PREVALENCE OF MALNUTRITION IN CHILDREN: ECONOMIC PERSPECTIVE AND POLICY ANALYSIS

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CERTIFICATE

This is to certify that this thesis entitled: **"Prevalence of Malnutrition in children: economic perspective and policy analysis".** submitted by **Mr. Muhammad Abdullah Asrar Mirza** is accepted in its present form by the School of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree in Master of Philosophy in Health Economics.

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Author's Declaration

I 'Muhammad Abdullah Asrar Mirza' hereby state that my MPhil thesis titled "Prevalence of Malnutrition in Children: Economic Perspective and Policy Analysis" is my work and has not been submitted previously by me for taking any degree from "Pakistan Institute of Development Economics" or anywhere else in the country/world.

At any time if my statement is found to be incorrect even after my Graduation the university has the right to withdraw my MPhil degree.

Date: Oct-28-22

Muhammad Abdullah Asrar Mirza

Dedication

Dedicated to my beloved parents and wife

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I would like to deeply express my gratitude to Allah Almighty for enabling me on this journey that allowed me to spend my most time seeking knowledge and utilizing it for the betterment of mankind.

Secondly, I felt immense pleasure during my stay at PIDE because the learning environment and all the opportunities in the shape of seminars, knowledge briefs, blogs, etc. especially daily activities (webinars) at the time of COVID-19 made me much more productive in the research and polished my critical thinking skills. So, I am thankful to VC, PIDE Dr. Nadeem ul Haq for his remarkable services that not just elevated the status of the university but the capacity of staff & students as well.

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ABSTRACT

Prevalence of malnutrition in children (under 05) is not just a public health issue but also has long-term economic implications that have been emphasized in the study. The adverse impact of child malnutrition on the GDP of the country has been estimated alongside projecting the losses due to economic inconsistency as a result of loss in the future workforce. The "Consequence Model" has been used to obtain the empirical results for effective and data-driven policy recommendations. Further, online interviews with relevant stakeholders were conducted for detailed policy analysis and better outcomes. It has been found, that the total economic losses to GDP were estimated at 0.0125%, while the annual losses to the economy due to lost in the future workforce resulted in $1.82 Billion/year. Based on the policy analysis, the study concluded that preventive health measures such as growth monitoring, immunization, maternal health, and education can play a vital role in controlling the rates of prevalence and will have a high impact at a low cost. However, challenges like 'institutional environment' and 'costing' requires to be organized for existing programs and policies first before the implementation of newer strategies, procedures, and policies.

Keywords: Malnutrition, Consequence model, economic inconsistency, preventive measures, costing, implementation

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Chapter 1

INTRODUCTION

In this chapter, malnutrition in children has been addressed concentrating on the prior work; prevalence, determinants, and impact while the latter part of the chapter emphasizes on the scope of the study. This study mainly focuses on the economic perspective of malnutrition in children instead of its debating on its nutritional side; which already has been carried out in other prior studies however very limited studies linked child malnutrition with economic aspect.

1.1 Background

Child malnutrition refers to stunting, wasting, and being overweight that restrict the growth cycle physically and mentally as compared to children with a normal growth cycle. This abnormality impacts their lives and makes them prone to serious challenges like poverty and the adoption of non-communicable diseases. Malnutrition is caused by one or a combination of factors. The immediate determinants of child nutritional status are poor dietary intake (i.e., energy, protein, and micronutrients) and disease, these factors are interdependent. For instance, a child with inadequate dietary intake is more susceptible to disease, which in turn depresses appetite, inhibits the absorption of food nutrients, and competes for a child's energy (Adeyemi, Ijaiya, Ijaiya, & Ijaiya, 2009). Dietary intake must be adequate in both quantity and quality, and nutrients must be appropriately consumed in the right combinations for adequate absorption. The immediate determinants of child malnutrition are influenced by three underlying determinants, which are; food security, adequate care for mothers and children, and a proper health environment, including access to health services (Engle,

Menon, & Haddad, 1999). Finally, the underlying determinants are influenced by the basic determinants: the potential resources available to a country or community, and a host of political, cultural, and social factors that affect their utilization (Ijarotimi, 2013).

Child malnutrition is not just a public health problem but it is also a threat leading to a poverty trap, conceded productivity, and economic growth. The statistics show that in 2020, 149 million children appeared stunted, 45 million marked wasted and 38.9 million were overweight. The global trend shows that about 45% of children (less than 05 years) deaths are associated with undernutrition, out of that a large portion comprises low and middle-income countries (WHO, 2021). The main cause of stunting in children is inadequate dietary intake during early childhood which makes them incapable to utilize their full potential due to compromised cognitive development consequentially because of learning difficulties at school. While wasting in children exists as a consequence of disease or poor nutrient intake weakening the immunity causing long-term age-related developmental delays and often leading to death in case of severe wasting. Furthermore, overweight-related malnutrition in children exposes them to non-communicable diseases or obesity, it is preventable but globally the estimates are not much progressed (UNICEF, 2021). All these forms of malnutrition impose a direct and indirect cost on households and at the national level, which is a vigorous obstruction towards the fulfillment of SDGs, 2030. According to an estimate, the burden of malnutrition overall (including child malnutrition) on the global economy could be approximately US $3.5 trillion per annum and the US $500 per individual (Adesina, 2016). These massive costs limit the economic growth in one or many ways, i.e. early childhood mortality and morbidity associated with non-communicable and diet-related diseases or lost in human capital investments. The

estimates reflect that there is a need to invest in child malnutrition to advance food systems or dietary and nutritional evolvement, by implementing cost-effective measures.

Further, region wise all said three forms of malnutrition are highly prevalent in Asia and Africa. Stunting has observed a declining trend in all regions except Africa (61.4 million) while wasting shares the highest prevalence rate in Southern Asia (31.9 million) as compared to any other sub-region, Moreover, all the regions observed a steadily rising trend for overweight however Northern Africa (3.8 million) and South-eastern Asia (4.2 million) witnessed a substantial increase in overweight overtime since 2000 (UNICEF, 2021). In particular, Asia faces a 'triple burden' of malnutrition a condition in which children either bear micronutrient deficiencies, or hunger and deal with obesity or overweight (APIYCNA, 2020). Out of 155 million children categorized as stunted, 62 million only belong to South Asia. India and Bangladesh have observed a drop of 1 percent in stunting, however, Sri Lanka and Pakistan didn't experience a decline due to the unaffordability of people to buy nutritious food and lack of knowledge about smart dietary choices (RAJU, 2018). According to a UN report, pre-COVID-19 about 1.9 billion people in Asia and the Pacific were incapable and had no access to a healthy diet that is still prevalent due to economic downfall harming households (SEARO, 2021).

Moreover, Pakistan has been reported to have one of the highest levels of prevalence of child malnutrition compared to other developing counties (Di Cesare et al., 2015). According to the (UNICEF, 2018) among malnourished children under 05, 40.2% were stunted, 17.7% wasted and 28.9% reported being underweight. It was found that malnutrition starts at an early age and remains persistent at later stages. According to

a UNICEF report, due to pandemic outbreak, the nutritional services experienced a 30 percent reduction during the early days of lockdown and also Pakistan missed the campaign for supplementation of vitamin A due in April 2020 affecting the 36 million children, an immediate cost of $2.4 billion was projected to protect the nutritional status among maternal and child health, specifically in most exposed countries (UNICEF, 2020). Most of the researchers employed the anthropometry technique i.e., wasting (weight-for-height), stunting (height-for-age), and underweight (weight-for-age) by the NCHS/WHO for the assessment of child nutritional status (Asim & Nawaz, 2018).

All the studies in past have mainly focused on determinants of malnutrition in children and very few concentrated on its economic aspect, therefore, this study will fill the gap by addressing its economic side.

1.2 Scope of the study

The study precisely emphasizes child malnutrition than examining the issue of malnutrition as a whole, further it does not account for the economic burden of child malnutrition on individual households instead it calculated lost in the workforce due to child mortality and its impact on the national economy. Moreover, instead of analyzing the previous policy trends and only relying on forecasting, specific points are identified in the study after an in-depth analysis of the current structure and then discussed with relevant policymakers/stakeholders to establish valid recommendations.

1.2.1 Research problem

Malnutrition in children is not just a public health issue rather its economic implications are far worse and can cause long term repercussions. The economic future of the country is dependent on the health of present child population, as their healthy bought up can lead to better economic outcomes or vice versa therefore the need to invest in child nutrition is very important. However, at first it is necessary to assess the current percentage rate of loss to GDP due to malnutrition in children further estimating the annual losses to the economy due to lost in the future workforce for better policy choices to diminish the prevalence rates, thus these two aspects are the main objectives of the study that are addressed in the study.

The prevalence of malnutrition in children especially those under 05 limits or slows down the natural growth process in children such as cognitive development, height, a weight, lack of focus, etc. This adversely impacts their learning behavior and activities as compared to the children that are not malnourished. Despite negative health outcomes such as early childhood mortality and morbidity this also implies a burden on the national economy, such as economic inconsistency due to loss in the workforce as a result of child mortality that projects losses on the national economy.

1.2.2 Research question

1. What are the implications of child malnutrition (under 05) on the national economy?
2. How policy measures can play a role to reduce the prevalence of malnutrition in children?

1.2.3 Research aim

Thus, the study aims to highlight the economic consequence of malnutrition among children under five, that due to inadequate nutritional status, the growth of these affected beings doesn't remain ideal restricting to utilize of their full potential in learning and development, later causing a loss in work/productivity that ultimately results in losses in GDP. Therefore, the study intends to uncover the economic aspect of the prevalence of malnutrition in children.

1.2.4 Research objectives

Following are the objectives of this study;

1. To evaluate the total burden of malnutrition in children (under 5) on GDP and economic inconsistency due to lost in the workforce as a result of malnutrition in children
2. To conduct policy analysis and examine the possible actions to diminish malnutrition in children.

1.2.5 Research significance

The mixed methodology used in the study comprising of "consequence model" for economic analysis and "structured interviews" from relevant stakeholders/specialized focal persons on the subject matter will enable the policy makers to formulate and implement effective plans. The study obtained and compiled the key outcomes after in-depth analysis, as all participants were of executive level and have a good command and years of experience in the subject of child malnutrition. Similarly, the economic analysis will assist future researchers in more micro-level research by addressing the topic using other economic evaluation approaches like cost-benefit analysis, etc. Lastly, this study will be a contribution to literature specifically in the

case of Pakistan and it will also provide a benchmark for researchers interested to address similar public health issues and to examine their economic consequences.

