted in some changes to child malnutrition, the efficacy of this programme again differs from state to state because of variation in the rate of implementation and environmental factors [22]. In Bangladesh, the National Food Policy or NFP is the key strategy through which the country is aiming to lower child malnutrition. For instance, Bhatnagar RS and Padilla-Zakour OI in 2021 indicate that, through the NFP that aims at expanding food availability, and improving the nutritional standard, the reductions in malnutrition among children have been recorded [23]. However, there is always room for problems to occur such as problems arising from economic stability and problems in the implementation of the policy making the policy a less effective one. It is quite conscious here to realize the need to revise policies from time to time to suit the dynamic nutritional requirements. Various programs such as Benazir Income Support Program (BISP) has been launched in Pakistan to help the poor families. Studies on economic stress and socio-economic deprivation during COVID-19 lockdown in South Punjab reveals that BISP have been useful in mitigating some of the harms of economic adversity on prices of food. However, the effectiveness of such a program is limited by regional inequality and the amount of financial aid received; this is why further targeted measures are needed Khalid, in 2020 [15]. In Nepal, The School Feeding Program and the National Multi Sectoral Nutrition Plan has played a major role to solve the Nutritional problems. As pointed out by the document review on food systems policies in India (source needed), these programs have been effective in promoting school attendance among children as well as enhanced dietary diversification. The National Multi-Sectoral Nutrition Plan seeks to focus on the need to coordinate efforts of different sectors to combat the vice of malnutrition. Nevertheless, there is a number of issues that still persist, for example, dealing with such obstacles as logistical concerns and the availability of the resources needed to support these programs Pradyumna A *et al.*, in 2022 [24, 25]. In general, the above analyzed regional strategies have positive trends in increasing the population's food security and nutrition level; however, these tendencies depend on regional peculiarities.

Adapting interventions to suit certain regional contexts and circumstances is important to ensure that they yield maximum return. Further empirical research and assessment are required to strengthen these approaches and achieve better impacts toward handling the heterogeneity of susceptible groups in South Asia Rehman A *et al.*, in 2024 [14, 26]. Based on the analysis, it is possible to state that there are some crucial differences in food security and nutritional approaches in South Asia. Studies have found mixed success in implementation of India's integrated child development services (ICDS) due to implementation challenges Leyvraz M *et al.*, in 2016 [21, 22]. The National Food Policy (NFP) of Bangladesh has enhanced the child malnutrition index, but this policy is influenced by economic and executive challenges Bhatnagar RS and Padilla-Zakour OI in 2021 [23]. Early initiatives like the Bangladesh's food security and the Benazir Income Support Program (BISP) in Pakistan have lessened the strings attached in terms of economic pressures on the food security except the hurdles of regional disparities (Khalid, Mukhtar and Murtaza, 2020. In Nepal, the School Feeding Program and the National Multi-Sectoral Nutrition Plan have made strides in improving child nutrition but face challenges due to limited resources. These programs' efficacy varied according to the setting, resources available, and techniques implemented.

Policy and Practice Recommendations for Improving Food Security

The assessment identifies a number of policy and practice implications which are imperative to address the multifaceted issues of food poverty and malnutrition in South Asia. First, in order to encourage innovation and increase productivity more resources should be allocated to agricultural research Rehman A *et al.*, in 2024 [14]. However, to sustain agricultural production and reduce the impact of climate change, there is a need for climate-smart agriculture practices to be adopted Khalid, in 2020 [15]. Strengthening food-based social protection instruments remains critical because these initiatives can significantly positively impact the food security of vulnerable groups Avula R *et al.*, in 2022 [22, 27]. Moreover, promoting rural growth and enhancing infrastructure is crucial in supporting agriculture growth and increases resourcefulness to the countryside in particular Gillespie S *et al.*, in 2019 [9, 28]. These strategies should be implemented with the aim of enhancing the effectiveness of food security system of the region in the future. However, it is necessary to pay attention to some limitations of this systematic review, primarily because its design is exceptionally rigorous. In particular, it was found that many of the included studies had incomplete or inconsistent reporting, which limited the detail provided in the analysis of all the related interventions. Furthermore, issues of study quality were another factor; the methods used, sample size and measurement tools used in the

studies influenced the quality, standardization and comparability of the results. Such limitations might affect the stability of the conclusions made, bring possible biases and limit transferability of the results. Therefore, although this review adds to the knowledge, it also pinpoints the lack of more rigorous and systematic studies to support policy and practice. Subsequent researches on nutrition and food security in South Asia should focus on some major gaps identified in the existing literature. One of the topics which require additional research is the question of long-term effectiveness of health management strategies. More so, cohort designs that track people over time can provide valued knowledge on several aspects of various interventions and help to identify the factors that may affect their outcome or lack of it. However, in order to assess these multiple outcomes and other less easily quantifiable effects of health policies and measures more comprehensive systematic reviews that incorporate both qualitative and quantitative data are also needed. Such evaluations must, in order to satisfy specific requirements, consider socioeconomic situations and regional differences. Emphasizing these topics of study shall enhance understanding of the effectiveness of existing strategies and guide the establishment of better and culturally relevant solutions [29-35].

CONCLUSIONS

The aim of this systematic review was to present an evaluation of strategies implemented in health administration in relation to food security and nutritional issues in South Asia. Some conclusions are very significant in demonstrating the extent to which the population in the area is food insecure, factors that have been made worse by poverty, degrading environmental factors and rapid population growth. The studies reveal that many of the existing programmes are not equally effective, where the programmes involving women's participation, direct food transfers, combined approaches and the agricultural support show varying levels of effectiveness. Future policy recommendations highlight the need to increase funding for agricultural research and development, the promotion of climate smart agriculture, enhancement of the social protection programs for the vulnerable and development of the rural areas. Despite such progress, there are significant differences between the regions and resources constraints.

Authors Contribution

Conceptualization: AA, ZZ

Methodology: AA, ZZ

Formal analysis: AA, ZZ

Writing, review and editing: AA, ZZ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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