Chapter 2

LITERATURE REVIEW

This chapter of the study focuses on theoretical/conceptual frame work while reflecting on the previously published literature on malnutrition in children, although in past very limited research has addressed the economic side of child malnutrition while extensive research is available on its other aspects such as determinants, associated factors, causes, etc. The timeline for the evaluation of literature ranges from 1995-to 2020.

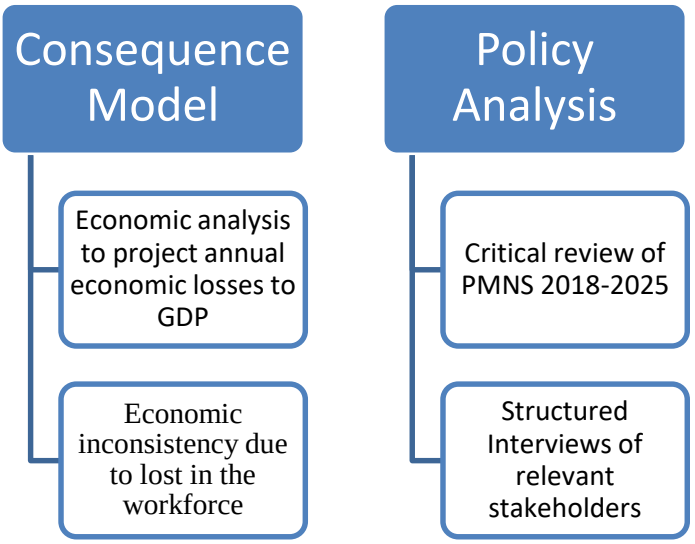
2.1 Conceptual framework:

As already stated in the research problem section that child malnutrition is not just a public health issue but a major economic challenge as well. It implies both short and long term costs in terms of burdening the GDP or lost in the future workforce.

In the context of Pakistan, the main determinants of malnutrition in children are their nutritional status, illness, nutritional status of their mothers, and environmental and community factors than poverty (Arif et al., 2012). Considering the nature of determinates and trends of child malnutrition in Pakistan, the government had developed a policy framework named “Pakistan Multi-Nutritional Strategy 2018-2025 to deal with the this emerging public health issue. The PMNS (2018-2025) aims to “Significantly and sustainably reduce the burden of malnutrition in the country with focus on most marginalized and disadvantage segments of the populations”.

Thus, the main argument in this study is that child malnutrition is not just a public health problem but economic challenge as well that has been carried out in objective one. To address this challenge “consequence model” is used to estimate economic

burden of child malnutrition on GDP because in order to signify the importance it is necessary to first diminish the current prevalence rates consequently the second objective of the study is concerned with policy analysis in which PMNS is critically reviewed before suggesting need based interventions. The "Consequence model" is derived from the report "Economic consequences of Undernutrition" published in 2017 by Planning commission, Pakistan in collaboration with WFP and SUN movement.



2.2 Determinants

(Yimer, 2000) conducted a study focusing on malnutrition levels in children and the risk factors associated with it in Southern Ethiopia. The study estimated the stages of malnutrition and examined the impact of a few socioeconomic, demographical and environmental variables on one of the elementary factors of malnutrition (stunting) in children in five overly populated zones of the "Southern Nationalities and People's Region (SNNPR)". The study took 850 children consideration aged 3-36 months, all three anthropometric protocols were used to identify the prevalence of malnutrition,

however detailed analysis was performed on ‘stunting’ specifically concentrating on the elements affecting malnutrition. The research employed both “bivariate and multivariate techniques” to examine the risk factors associated with malnutrition. The results showed that 45% of children were stunted, 42% underweight and 12% wasted. The author recommended initiating programs for income elevation, education, and child care for women of reproductive age in relatively poor households.

(Mian, Ali, Ferroni, & Underwood, 2002) examined the “nutritional status of children (school-aged) residing at an urban squatter settlement in Pakistan. The squatter settlement selected was a Muslim colony, Noorpur Shahan, Islamabad. Of the population of 1479 children between the ages of 5-10 years among 1147 households, 200 were schools adopting a systematic random sampling approach. The study was based on a cross-sectional design (qualitative and quantitative) so initially, the researchers carried out interviews (structured and semi-structured) with mothers, fathers, and mother laws regarding feeding practices and socioeconomic background, the researchers also implied anthropometric measurements to measure height and weight. The results presented that the average size of a family consisted of 5 members, a large portion (67%) had monthly income less than 3000/- PKR, 95% of women were house wives and the remaining were involved in odd jobs while for fathers 40% daily wagers, 26% salaried and 18% were indulged in small business or trade, it also revealed that malnutrition was more prevalent in older children and relatively poorer households.

(Thang & Popkin, 2003) conducted a study and reflected on “child malnutrition in Vietnam”. The study primarily examined the factors excluding income by discovering the socioeconomic factors that affect the health status of children due to high rates of underweight and stunting. The authors extracted data from “Vietnam Living

Standards Survey" (VLSS) 1997-98, and regression analysis was applied using the "Multivariate Logit" model. The main variables used in the study were; poverty status, total expenditure, minority status, and rural residence status with controls from many vital social and demographic measures. The study portrayed that children belonging to rural standings, relatively poor households, and minorities were malnourished; 17.6%, 10.9%, and 14.1% respectively as compared to children residing in urban areas, non-poor and native populations. Based on the results, it was evident that in Vietnam, minorities and rural poor were bypassed during the economic transition and dismantled the nutrition indicators of health in Vietnam.

(Collins et al., 2006) in their study discussed the "management of severe acute malnutrition (SAM) in children". The study highlighted the statistics that around 13 million children less than 05 years carry SAM from which 1 million to 2 million child deaths are preventable each year. The authors criticized that regardless of the trend, 'WHO does not distinguish the term "acute malnutrition". The study raised an important argument that inpatient treatment requires resources and trained staff, while SAM is common and the rate becomes high that it exceeds the inpatient capacity, resulting in the ineffective treatment (case mortality rates are 20-30% and coverage under 10%). Therefore, the study proposed the implementation of "community-based therapeutic care" that considerably reduces the mortality rate and increases the coverage rates, such programs have strong characteristics (better coverage and recovery rates, therapeutic foods, minimized opportunity costs, etc.) that make them successful and cost-effective.

(Mahgoub, Nnyepi, & Bandeke, 2006) evaluated a study and explored the "factors affecting the prevalence of malnutrition amidst children less than three years of age in Botswana". The study aimed to analyze the malnutrition level and the impact of other

social, economic and demographic factors on the nutritional status of children less than 03 years. Some other important factors included in the study were; parental literacy status, mother's nutritional knowledge, the total income of the family, occupation, area of residence (rural and urban), breastfeeding practices, and gender. The study was cross-sectional and relied on a questionnaire, the sample of mothers of children less than 03 years were selected (400 participants) from 23 regions. The results presented that 5.5% were wasted, 38.7% stunted and 15.6% appeared underweighted respectively, other factors that showed substantial association with child malnutrition were; income, mothers' education, and breastfeeding practices. Therefore, the Botswana government was suggested to focus on the establishment of maternal education and income and improved breastfeeding practices.

(Hirani, 2012) examined the "malnutrition in young Pakistani children", the objective of the study was to analyze the in-depth determinants (social, economic, political) of malnutrition among young children to develop need-based intermediations to avert and overcome the issue. The methodology of the study was based on a "systematic literature review" for that national, regional and internationally published literature was searched and taken into consideration from peer-reviewed databases ("MEDLINE, CINAHL, and PubMed") from 1991 to 2011. The authors also expanded their search for literature gathering from 'WHO' and 'UNICEF', books, newspapers, etc. The study concluded that malnutrition in young children in Pakistan is prevalent at individual, family, and community levels and multiple determinants play part in it while mostly their elements are interconnected. The study, therefore, suggested the implementation of composite interventions at the individual, family, and community levels in Pakistan.

(Arif et al., 2012) conducted a study concentrating on "Trends and determinants of

child malnutrition in Pakistan" at PIDE research institute. The main objective of the study was to reveal either poverty and child malnutrition has an association or not? The conceptual framework of the study was based on "household utility maximizing model" from which it was derived that there is a positive impact of per capita expenditure on weight-for-age while no strong association has been found with stunting and wasting. Therefore, the findings of the study suggested that household poverty status must not be considered as vital determinant of child malnutrition in Pakistan however, other determinants such as diseases, maternal health, community and environmental factors may be influential towards malnutrition.

(Ijarotimi, 2013) examined the determinants of malnutrition and its consequences for developing countries. The study was based on a qualitative research methodology aimed to highlight the elements triggering malnutrition which ultimately affect the normal growth cycle, cognitive and neurological development of children, and essentials to living a healthy life. The author explained that in many developing countries the said determinants are not established due to poverty, illiteracy, poor child feeding practices, untrained caretakers, and prevalence of infection. As a result, malnutrition raises further elevating high rates of morbidity and mortality in children in developing countries. Therefore, the study emphasized that there is a great need for local and foreign organizations to join hands concentrating on the programs specifically related to nutrition and for women empowerment to eradicate the poverty among women so that the high rise in nutritional problems could be diminished. The study was published in 2013 so the author focused on (MDG 1) and (MDG 4) to eliminate absolute poverty and decrease child mortality.

(Hecht et al., 2015) examined the relationship between "malnutrition and length of stay (LOS) at the hospital". The study was based on primary data and used a "multi-

center cohort" approach so initially, researchers selected a sample of 2567 patients from age 1 month to 18 years selected from 14 centers in 12 countries (Europe) considering the anthropometry protocol of the first 24hrs after admission. The study related the association of body mass index (BMI) and height/weight to length of stay (key outcome), frequency of exposure to vomiting and diarrhea, infections, variation in weight during the stay, and quality of life. To check the relationship, the researchers relied on WHO references for appropriate and practical choices to obtain nutritional status (globally). The results of the study showed reduced BMI and LOS for a large segment were dependent on age adjustments, chronic diseases, and gender, the LOS appeared to be at 1.3 days additionally for child patients having BMI < 2 SDS that ultimately increases the cost of treatment at the hospital.

(Gubert, Spaniol, Segall-Corrêa, & Pérez-Escamilla, 2017) conducted a study in Brazil, concentrating on the double burden of malnutrition in food-insecure households. The authors initiated that "Household food insecurity" (HFI) has a strong relationship with both; obesity among mothers and undernutrition among children, they argued that, in past, this alliance has not been formally studied for pairs (mother/child) residing together. Therefore, the primary objective of the study was to investigate the relationship of coexistence of "maternal overweight" and "child stunting" due to HFI. The study was based on secondary analyses and gathered data from "BDHS, 2006". The sample of 4299 pairs of age 15-49 was taken into consideration for analysis. The "hierarchical multivariable logistic regression analyses" was used to examine the relationship between HFI and DBM (double burden of malnutrition). The findings of the study suggested that the coexistence of obesity among mothers and malnutrition in children could be diminished if cost-effective programs and policies considering HFI are implemented.

(Khattak, Iqbal, & Ghazanfar, 2017) initiated a study focusing on the role of parents' educational status on malnutrition in children less than five years. The study aimed to examine the relationship between parents' literacy with malnutrition to suggest recommendations to develop the nutritional condition of the children. The authors piloted a case-control study taking into consideration 400 mothers as a sample from a primary health care center situated in a peri-urban community in Pakistan, the period set was from Feb 2016 to July 2016. The authors developed a self-constructed questionnaire consisting of 75 questions to gather data. The results showed that the average age of the mother appeared to be 27.1 ± 5.13; a vast majority of mothers were illiterate 168 (42%) while only 116 (29%) fathers were not educated. Almost 226 (56%) children appeared with normal nutritional status while 102 (25%) were mild malnourished, 52 (13%) had second-degree malnutrition and 20 (5%) were diagnosed with third-degree malnutrition. It was also observed that the normal nutritional status of children was significantly associated with higher parental educational status (p= 0.008) and maternal educational status (p= 0.011). Therefore, the study concluded that parents' education especially mothers' education required to be promoted in rural and semi-urban areas of Pakistan.

(Zhang et al., 2018) investigated a study to examine the nutritional status and associated risk factors in children less than 05 years, with a focus on the coexistence of malnutrition (over and under) in comparatively poor areas of China. The study relied on primary data and to obtain the prevalence of malnutrition (stunted, overweight, wasted, overweight) 6570 children were sampled from 26 counties (poor areas of China). To obtain estimates for overweight two indicators were used; weight for height Z score (WHZ) and BMI for age Z score (BAZ) and later results was compared. The results revealed that the total prevalence of malnutrition was 19.2%

while the estimates of stunting and overweight were 8.4% and 8.8% respectively. It also showed that children older than 12 months of age were stunted and significantly associated with primary education level (caregiver) in “multilevel regression models” while children younger than 24 months were significantly associated with overweight. Therefore, the study concluded that caregivers should be guided (with children at high risk or more prone to malnutrition) for improved and healthy feeding practices.

(Sand et al., 2018) in their study examined the determinants of severe acute malnutrition among children less than 5 years of age, it was initiated in a hospital located at Tharparkar-Sindh, Punjab. The study was hospital-based and developed a survey therefore semi-structured questionnaire was developed to interview mothers of children admitted to the hospital, the sample size of children was 105 for which WHO guidelines for height and weight measurements were implemented to obtain and record the data. The results revealed that 48% of children admitted to hospitals were classified with severe acute malnutrition among that 55% were males and 45% were females. The study also exposed the factors contributing to child malnutrition; income, size of the family, infections frequency, breastfeeding practices, and immunization status. Therefore, the study suggested improvements and betterment in the said factors; it also emphasized the sector-wise monitoring of these factors to address the issue of malnutrition.

2.3 Prevalence

(Pawellek, Dokoupil, & Koletzko, 2008) conducted a study on the “prevalence of malnutrition in pediatric hospital patients”; the study was carried out in a tertiary care children’s hospital, in Germany. The researchers undertook a series of unselected patients repeatedly admitted to the hospital, and a sample of 475 children aged 7.97 (mean SD) was drawn. The “Waterlow classification of malnutrition” was used to

obtain results for mild, moderate, and severe malnutrition. The results revealed that a total of 24.1% were malnourished out of that 1.7% were severe, 4.4% moderately and 17.7% were mildly malnourished. It also presented the common problems or triggers leading to malnutrition, a large segment of malnourished patients appeared with multiple diagnoses (42.8% malnourished), infectious diseases (34.5%), mental health issues (40 %), and 33.3% due to cystic fibrosis. Based on the results, the study concluded that the prevailing trends of child malnutrition are indigestible leading to serious challenges in the short and long term considering health status and wellbeing, therefore methods of screening and treatment of malnutrition require refinement and need to be enhanced.

(Bernal, Velasquez, Alcaraz, & Botero, 2008) conducted a study to explore the WHO guidelines for the cure of children suffering from acute malnutrition in grade 1 hospitals. The methodological framework of the study was prospective and descriptive analysis, with a total of 335 children taken into consideration less than 06 years suffering from moderate (17%), acute (83%), or severe malnutrition treated between 2001 and 2005 at Turbo, Colombia. The caregivers were 'WHO' trained staff, employed to look after these children following the 'WHO' guidelines. The results showed that the most common disease in children with severe or acute malnutrition (60.8%) was "Kwashiorkor", out of that 58% were younger than 1-year-old, while three identified complications were as follows; diarrhea (68.4%), sepsis (9%) and anemia (51%). On the contrary, children with moderate acute malnutrition showed the same trends as compared to children with severe acute malnutrition. The results presented a positive impact of 'WHO' implemented treatment as in the first-year mortality rate was 8.7% that diminished to 4.0% in the last year, therefore the study concluded that 'WHO' guidelines if applied (at class 1 hospital) could achieve

low mortality rates due to severe acute malnutrition.

Campanozzi et al. (2009) evaluated a study for hospital-acquired malnutrition in children with grade one clinical conditions, the study primarily aimed to recognize the symptoms of malnutrition at an early stage in children hospitalized. The sample of 496 children of age (01-192 months) with minor conditions from the “pediatric unit of the public city hospital of Foggia, Italy" was selected for examination. The weight of the selected patients was calculated daily while BMI was calculated for all patients. The study confirmed that all the children at the time of admission were malnourished either due to undernutrition or over nutrition. The results revealed that the hospital stay has a significant impact on the nutritional status of the children as it was evident in the study that already malnourished children were more prone to further deterioration during their stay at the hospital, and likely nutritional status was declined for all children identified by BMI Z-score.

(Burgos et al., 2012) examined the relationship between the “prevalence of malnutrition and its etiological factors in hospitals”. The primary objective of the study was to establish the prevalence of malnutrition in hospitals in Catalonia, Spain, to measure the association between malnutrition, demographic and social data, total costs, and mortality. The methodological framework of the study was based on a “prospective and multi-center approach” implemented on 796 patients from 11 hospitals. The stats extracted from data presented that 28.9% of patients were malnourished and at nutritional risk, the trend also exposed that elderly patients, patients with comorbidities, and those admitted in an emergency are more prone to get affected by malnutrition, the authors stressed that type of hospital also matters from service quality perspective. Therefore, the results confirmed that malnutrition is more likely to be existent in the hospital which also results in higher medical costs.

(Musa, Musa, Ali, & Musa, 2014) conducted a study in "Khartoum State, Sudan" aimed to explore the prevalence of malnutrition in children under five years. The study was descriptive and community-based so adopted a cross-sectional methodology, it included 505 families out of which 26% were males and 74% were females while from 411 children 47.4% were boys and 52.6% were girls. The primary data was gathered with the help of a questionnaire, 'anthropometric measurements', and clinical assessments of malnourished children. The results discovered that malnutrition surges with poor feeding practices while maternal education, poor dietary intake, and socioeconomic factors also play a significant role. Therefore, the study concluded that to avoid the surge of malnourished children, improved feeding practices and better mother's education are required.

Asim and Nawaz (2018) evaluated a detailed qualitative study exploring the literature to examine the status of child nutrition in Pakistan. The secondary objective of the study was to review the methodological framework used in published studies to identify the gap and undressed areas in this subject matter. The authors employed various databases and search engines to gather relevant information and mainly cited articles published between, 2000-2016. This narrative review eventually selected 28 articles to reflect and examine methodologies, the researchers found it evident that all studies used almost homogenous methodologies; a large segment piloted "cross-sectional quantitative and descriptive studies" implemented thorough structured interviews, and only one study used a mix-method approach. The malnutrition in children was assessed following WHO standards or protocols. The authors stressed that there is a dire need of understanding the qualitative and mixed methodologies for further in-depth analysis to have a better solution to diminish malnutrition in children.

2.4 Economic aspect

(Heltberg, 2002) in his study raised an important question "does economic growth reduces child malnutrition". The study aimed to explore whether economic growth has the same effect on chronic child malnutrition, also does growth similarly influence child malnutrition? The researcher highlighted the fact that the strength of the linkage between child health and income are crucial components during development policy and research. The study undertook cross-region analysis and used secondary data to answer the question, "a set of four continent dummies have cooperated with the growth rate of GNI". The results showed that economic growth does not affect stunting prominently for Sub-Saharan Africa while the three other regions indicated a substantial effect of stunting. The estimates suggested that other than in Africa, malnutrition incidence will be cut by 5-10% doubling the income depending on the region. Therefore, the answer to the question raised in the study is "YES", economic growth significantly decreases child malnutrition but not as much as observed in the case of Africa (south of the Sahara).

(Elia & Bistrian, 2009) conducted a narrative review on the "economics of malnutrition" because very limited literature and research are available on the economic consequences of malnutrition however a wide range of research has addressed its other aspects; psychological and physical. The author stressed that international studies suggested that the hospital cost rises by 30-70% due to disease-related malnutrition. The study presented that, in the United Kingdom "Malnutrition Universal Screening Tool" (MUST) is used for screening to identify the prevalence of malnutrition, it had been evident that due to malnutrition; length of hospital stays and rate of admission raised resulting in more visits form medical practitioner and outpatient visits along with the need to placement in care homes. The researcher

deployed utilization of these services with national representative costs which showed that in the UK in 2003 the public expenditure on diseases related to malnutrition estimated was approx. GBP 7.3 billion.

(Sanjay, 2011) evaluated a study focusing on the rising trend of child malnutrition and its relationship with economic growth. The author examined the incidence of malnutrition among children less than five years of age residing in the “Kutcha slums of Mumbai city”. The study showed that the incidence of stunting had an increasing trend leading to children's death due to severe malnutrition while the incidence of underweight appeared stagnant. The researcher employed the “Logit model” to signify the relationship between economic growth and the rising trend of child malnutrition, the results exposed that “incidence of child malnutrition is negatively correlated with per capita income, breast feeding, and health care facilities”. Therefore, the study concluded that the provision of supplementary food and staffing of more health practitioners would improve child health. Also, women's education in terms of technical training leading towards self-employment and investing in water supply, sanitation, and housing for dwellers could bring better outcomes.

(Moench-Pfanner et al., 2016) evaluated a study and focused on the monetary implications of malnutrition in children under 5 and pregnant women. The study was conducted in Cambodia to obtain the estimates of economic losses due to malnutrition. The “consequence model” was used to obtain the statistics; it applied the coefficient risk deficit on economic losses suggested in the global scientific literature towards the status of health in Cambodia and economic data to acquire a national estimate of economic losses due to malnutrition. The results showed that overall Cambodia bears an economic loss of 266 million USD annually due to malnutrition (1.7% GDP) in which stunting alone compromises the output by 120 million USD and

iodine disorders by 57 million USD. The authors argued that the said stats representing economic burden are very high and a challenge in way of economic development. Therefore, the study suggested that the Cambodian government should initiate or expand the low cost effective nutritional interventions to stop the prevailing cycle of mortality, poor health status, compromised productivity, and earnings.

(Rashad & Sharaf, 2018) commenced a study in Egypt, concentrating on economic growth and child malnutrition. The study examined the relationship between the growth of per-capita income at the province level with components of child malnutrition; wasting, stunting and underweight from the period 1992-to 2008. The data was obtained from the "National demographic and health survey" (DHS) and the "Logistic regression model" was applied to pooled data with regional and time fixed effects. The estimates showed that among children less than five years; 29% were stunted, 7.2% were wasted and 6% appeared as underweight in 2008. The study established a statistically substantial robust negative relationship between economic growth and said four components of child malnutrition; wasting, extreme wasting, extreme stunting, and underweight, the evidence revealed that in the last two decades the economic transition has helped combat child malnutrition in Egypt. The results also exposed that no substantial statistical association was witnessed between income inequalities and malnutrition outcomes as measured by Gini Index.

(Prentice, 2018) evaluated the double burden of malnutrition in low and middle-income countries, he argued that undernutrition has a strong correlation with the "wealth of nations" and as the country's wealth rises, the rate of undernutrition began to fall. Further, the author demonstrates that "Millennium Development Goals" (MDGs) were achieved by many countries except Africa, that was due to the rapid population growth. The study showed that despite improvement in the under-nutrition

(stunting and underweight) in a country, when the economic advancement is accelerated, the trend shows that there is another drawback; rising rates of obesity. This rise in the rates of obesity will eventually increase the health costs due to associated diseases especially diabetes, which also accumulates comorbidities. Therefore, the study suggested that authorities should tackle this double burden (under nutrition and over nutrition) timely otherwise this would appear as a challenge for the health systems of the low and middle-income countries (LMICs).

(Nugent, Levin, Hale, & Hutchinson, 2020) initiated a study to obtain the economic effects of the double burden of malnutrition which just do not increases the medical expenses but also restricts the households and individuals to be productive in their daily lives. This study includes the double burden of malnutrition to emphasize nutrition concentrating on overweight, obesity, and stunting that leads to compromised childhood development and more prone to infectious diseases and other non-communicable and communicable diseases as well. The study does not undertake the associated economic costs with the said conditions but it explored the prevailing approaches that are used for modeling the economic effects of the double burden of malnutrition and to identify the shortcomings in these methodologies. The study suggested that rather than relying on DBM for nutritional interventions, the economic evaluation analysis could be more suitable that perceives both stunting and overweight simultaneously, the authors experimented with this using cost-benefit analysis (economic evaluation) in children of age 4 and above by providing the improved quality meal at schools. Therefore, the result revealed that “Double-duty interventions” are more cost-effective and efficient as compared to “Single-duty interventions”.

(Laillou et al., 2020) investigated a study concentrating on nutrition (child wasting)

from the perspective of “Sustainable development goals” (SDGs) and their impact on the economy. Therefore, the study primarily aimed to acquire the trend of child wasting in Ethiopia and later account for the economic cost accompanying the slow progress towards the achievement of SDGs. The study applied the “consequence model” for coefficient risk-deficit on economic losses recognized in the scientific literature (globally) towards health status in Ethiopia, demography, and the economic data to monetize losses regarding child wasting. The results showed that the Ethiopian economy bears an estimated loss of 157.8-230.2 million USD per year while 43.5-63.5% (burden depending on the discount rate) million USD were projected in the account of supply costs and human resources mobilized to reduce wasting. Based on the results, the researchers suggested that Ethiopia should increase its annual average reduction rate (AARR) in children (<59 months) from 0.1% to 5.4% (wasting) to achieve SDGs (2030).

2.5 Cross country analysis

(Mason, Hunt, Parker, & Jonsson, 1999) evaluated a study focusing on situation analysis of child nutrition in Asia, a large portion of the study reflected on nutrition-oriented programs in eight Asian countries. The authors stated that the current trend of prevalence of child malnutrition in Asia is so high that it will take decades to cut the prevalence rate to half of the present rates. The study also showed that in most countries the nature of nutritional-oriented programs is similar however the coverage is very low which leads to ineffectiveness. The study proposed enormous expansion of community-based programs and capacity building so that quality services can be provided, such as breastfeeding practices, pre-birth care, healthcare access, and growth monitoring. The authors also argue that a strong network of local health workers is inevitable and is a crucial feature for the effectiveness of implemented

programs. In the end, the study suggested that programs specifically for micronutrient deficiency must expand to universal coverage to reduce child malnutrition.

In conclusion, considering the literature review or after analyzing the available research work executed on the subject matter, it is clearly identified that the present study focuses on the economic implications of child malnutrition (objective 01) later reflecting on the policy analysis (objective 02), while in past most of the work has been accomplished addressing the determinants of malnutrition in children that restricted the subject matter as public health problem but the present study has addressed its economic aspect. Therefore, the research gap in the study is defined by emphasizing the evidence based fact that child malnutrition is not just a public health issue but it also requires to be addressed from economic perspective (in context of Pakistan), using "consequence model" that allows projecting the economic impact of child malnutrition by applying the global coefficients from the scientific literature to this national health, demographic, labor, and economic data and by projecting the magnitude of annual loss (WFP, 2017) though determinants of child malnutrition suggests medical interventions to prevent it, the economic aspect suggests need based policy interventions to diminish the prevalence rates.

Chapter 3

DATA AND METHODOLOGY

The study is based on a mix-methodology (qualitative and quantitative) to meet the objectives and therefore divided into two parts;

a) Quantitative Analysis: The "Consequence Model" is used for economic analysis to project annual economic losses to GDP and lost in the workforce due to malnutrition in children under five of age.

b) Qualitative Analysis: The "Structured Interviews" of relevant focal persons/stakeholders were conducted for better and more effective policy analysis.

For objective 01; Secondary data is employed whereas the "Consequence Model" is acquired to draw the economic implications of child malnutrition after organizing and arrangement the data into Ms. Excel, later converting the data into a useful form, descriptive analysis is performed to obtain the results. The data is extracted from PDHS-2017-2018 and NNS-2018 while for some economic indicators and statistics; 'The Economic Survey of Pakistan, PBS, and WDI have been sourced.

Subsequently, for objective 02; a questionnaire was developed using the deductive approach based on 13 questions, and afterward using the CAPI method "Structured Interviews" of 05 relevant stakeholders were conducted using 'purposive sampling', comprising of; 01 consultant nutritionist, 01 Asst. Professor, 01 foreign and 02 national policymakers, belonging to; Nutritional International, Scaling Up Nutrition, PNDS, and NUMS. All the participants secure a demonstrated working history in the field of malnutrition in children. The responses were then longlisted in Ms. Excel and interpreted using bar graphs.

3.1 Quantitative Analysis

As stated, child malnutrition is not just a public health problem but also has implications for the national economy. To project the annual economic losses, the economy, the "consequence model" has been used.

3.1.1 The Consequence Model

Logic Model and Parameters to Project Economic Losses from Individual Indicators											
Number Affected		**Average Earnings**		**Labor Force Participation**		**Coefficient Risk-Deficit**		**Average Work-Life**		**Net Present Value (NPV)**		**Losses to Economy**
Prevalence **X** Risk Group	**X**	National $1410/y	**X**	National 55% Male 83% Female 22%	**X**	RR or % Deficit From Scientific Literature	**X**	50 Yrs Work life	**X**	Formula @ 3%	**X**	NPV $/yr.

Figure 1 Logic Model

The "consequence model" allows projecting the economic impact of child malnutrition in Pakistan by applying the global coefficients from the scientific literature to this national health, demographic, labor, and economic data and by projecting the magnitude of annual loss. Figure. 01 reveals the general presentation of the "logic model" (WFP, 2017).

3.1.1.1 Number Affected

Prevalence is denoted as the number of persons among the population having a specific disease at a certain period including all current and new cases and is the opposite of incidence, in which only new cases are incorporated (CDC, 2012).

Table 1. Prevalence rate and types of malnutrition in children

Total Population	*220892331*	***Number of Children Under 05***	*27962852*
Prevalence	**Total Number of Population under 05**		
	27962852		
	Types	**Percentage**	**No. of Prevalence**
	Stunting	40.20%	11241067
	Wasting	17.70%	4949425
	Underweight	28.90%	8081264

The values for the prevalence of all forms of child malnutrition are extracted from the NNS 2018 and the PDHS 2017-18 ((NIPS), 2017-2018). “The government official published reports: National Nutritional Survey, 2018 and Pakistan Demographic and Health Survey, 2018 have been used to fetch estimates for stunting, wasting and underweight.

Risk ratio or relative risk (RR) is the percentage chance of occurring a disease, mortality, or any other related outcome in an exposed group compared to the non- exposed group (“The Economic

Consequences of Undernutrition in Pakistan: An Assessment of Losses", 2017), it can be calculated from the formula;

(Prevalence*(RR-1))/(1+(Prev*(RR-1)))

Table 2 Risk Group

Risk Group	**Formula**	**(Prevalence*(RR-1))/ (1+ (Prev*(RR-1)))**
	For Stunting	**11241067*(1.11-1) / (1+ 11241067*(1.11-1)**
	(Prevalence*(RR-1))	**1236517.37**
	(1+ (Prev*(RR-1)))	**1236518.37**
	Division	**0.999999191**
	For Wasting	**4949425*(0.45-1) / (1+ 4949425*(0.45-1)**
	(Prevalence*(RR-1))	**-2722183.75**
	(1+ (Prev*(RR-1)))	**-2722182.75**
	Division	**1.000000367**
	For Underweight	**8081264*(1.55-1) / (1+ 8081264*(1.55-1)**
	(Prevalence*(RR-1))	**4444695.2**
	(1+ (Prev*(RR-1)))	**4444696.2**
	Division	**0.999999775**

The numbers for affected children from all forms of malnutrition (stunting, wasting, and underweight) are derived from the total population of children under 05 projected by the World Bank (2020).

3.1.1.2 Average Earnings

Average earning is labeled as the amount of money that individuals usually earn in a particular industry, area, or economy during a specific period (average earnings, n.d.). It includes both formal and informal sectors (shadow economy). It is obtained by dividing the average wage rate by the average estimated number of employees in the country (OECD, 2022). However, in a country like Pakistan, where a vast majority of people earn money from an informal sector that is unregistered, it is difficult to identify the average income of an individual.

Table 3 Average Earnings

Average Earnings	Source Estimates	Annual Income (Dollars)
	World Bank (2019)	1410

Therefore, the average wage rate has been determined from World Bank (World Bank,2019) ~ $1410 USD.

World bank has been considered as a reliable source for using economic indicators although there are other available sources to obtain average earnings/wage indicator such as ILO and WDI but the methodology of world bank is based on “GNI in U.S dollars (Atlas method).

3.1.1.3 Labor Force Participation

It refers to the ratio of the population that is actively participating in the economy through all kinds of services. The contrary to employment rate, it also incorporates the number of people vigorously looking for work along with the people those already engaged in work or are employed (WFP, 2017).

To calculate the rate of labor force participation, the following formula is being used;

Labor force / Total working-age population

and for the working-age population, the people from age 15 to 64 are perceived. Further, the indicator is adjusted down considering the age group, which is measured as a percentage of each age group (OECD).

Table 4 Labor force participation

		Total Number	Percentage
Labor Force Participation	**National**	**121490782.1**	**55%**
	Male	**183340634.7**	**83%**
	Female	**48596312.82**	**22%**

The statistics for labor participation in this assessment are reported by the World Bank and the International Labour Organization (ILO) as 55 percent of the total population, with 83 percent for males and 22.3 percent for females respectively.

3.1.1.4 Coefficient Risk-Deficit

The scientific literature suggests that, in the course of any specific disease among a population, the chances to develop negative outcomes extensively increase, such as; mortality, morbidity, and compromised productivity work due to mental or physical breakdown (WFP, 2017). For instance, due to the prevalence of malnutrition in children under five, there are chances of these mentioned negative outcomes that may adversely affect the children.

Table 5 Coefficient Risk Deficit

		Under 05 Child Mortality	Total Num. of Children Under 05	Relative Risk
Coefficient Risk Deficit	Due to Stunting	84672	11241067	0.007532381
	General	188160	27962852	0.006728927
	Total	272832	39203919	**1.119402936**
		Under 05 Child Mortality	**Total Num. of Children Under 05**	
	Due to Wasting	84672	4949425	0.003028017
	General	188160	27962852	0.006728927
	Total	272832	32912277	**0.45**
		Under 05 Child Mortality	**Total Num. of Children Under 05**	
	Due to Underweight	84672	8081264	0.010477569
	General	188160	27962852	0.006728927
	Total	272832	36044116	**1.55709347**

To assess the chance of developing these negative outcomes, relative risk (RR) is used. The relative risk compares the probability of dying for a certain population group in contradiction to the risk of death for all other population groups (Services, 2004). E.g. The mortality rate in children under five suffering from malnutrition versus the possibility of death among all other non-malnourished children. i.e. formula;

RR = Risk in One group (Group A) / Risk in all other groups

3.1.1.5 Average Work-Life

It refers to the period on average, in which an individual during their lifetime indulges in some sort of economic activity to earn a livelihood (author). To determine the value of lifetime future productivity amidst loss to childhood malnutrition is difficult to obtain because not everyone performs the same kind of work and consequently the time to enter and end work life varies.

Table 6 Average work-life

Average Work-Life	No. of Years
	50

(The estimate of 50 years' average work life is drawn from "The Organization for Economic Cooperation and Development,2022)

However, in this assessment, 50 years is supposed as average work-life, considering that children at the age of 15 become eligible for work (i.e. to be employed or unemployed) and until the age of 65 years (OECD, 2022). For instance, the earning projections cannot be estimated for a child that is born in 2021, until the child becomes eligible or enters the workforce in 2036.

3.1.1.6 Net Present Value (NPV)

NPV represents the "present value of cash flow at the required rate of return of the project compared to the initial investment" or in simple words, it projects the return on the investment. The NPV allows forecasting the future value in the present currency by applying the rate of interest or discount rate (FERNANDO, 2021). However, whenever NPV is used to analyze data for the health and development sector, the discount rate is presumed a "social discount rate" that represents the

particular preference for present over future savings instead of taken as the conventional interest rate. It is denoted by the formula;

$$NPV = R_t / (1 + i)^t$$

3.1.1.7 Losses to the Economy

Despite being a public health issue, malnutrition enormously imposes an adverse impact on individuals, households, and the national economy in the shape of direct and indirect costs (glopan)[1]. However, in particular, due to the prevalence of malnutrition in children under five the short and long term economic prosperity is compromised, as child malnutrition also causes long term economic inconsistency due to loss in work force along with the current burden on GDP as a result of impeded learning, poor school performance, compromised productivity at work, and high health care costs (author).

3.2 Qualitative Analysis

To draw effective policy outcomes after reflecting and obtaining empirical results, it is important to analyze the current and previous policy frameworks to suggest new strategies. For this, none is the best source other than the involvement of relevant stakeholders. Therefore, the following steps have been followed for effective policy analysis;

3.2.1 Non- probability Sampling (Purposive Sampling)

Non-probability sampling techniques are widely used in qualitative and exploratory research. In this kind of research, the goal is not to examine a hypothesis regarding a huge population, but to develop a basic understanding of a small or less researched

[1]Global Panel on Agriculture and Food Systems for Nutrition

population (Qualtrics)[2]. Since objective two of the study was to analyze policy framework, therefore relevant stakeholders were approached in a non-random way to be included in the research considering their experience and relevance to the subject matter (child malnutrition). Particularly, during the sample selection process, the purposive sampling technique was used because it enables the researcher to rely on their judgment and capability to choose a sample that is most suitable for the research.

According to (McCombes, 2019) "purposive sampling is frequently used in qualitative research, wherever the researcher needs to gain in-depth knowledge about a specific phenomenon rather than make statistical inferences, or where the population is very small and specific. An effective purposive sample must have clear criteria and rationale for inclusion".

Therefore, considering the nature of the objective and after selecting the sampling technique, 05 stakeholders were chosen to be interviewed for the analysis. The participants were selected using LinkedIn profiles (02) and through official email addresses extracted from the official websites of their organizations (03) i.e. Nutritional International, Scaling up Nutrition, Pakistan Nutrition, and Diatec Society. Further, to acquire comprehensive and detailed responses a questionnaire was developed and structured interviews were conducted using the online module (CAPI) after getting consent from the respondents.

[2] https://www.qualtrics.com/experience-management/research/non-probability-sampling/

3.2.2 Structured Interviews

In qualitative research methodology, an open-ended structured interview is a useful approach, where the researcher intends to draw results based on the experience of the respondent, which increases the credibility and reliability of the outcome. A structured interview also relies on the standard sequence and follows the same context, which diminishes the negative impact of 'context effects' because all questions were placed in the same order for all the respondents, doing this also increases the element of validity (Blackman & Funder, 2002).

According to (Bingham & Witkowsky, 2021), This method is useful when researchers have a broad list of interview questions since it assists in targeting the precise phenomenon or understanding that the researcher is investigating. It makes the interview convenient and allows the examiner to gather correct required information, so the chance of missing any important point is less which also avoids re-conduct interviews in case of forgotten questions. Further, with each question asked in the questionnaire, the respondents were allowed to explain their opinion for a better understanding.

3.2.3 Exploratory Questionnaire

It is a type of questionnaire that allows the examiner to conduct an in-depth understanding of the research problem during the survey or an interview to expand understanding of an existing phenomenon and to attain additional insights for a precise outcome (Voxco)[3].

[3] https://www.voxco.com/blog/exploratory-research-questions/

As stated, since the study aimed to reflect on policy insight in objective two and open-ended structured interviews were preferred, hence exploratory questionnaire was settled comprising 13 questions using a deductive approach.

In qualitative analysis, the deductive approach is used to test an already established theory using a "top-down" approach that allows the examiner to induce from literature, theory, and propositions depending on the objective of the study (Bingham & Witkowsky, 2021).

The questions were established mainly focusing on elements that contribute to child malnutrition, ways for elimination, program implementation, financial limitations, and the role of monitoring and evaluation, particularly in the case of Pakistan.

Moreover, considering the COVID-19 SOPs and time constraint barriers, the online module was selected for conducting structured interviews using an explanatory questionnaire After giving a general description of the research and its objectives through email and the telephonic conversation to the targeted stakeholders, the questionnaire was shared via email to all the participants.

3.2.4 CAWI (Computer Assisted Web Interview)

Computer Assisted Web Interviewing or CAWI is another name for online surveys or interviews, which are surveys administered through a web browser or mobile application. Links for CAWI surveys can be sent through multiple methods, including email, mobile application notifications, online advertisements, and SMS messages. CAWI surveys support both closed-ended and open-ended survey questions (ELLIOTT, 2021). Based on the CAWI principle, the developed questionnaire (.pdf) was then shared with respondents via email. The responses were gathered and

longlisted in Ms. Excel for analysis using a pivot table. However, the arguments and suggestions from the participants are discussed in detail in Chapter 05.

Chapter 4

RESULTS AND DISCUSSION

In this chapter, empirical results are derived step by step by applying the "Consequence Model" and estimating the total burden of malnutrition in children on GDP and economic inconsistency due to lost of workforce by applying the coordinates of consequence model described in chapter 03. Further, the key findings obtained from the interviews are also presented.

4.1 Applying Model:

Table 7 Applying "Consequence Model" using its coordinates

Prevalence	**Number Affected**			**Average Earnings**		**Labor Force Participation**		**Coefficient Risk Deficit**		**Average Work Life**
	Stunted	0.402						Stunted	1.11	
	Wasted	0.177						Wasted	0.45	
	Underweighted	0.289						Underweighted	1.55	
	X		**X**	1410	**X**	0.55	**X**		**X**	50
	Risk Group									
	Stunted	0.99								
	Wasted	1								
	Underweighted	0.99								

No. Affctd*Risk Group	Stunted	0.39798						1.11		
	Wasted	0.177	**X**	1410	**X**	0.55	**X**	0.45	**X**	50
	Underweighted	0.28611						1.55		

Table 8 Number of affected risk group

Number of Affected Risk Group	
For Stunting	**17129.1587**
For Wasting	**3088.42875**
For Underweight	**17195.56864**

The table 08 represents the estimated numbers of affected risk group separately for stunting, wasting and underweight comprising of mixed units (prevalence, average earnings, labor force participation, average work life, coefficient risk deficits), therefore, it is incomplete without using the NPV formula collectively for all forms of malnutrition as prescribed in the consequence model in order to obtain the estimates (economic value). As stated, whenever NPV is used to analyze data for the health and development sector, the discount rate is presumed a "social discount rate" that represents the particular preference for present over future savings instead of taken as the conventional interest rate. A 3% discount rate has been used to calculate NPV of lost future earnings as a result of child mortality or growth deficits in childhood.

Table 9 Net present value

NPV	NPV = R t / (1+ i) t	
	Required return	3%
	NPV =	**$35,277.77 USD**

The total GDP of Pakistan was $280 Billion USD by the end of 2021 (Economics, 2022), that has been taken into consideration to acquire the burden of children malnutrition on the GDP.

Table 10 Percentage losses to GDP

Total GDP of Pakistan	**$280 Billion USD (2021)**
Equivalent (Converting in thousand)	280,000,000 USD
Losses to the economy	$35,277.77 USD
Percentage	0.0125%

Table 11 Losses to the economy

Losses to economy	**$35,277.77 USD**
Losses to economy as Percentage of GDP	**0.0125%**

The result significantly shows that the country is losing **0.0125%** of its GDP each year on account prevalence of malnutrition in children (under 05) as per the estimate for the year 2021.

Estimating lost in future workforce:

As discussed, the long term economic implications of malnutrition in children due to lost in future workforce is as follows;

Attributed Deaths		**Average Wages**		**Labor Force Participation**		**NPV: Work life**		**Delay Earnings**		**NPV**
188160	*	1410	*	0.55	*	$12.50	-	15	=	$1,823,975,985.00
										$1.82
Lost in future workforce due to malnutrition in children per annum										**$1.82 Billion/y**

"The valuation projects a 50-year work life, based on children entering the workforce at age 15 and continuing to work until 65 years of age, which constitutes a few years less than Pakistan's national life expectancy at birth, therefore, Delay Earnings=15 was subtracted".

This shows that 188160 children die every year in Pakistan before their fifth birthday because they or their mother are malnourished. The value of this lost future workforce

is estimated at US$1.82 billion annually.

On the contrary, the estimate for lost in future workforce due to malnutrition in children as per the coordinates for PDHS 2012-2013 were accounted as $1.96 Billion, that indicates that overall the economic consequences of malnutrition in children have improved however the intensity of improvement is not much satisfactory.

Attributed Deaths		**Average Wages**		**Labor Force Participation**		**NPV: Work life**		**Delay Earnings**		**NPV**
177180	*	16111	*	0.55	*	$12.50	-	15	=	$1,962,379,222.50
										$1.96
Lost in future workforce due to malnutrition in children per annum										**$1.96 Billion/y**

Empirical Findings

The results obtained from the "Consequence Model" clearly reflect the significance of the economic implications of child malnutrition and it is now evident that malnutrition in children has a direct impact on the national economy. Pakistan has already faced many economic challenges in which child malnutrition also contributes to downsizing the GDP by 0.0125%, that has both short and long term implications. For Instance, particularly in case of Pakistan, in the short run the total GDP is compromised by 0.0125% as an opportunity cost of GDP growth while in the long run it would have multiplier effect when these malnourished children will not full participate or contribute in the national economy in terms of losses in the future workforce as a result of child malnutrition, restricting the affected children to use their full potential or productivity as compared to normal children, which approximately accounts for

$1.82 Billion per annum.

Moreover, besides the health and economic issue on a national level, it also has an impact on countries ranking on the global SDGs agenda. This area falls under SDG 3; “Good health and wellbeing”, which means “To ensure healthy lives and promote well-being for all at all ages." To achieve the goal, a lot of adjustments at both the micro and macro level are required. For which, a detailed qualitative analysis is necessary that has been incorporated in the study after interviewing relevant stakeholders covering key determinants.

4.2 Discussion of Qualitative results

To diminish the rate of child malnutrition the measures must be taken initially addressing the root cause and subsequently focusing on other health and economics-related actions to eventually meet the goal. Therefore, an exploratory questionnaire methodology has been adopted while interviewing the respondents (05). In the section below, the results obtained from the qualitative analysis are discussed in detail;

4.2.1 Primary cause of malnutrition in children

It has been identified from the results that the two leading sources of malnutrition are; ‘Poverty and Maternal health’. First of all, if someone has access to adequate food through a sustainable economic level, then maternal health will improve with maternal education. Therefore, poverty alleviation is directly proportional to improved maternal health and education (F. Zeb, personal communication, January 19, 2022). In Pakistan poverty is the main reason, a typical poor family has many difficulties, and adequate food for the children is always a problem. Many poor families find it difficult to provide milk and eggs to their children, as they cannot afford them (R. Khan, personal communication, November 11, 2021).

Further, the first ‘1000’ golden days of life are critical for the growth and development of the child, For the first ‘500’ of these days, from conception to about 6 months of age, the infant is entirely dependent on its nutrition on the mother: via the placenta and then ideally via exclusive breastfeeding. This has resulted in greater attention to children under two, including efforts to ensure safe delivery and increase survival, and the promotion of appropriate infant and young child feeding practices. Actions have been directed more to the child than to the mother (I. Danish, personal communication, November 08, 2021).

Moreover, having better maternal health and education empowers mothers to make better choices for their babies and be in better health themselves. However, many times it’s partly because of poverty that mothers are unhealthy and don’t have access to family planning. These are all related and should be addressed when it comes to malnutrition (M. Daget, personal communication, October 02, 2021). Poor care of women in pregnancy and childbirth could pose a longer-term risk to the health of the child, as well as increasing immediate risks for both mother and child. *Immediate* causes of malnutrition are inadequate dietary intake and illness. The *underlying* causes that lead to inadequate dietary intake and infectious disease include inadequate household access to food, poor health services, unhealthy environments, and inadequate care for women. to prevent bad maternal health, women need to be educated/council to improve their health. Government shall formulate a policy to incentivize women with poor backgrounds (S. Raza, personal communication, January 02, 2022).

4.2.2 Role of breastfeeding (BF) practices in infants

During interviews, all respondents strongly endorsed that BF practices have a significant impact on the health of infants. To avoid the risk of malnutrition in children, mothers must educate and ensure the importance that BF is beneficial for both children and the mother itself, it also decreases the burden on the household budget (F. Zeb, personal communication, January 19, 2022).

Awareness has to be created among the women on a nationwide basis that breastfeeding is very necessary for the first six months, NGO's can play a significant role. The relevant ministries should include food and nutrition-educated NGOs in their plans (R. Khan, personal communication, November 11, 2021). BF practices must be ensured through the adoption of "Behavior Change Communication" and "Implementation of Protection and Promotion of Breastfeeding laws" (I. Danish, personal communication, November 08, 2021).

Improvement in breastfeeding practices has many advantages to reduce the rate of malnutrition. However, this alone is not enough. If we take the example of Burundi, it has a very high rate of exclusive breastfeeding (above 80%), however, it also has the highest rates of stunting in Africa. The benefits of breastfeeding are multiple: children get their mothers' immunity; the milk is adapted to their needs. However, for that to happen the mother needs to be healthy herself. To increase breastfeeding practices, countries need proper legislation (and enforcement) on Breastmilk substitutes and parental leave (both for men and women), they also need proper maternal education. In some countries, religion also has an impact on those practices and religious leaders should be made part of the strategy because they have a role to play (M. Daget, personal communication, October 02, 2021).

To literate women about the benefit of breastfeeding through mass media, and community sessions/seminars. Breastfeeding may yield economic benefits to women. It allows the mother to feed her offspring relatively independently of the source of her food, relying on her stores of energy, macronutrients, and micronutrients. Breastfeeding practices can be enhanced through good practices i.e. establishing breastfeeding corners at health facilities, ensuring KMC services, and breast pumps usage (S. Raza, personal communication, January 02, 2022).

4.2.3 Cost-Effective Approach

In response to suggest a cost-effective approach; Growth monitoring (02), Immunization (01), and Social safety nets (01) have mainly opted as an economical way of tackling malnutrition in children in the first '1000' days of life. Nutrition education considering the "life cycle approach" is important during the antenatal visit also the family of pregnant and lactating women should be educated about nutritious and safe diets (I. Danish, personal communication, November 08, 2021).

However, as long as policymakers keep prioritizing one element (or sector) over others, it will be difficult to achieve the objectives because everything is interdependent. Therefore, each ministerial sectoral plan must include nutrition; health, education, agriculture, social affairs, finance, family and planning, etc. into consideration (M. Daget, personal communication, October 02, 2021).

4.2.4 Family system

The family system plays a vital role in the health of children because they are in the developing stage, for this 'Nucleus' and 'Joint family' systems have a decisive influence on child health. The nucleus family system allows proper accessibility, availability, and equal utilization of the food (F. Zeb, personal communication,

January 19, 2022). Each structure has both pros and cons but usually, children in the Nucleus family system have more access to food (I. Danish, personal communication, November 08, 2021).

In Pakistan, especially in the rural areas, there is a common practice of sharing food among family members, neighbors, and relatives. There is easier in a joint family system when it comes to food sharing (R. Khan, personal communication, November 11, 2021). A joint family system may sound easier to put in place (this would potentially reduce big inequalities). In the same way that as long as the world individually deals with their issues, issues will never have been solved. We, as humans, live in an ecosystem. Everything we do has an impact on others (M. Daget, personal communication, October 02, 2021). Moreover, the joint family system allows the availability of multiple caretakers and substitutes to parents are well-established family structures that play a pivotal role in the upbringing of a child not only for nutrition but for developmental milestones and achievements (S. Raza, personal communication, January 02, 2022).

4.2.5 Role of family size

The role of family size has a significant impact on a child's health because there is a strong correlation between resource availability and utilization. To control the family size more opportunities should be created for women to earn income because when women like men are also busy in income generation activities, then the family size will be smaller, and more attention will be given to fewer children (R. Khan, personal communication, November 11, 2021).

If the family size is big then there must be the presence of employment opportunities to maintain the balance, Women should also be empowered to support their family in earning (I. Danish, personal communication, November 08, 2021).

The size of the family must be controlled by effective family planning and to decrease the population growth rate alongside improving the literacy rate so the dependency ratio could be minimized (S. Raza, personal communication, January 02, 2022).

4.2.7 Therapeutic food and cost-effectiveness

The results have shown that “therapeutic food” intervention alone is not very effective from the aspect of cost-effectiveness. It might be useful in the short run but its effects are not sustainable in the long run if not adjusted with long-term intervention (M. Daget, personal communication, October 02, 2021).

4.2.8 Impact of Father's income

It has been found that ‘father’s income’ is among the primary determinants of the prevalence of child malnutrition because the father is mainly responsible to provide for essential family needs.

Therefore, if the father has a good income it will allow the children to explore and more access to adequate food that will eventually nourish the mental and physical health of the children otherwise if the father has no proper source of income then this household instability will push the family into the poverty trap. In many countries, fathers are the main providers of the family. Without appropriate financial resources, the family will be stuck in poverty and this will affect the family’s health (M. Daget, personal communication, October 02, 2021).

4.2.9 COVID-19 and SDGs

Good health and well-being are one of the global agendas under “Sustainable Development Goals” that embark on health as the basic need for people of all ages. However, it becomes an adverse impact due to the COVID-19 outbreak.

Therefore, all health-related national policies and programs also slowed down

resulting in delayed effective outcomes, such as improved diets will be difficult to maintain because of issues related to access to food. Unemployment and rises in prices mean that fewer households will be able to afford the best nutrition choices for their diet health (M. Daget, personal communication, October 02, 2021).

4.3.0 Council of common interests

The "Council of Common Interest" (CCI) has approved 350Billion rupees for tackling malnutrition induced stunting in Pakistan; aiming to reduce malnutrition from 40.2% to 32% and acute wasting to 10% from 17.7% by 2025 and consequently effective strategies are required for efficient utilization of the resources. The respondents suggested many schemes; Hiring a skilled people to intervene in the nutrition program (Nutrition Experts) along with School Nutrition programs, Safe and healthy food programs in the community, health centers, and education (F. Zeb, personal communication, January 19, 2022.

Another respondent stresses that 350 billion Rupees can play a significant role in the short term and the amount should be used for subsidizing food in Pakistan keeping in mind tackling malnutrition in children while a further amount should be provided for this in the next budget (R. Khan, personal communication, November 11, 2021). In addition, it was revealed that although, PC-1 has been approved money has not been allocated in the first year of the project (I. Danish, personal communication, November 08, 2021). Moreover, a joint multi-sectoral strategy for nutrition that would integrate nutritional interventions, educational programs, and social safety nets would be implemented as Pakistan is very active within the SUN Movement (M. Daget, personal communication, October 02, 2021). Likewise, to execute educational programs regarding mother-child healthcare and nutritional intervention shall be started after the health education (S. Raza, personal communication, January 02,

2022).

4.3.1 Food Fortification

The results revealed that it is one of the useful yet critical approaches to diminish child malnutrition However one should not forget that many times the issue is affordability and availability (remote areas where we see the highest levels of malnutrition may not all have access or availability of these products) (M. Daget, personal communication, October 02, 2021).

4.3.2 Pakistan Multi-Sectoral Nutritional Strategy (2018-2025)

It is one of the most defining strategies in response to eliminating malnutrition among children. It is the "GPS" that will guide all actors and interventions. What is also important is to have a strong accountability mechanism as well as a robust data system (for monitoring and evaluation) to be able to address any issue as quickly as possible. Government and partners also need to fund so that interventions can be implemented. Capacity strengthening is also key as some countries sometimes have the money but no qualified workforce to work in the field. Civil society is key at the subnational level as they usually are the operational arm supporting the government (M. Daget, personal communication, October 02, 2021).

However, financing is the main challenge to efficiently executing the environment because the government has developed the implementation plan but still resources are not allocated to implement this plan (I. Danish, personal communication, November 08, 2021).

4.3.3 Monitoring and Evaluation

There are many factors involved that decide the attainment of any program but "Monitoring and Evaluation" is the key element for which institutional environment and costing are identified as the main factors. Therefore, if more than adequate funds are provided for monitoring and evaluation, it will set up such a network that will be very helpful in the success of the national health program. Proper M&E can turn PMNS (2018 -2025) toward success (R. Khan, personal communication, November 11, 2021).

However, Non-serious National Priorities and health goals can turn into a great challenge for PMNS towards target achievement (S. Raza, personal communication, January 02, 2022). Another important element to keep in mind is that the lack of M&E often leads to duplication of activities and doesn't allow to take corrective actions when needed to stay cost-effective (M. Daget, personal communication, October 02, 2021),

Chapter 5

Policy Analysis

In this chapter, “Pakistan Multi Nutritional Strategy” (2018-25) have been critically analyzed afterwards policy formulation has been designed depending on the results obtained from qualitative and quantitative analysis. Since the research concentrates on the prevalence of malnutrition in children (under 05) and emphasizes the importance to diminish it, the research comprises of “Directional Policy Analysis” that allows to classify and categories, the strengths, capabilities and current situation matrix used to implement organizational or national policies (Meldrum et al., 1995)

The prevalence of malnutrition in children has lifelong consequences on the health of the affected person, their household income, and the national economy. Malnutrition in it all forms; stunting, wasting, and overweight contribute to the depletion of lifecycle in terms of increased mortality rates, high treatment costs, and loss in the workforce as a result of compromised physical growth along with weak cognitive development. Good health is the basic requirement to live a natural life but whenever it's adversely affected, it is the immediate responsibility of the government to provide adequate health services whenever and wherever a sick person needs them. However, the government alone can't tackle the problem, therefore all ways of disease prevention must be taken into consideration than later imparting on the curative side of the disease. The prevalence of such disease results in an adverse impact on both national and global health goals, to diminish the prevalence of child malnutrition a strong policy framework from identification to implementation of the problem must be established. The PMNS, existing national health plan to deal malnutrition is critically review and presented in the study before suggest needful interventions.

5.1 Critical Review of PMNS (2018-2025)

5.1.1 Introduction

Pakistan Multi-Sectoral Nutrition Strategy was developed to provide strategic direction towards the prevalent issue of malnutrition by implementing nutrition specific and sensitive interventions. Malnutrition in all its forms (stunting, wasting, underweight) found to be highly widespread in infants, children and women of productive age and it is evident from global literature that a complex multi-sectoral framework is required accompanying the institutional, political and policy processes for nutrition. Malnutrition is not only a threat to GDP but it badly impacts the health of future generation of the country, therefore there is a dire need for eradication of malnutrition rates on priority for which several global agenda/vision are working namely SDGs[1], ICN-2[2], SUN Movement[3] while in Pakistan, PMNS provides vision for diminishing the malnutrition rates by 2025.

5.1.2 Summary:

The PMNS aims to cover all the aspects of nutrition strategy from planning, executing and implementing the policy framework to establish coordination among provincial, federal or national policies in line with the global protocols while developing efficient reporting mechanism for effective monitoring and evaluation.

The main objective of PMNS includes:

1. Alignment of provincial goals with national objectives and international standards while facilitating the national reporting in line with global principles.
2. Achieving economies of scale during capacity building, procurement,

[1] Sustainable Development Goals
[2] Framework of Second International Conference on Nutrition
[3] Scaling Up Nutrition Movement

logistics and M&E when coordinating provisional program design for implementation.

3. To scale up the interventions on national scales by opening channels between provisional programs such as information sharing, experiences and lesson drawn from practices.
4. Establishing inclusive environment for the federal technical institutions by enabling the national policy environment.

On the contrary, interventions specific for nutrition covers therapeutic and preventive strategies to deal with malnutrition that includes:

- Organization of severe, moderate and acute malnutrition.
- Improved antenatal services to pregnant women with provision of folic acid and iron, monitoring the severe anemia alongside nutritional health counselling
- Ensuring enough protein intake to key risk groups.
- Adolescent and maternal multiple micro nutrient supplementation.
- Infants immunization for preventable diseases.
- Supplementation of Vitamin A to children of 06-59 months.
- Food fortification.
- Providing counseling, support and promotion of complementary and optimal breastfeeding prating.
- Sensitizing and counseling to key risk groups including deworming of pre-school and school going aged children.

Moreover, the PMNS has broad set of nutrition sensitive intervention based on thematic areas such as: Food security, education, gender equality, family planning, sanitation, access to clean water and social protection.

For the smooth implementation of all above said interventions/objectives, The PMNS has a mechanism to monitor and report these agendas via “Nutrition Lens”, the aim is to intrude where necessary and to see budget preferences as well.

Lastly, PMNS has an extensive set of 08 key strategic objectives to stick all stakeholders for planning, coordination and mobilization of resources to empower administrative environment.

5.1.3 Evaluation:

In the light of all above discussed interventions, objectives and strategies it is evident that PMNS has an effective mechanism to deal with malnutrition however, few areas require more contribution to end the malnutrition.

At First, the all four objectives of PMNS are more centered towards focusing on the institutional environment which is good to an extent but this will also promote the environment of dependency. The provincial bodies will set and implement goals based on outward approach (considering competitors) while every province or state has its own set of problems. Too much reliance and coordination will filter and oversee that set of specific problems.

On the other hand, the nutrition specific interventions of PMNS concentrating on therapeutic food and preventative measure have covered almost covered the minor and major aspects however, as far as only malnutrition in children is concerned, more interventions must be included in the agenda for effective results such as growth monitoring mechanism of fetus till it reached 59 months of age. Further, from preventative health strategy, these are the apt measures to adopt however, in order to deal with the current malnutrition rates or prevalent cases, an effective curative health strategy is missing, only relying in therapeutic food is not enough. The nutrition sensitive interventions are although based on key thematic areas but Pakistan is a

development country and people often struggle for basic necessities to these must be revisited such as it must include subsidized food, shelter, education and basic health facilities for relatively poor people. Administrative environment plays important role in designing, planning, executing and implementing policies or program, PMNS has an effective mechanism for this having 08 strategic objectives.

5.1.4 Conclusion:

Considering the above arguments, it can be seen that PMNS has the ability to diminish malnutrition rates with some new interventions based on solid arguments. The current structure of PMNS has strong organization of institutional environment. However, costing is not deliberated in the strategy as it should, therefore mechanism for costing should be indulged in the national strategy.

It also has the sound justification for preventative health strategy exhibiting the therapeutic food but does not addressed the curative side for prevalent cases, therefore curative health strategy for malnourished people must be indulged for better outcome, also costing is missing in the national strategy while institutional environment was the center of argument, thus budgeting must be take into consideration for cost effective choices.

5.2 Economic Cost of Child Malnutrition

The estimated total cost or burden of malnutrition in children is projected as 0.0125% of the GDP, which is a massive amount that could be reduced and put to use for better health outcomes or other welfare purposes. Thus, the economic consequences of children's malnutrition are severe and long-lasting making this health issue also an economic challenge. To strive for equilibrium in the leakages and injections of GDP, such as health-related diseases, and to deal with the disease-related programs, the cost could be minimized through established preventative health systems instead of

curative health systems. In his way, short-term disease-related economic losses could be reduced but another aspect of child malnutrition is long-term consequences in terms of the lost future workforce due to conceded productivity, which approximately accounts for $1.82Billion per annum. This irreversible damage to the economy must take into consideration during the policy-making process and funds must allocate accordingly however financing alone is not enough to eradicate the issue but a trained workforce is also required to obtain effective outcomes. Therefore, all the economic and administrative costs for program implementation must be compared and taken into consideration before the allocation of resources.

Malnutrition as a whole is a very pressing dilemma however its implications for children could be severe because children are the future resource of the nation and their development both physical and mental is a crucial part of growth. Thus, malnutrition in children in any form (stunting, wasting, overweight) could be damaging for the physical growth or cognitive development leading to conceded productivity as a result of fatigue and lack of attentiveness due to deficiencies of essential nutrients. Specifically, the first 1000 days of life in children are termed as detrimental as per health experts and also these children of this age group are more prone to be malnourished. Therefore, the analysis is executed for children under the age group of five particularly so a better and more effective possible policy action could be suggested.

5.3 Stakeholder's View

A wide range of policy actions has been already acquired from the relevant stakeholders (interview respondents). Below are policy response options to tackle the issue;

Disease-Related:

1. Nutritional Interventions
2. Educational Programs
3. Social Safety Nets
4. A Joint multi-sectoral strategy incorporating all of the above (03)
5. Food Fortification

Program-Related:

1. Monitoring and Evaluation (PMNS, program implementation-oriented)
2. Institutional environment
3. Costing

Since the possible policy actions two major categories are drawn; 'Disease Related' and 'Program Related' policy action. During the analysis, it has been observed all policy suggestions eventually lead to the above-mentioned actions. Mother's education and nutritional interventions such as; growth monitoring, immunization, and therapeutic foods (RUTF) were considered primary sources that can be useful to eliminate malnutrition in children. The provision of social safety nets to the affected household may also contribute to reducing the numbers. Moreover, food fortification was also suggested as a useful technique but it has some limitations like affordability

and availability in the remote areas (rural) due to poverty that also affects the maternal health.

After analyzing the set of policy actions drawn from relevant stakeholders from both disease and program-related intrusions and analyzing previous and existing policies. Following strategy is suggested to policy makers keeping in view the set of criteria suggested by stakeholders.

1. Preventive health strategy

From the literature review and interviews, it has been observed that government expenditure in response to child malnutrition is too high in terms of funds mobilization for programs implementation (PMNS 2018-2015), Food fortification, etc. On the other hand, the existing cases or prevalence rates are also downsizing the GDP as already discusses in detail. Ultimately double burden of child malnutrition will occur and subsequently lasting adverse impact on health-related national and global goals. The curative health strategy validates the prevalent cases (program-oriented implementations) but new cases (incidence) must be treated under the preventive health strategy to control the number of cases. Again all the disease-related possible actions required to be practiced as suggested by stakeholders (nutritional interventions, growth monitoring, immunization, educational programs, etc.).

However, the cost of preventive health strategy as compared to curative health strategy is a broad topic to be researched. But all over the globe, the developed countries are now practicing preventive health care than curative health care systems because “Prevention is better than cure”. Practically, in the present scenario along with the fund's mobilization for existing programs i.e. PMNS 2018-2025, the government must initiate another program considering preventive health strategy

where all sets of possible response options (nutritional interventions, growth monitoring, immunization, educational programs, etc.) as suggested from policymakers must be gathered under one umbrella to address malnutrition in children. This will further refine the required interventions considering prevention from pre-pregnancy education to childbirth till 05 years of age. The reeducation in new cases (incidence) will help control the morbidity and mortality rates, the policy may cost more in the short run due to financing of existing programs but in the long run better and long-lasting health outcomes could be achieved that will also decrease the economic losses due to lost in the workforce.

5.3.1 Evaluation

As already discussed, there is a need to research "Curative and Preventive" health costs associated with child malnutrition. However, with the help literature review and results obtained from interviews, the preliminary findings suggest the "preventive health strategy" that takes into account nutritional interventions, maternal education, immunization, growth monitoring, social safety nets, etc. as a successful tool for implementation to draw better health outcomes because the treatment costs are different depending upon the age group or severity (mild, moderate, acute) of the type (stunting, wasting, overweight). Therefore, a preventive health strategy must be implemented, however, the strengths and weaknesses associated with this policy suggestion must be taken into consideration;

5.3.2 Strengths

Based on the collective policy suggestions of interview respondents (stakeholders) from all reputed and renowned national (PNDS, NUMS) and international (SUN, Nutritional Intl.) organizations, the "preventive health strategy" is drawn to save

health as well as cost at the household and national level. Therefore, the strengths associated are authentic and broad, such as;

1. The elimination of disease even before its origination.
2. Decreasing the annual losses due to loss in workforce in the long run.
3. More chances to reach national and global health goals related to malnutrition in children.

5.3.3 Weaknesses

However, on the contrary, there are some weaknesses and limitations that could turn into a great challenge during the implementation process because the adoption of the new policy when existing policies are already slowed down towards attainment of desired goals after the COVID-19 outbreak has distressed the global health systems might become one of the biggest challenges. Here is some weakness linked to preventive health strategy.

1. Mobilization of funds for new strategy when already there are financing challenges to the existing policies, the recent example is of funds allocated in "Council of common interests" yet have not been disbursed due to lack of resources.
2. The lack of a trained workforce is another weakness after the financial challenges.

5.3.4 Barriers to implementation

Two major barriers were pointed out during the interviews were;

1. Institutional Environment
2. Costing

The institutional environment is sometimes considered a barrier when implementing newer strategies, policies, procedures, and guidelines because many times it affects a certain group of people. For instance, a new policy will likely replace the previous or existing policies in case it turned successful while the people involved in the previous policy making will feel insecure and therefore a strong criticism could be raised. Political instability and lack of coordination among institutions is another barrier to implementing newer policies because an economist's view of tackling child malnutrition may be different from the aspect of a health practitioner.

Costing may be another key impediment to the implementation of newer policies because it has been identified that the funds allocated for existing policies were already delayed. So when a new policy will be taken into consideration, the costs (economic and administrative) could turn into a barrier to implementation. Before the intrusion of newer policies, it is important to conduct monitoring and evaluation of previous policies and programs so the duplication of unnecessary protocols could be eliminated and stay cost-effective. However, conducting monitoring and evaluation also endure a cost but this cost could be put to usefulness if efficiently performed to extract beneficial results to save the cost of policies and programs similar in nature in the future.

Chapter 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

In conclusion, using the "Consequence Model" it is now evident that the prevalence of malnutrition in children (under 05) has significant economic implications. As discussed, the total economic losses projected to GDP are estimated as 0.0125% of the GDP as per estimates for 2021, while the annual losses to the economy due to the loss of future workforce are estimated as $1.82 Billion/year. This shows that despite a public health issue, child malnutrition is an economic issue too. Health is a basic need and government is liable to provide adequate health services to everyone whenever or wherever they need them. Thus, in this study, children are assumed as a future resource of the country and due to the prevalence of any form of malnutrition (stunting, wasting, overweight) in children, the future economic growth could be compromised due to conceded productivity as a result of abnormal cognitive development and physical growth that leads to fatigue, lack of attentiveness and lack of utilizing full potential as compared to the other children (healthy) of same age group.

Further, the study identified the two main contributors or primary sources of child malnutrition are; 'Maternal health' and 'Poverty'. It has been found that due to unaffordability towards adequate food and improper diet mother's deprived health also injects malnourishment in children. Other relevant factors include lack of maternal education and inadequate breastfeeding practices that originates the malnutrition in children. In addition to that, the father's income status, family size,

and family type (nucleus or joint) also play a vital role in determining the health status of the children. Moreover, the study undertook cost-effective interventions such as therapeutic food (RUTF) and food fortification as curative measures and found that they are useful but not the least cost-effective approaches and their effectiveness is limited to some extent based on the results obtained from interview respondents. On the contrary, nutritional interventions, immunization, growth monitoring, and maternal education were considered effective approaches toward child malnutrition. Therefore, a "preventive health strategy" has been suggested in the study as a cost-effective approach incorporating all the said interventions on a joint multi-sectoral level in the study to diminish the rate of child malnutrition.

Lastly, the cost of program implementation has been studied before the effective execution of a newer policy to avoid the loopholes in the existing and previous policies or programs. Considering the current structure, it has been observed that "Institution environment" and "Costing" are the key challenges reductant towards the smooth enactment of existing policies mainly due to funds mobilization and lack of coordination among institutions. It has been revealed in the study the funds previously allocated were yet not fully disbursed leading to delayed outcomes, also without proper monitoring and evaluation of an existing or previous program, there is a chance of duplication of unnecessary protocols/procedures and room for new strategies becomes limited. Therefore, M&E must be performed to save future costs associated with new policies and refines the process//protocols during implementation.

6.2 Way Forward

In the end, both 'recommendations for change' and for 'further study' in the field are evaluated separately. Keeping in view the objectives, findings, and policy suggestions, the following recommendations are proposed:

1. All over the world, decision-making is dependent on data-driven trends to save time and cost. Therefore, it is highly recommended to establish a well-maintained database. For instance, after the birth of a child who is suspected of acquiring malnutrition, regular growth monitoring could be ensured by assigning the task to relevant 'BHU' staff.
2. To tackle the problem of 'institutional environment' and 'costing' related disputes resulting in time delays ultimately lasting adverse impact on desired outcomes. A weekly/monthly assessment checklist should be developed under independent regulatory bodies or focal persons for smooth flow of work.

The research was conducted to quantify the economic impact of child malnutrition on the national economy and to examine existing policy analysis with intrusion from relevant stakeholders for valid recommendations, however, there are a few limitations associated with the study that must incorporate in the future for effective outcomes. The following recommendations must be considered for future research in this field of study.

1. The economic losses projected as 0.0125% is a cumulative estimate including all forms of malnutrition; stunting, wasting, and overweight. However, if the economic losses will be extracted specifically for each type, it will help categorize the most destructive type towards GDP that eventually would be useful in disease-specific goals.

2. Economic implications from a macro aspect have been covered in the study (per year GDP loss and loss in the future workforce). However, the micro aspect (economic burden of malnutrition on the household) should also indulge in the study to examine both sides of the study as the title also suggests “economic perspective” so it would be a complete compendium.
3. Another limitation of the study was that very few stakeholders (05) were interviewed due to time constraints. Therefore, it is suggested that more stakeholders must be interviewed for a detailed set of ideas, policies, and implementation techniques.

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